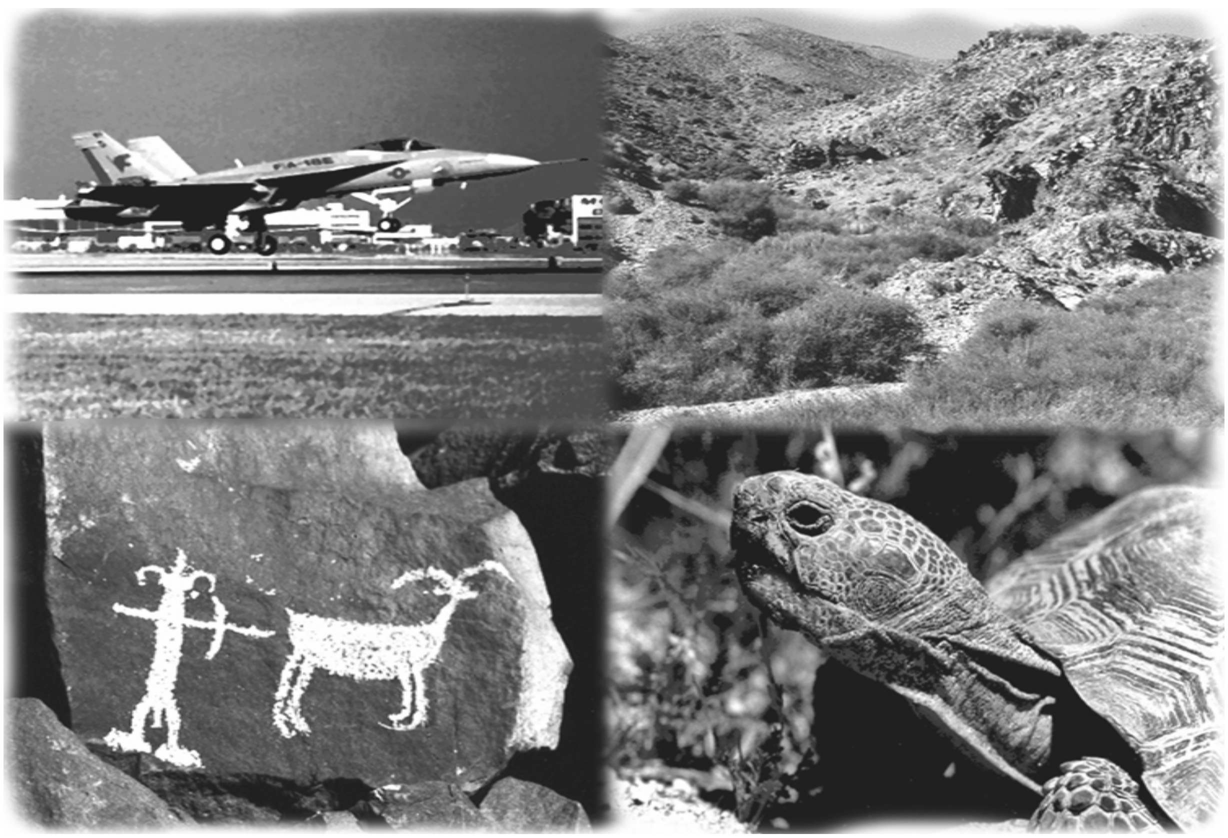
Volume II
Appendices

Final

ENVIRONMENTAL IMPACT STATEMENT
For Proposed Military Operational Increases and Implementation of Associated Comprehensive Land Use and Integrated Natural Resources Management Plans



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Public Involvement

APPENDIX A – PUBLIC INVOLVEMENT

NEPA requires an early and open process for determining the scope of issues that should be addressed and analyzed in the EIS before making a decision to implement the proposed action by selection of one alternative. The EIS process, and NAWS's approach, is designed to involve and inform the public and local, state, and federal agencies as to the environmental consequences of a federal agency's actions. This is to provide the agency with important information and analysis to promote better decision-making by the federal agency.

Comments from agencies and the public have been solicited to help identify the important issues during the public scoping process, which began April 1, 1997 and ended June 30, 1997. This process was designed to reach all interested residents and community organizations in the vicinity of NAWS and local, state, and federal agencies that have interest in or regulatory cognizance over the affected resource.

Methods employed to involve the public in this EIS process have included the following:

- Publishing a notice of intent (NOI) to prepare an EIS in the *Federal Register* on April 1, 1997;
- Publishing notices of public meetings in local newspapers; mailing public announcements; and coordinating media coverage, press releases, and feature articles;
- Publishing Fact Sheets to provide the public and agencies with information on the proposed action, mission, and military operations at NAWS, and the environmental resources present;
- Creating and maintaining an extensive mailing list to disseminate information;
- Holding six public scoping meetings before initiating the environmental study to solicit comments and to identify issues of concern;
- Holding information sessions to allow the public an opportunity to communicate with NAWS environmental and range personnel;
- Conducting public hearings on the DEIS in the cities of Ridgecrest, Inyokern, Barstow, Independence, and Trona and providing a public comment period of 90 days;
- Producing a video to provide the public with information on the history and operations at NAWS; and
- Creating an administrative record, placing documents in local libraries, providing information via the worldwide web, and creating a toll-free information telephone number.

One goal for public involvement, under Executive Order 12898 on Environmental Justice, is to involve affected low-income and minority populations in the public participation process. Actions taken to achieve this include:

- Announcing public meetings in newspapers with a wide circulation and encouraging written comments for those unable to attend the meetings; and
- Holding public scoping meetings in the cities of Ridgecrest, Johannesburg, Independence, Trona, Barstow, and Inyokern on May 20, 21, 22 and June 3, 4, and 5, 1997, respectively.
- Holding public hearings on the DEIS in the cities of Ridgecrest, Inyokern, Barstow, Independence, and Trona.

A.1 Scoping Process

The scoping process for this EIS included publishing the NOI to prepare an EIS in the *Federal Register* on 1 April 1997 and in local newspapers, holding six public meetings in the vicinity of NAWS, and notifying parties through direct mail. The Navy considered comments received during the scoping process in determining the issues to be evaluated in this EIS.

To initiate the scoping process, press releases were sent to the news media and a public notice was published in seven local newspapers, including the *Barstow Desert Dispatch*; *Daily Independent*; *News Review*; *Trona Argonaut*; *Inyo Register*; *Bakersfield Californian*; and *Rocketeer* (now *Weaponeer*). Scoping letters were sent to public agencies, public interest groups, and individuals either known to have an interest in, or thought to have interest in, the proposed action. Attached to the letters was a fact sheet, which described the proposed action and dates and locations for public scoping meetings. Scoping meeting locations included the following:

- City of Ridgecrest, May 20, 1997;
- City of Johannesburg, May 21, 1997;
- City of Independence, May 22, 1997;
- City of Trona, June 3, 1997;
- City of Barstow, June 4, 1997; and
- City of Inyokern, June 5, 1997.

Overall, approximately 75 individuals attended the scoping meetings and 10 persons provided public testimony.

During the EIS scoping process, which ended June 30, 1997, approximately 40 written comments were received from members of the public; interested groups; and federal, state, and local agencies. Scoping comments identified issues and concerns that have been evaluated in the EIS.

A.2 Summary of Scoping Issues

During the DEIS scoping process, which lasted from April 1, 1997 to June 30, 1997, 42 comments were received from members of the public, interested groups, and federal, state, and local agencies. Scoping comments were received in the following forms: written and oral comments received at one of six scoping meetings; or written comments received via mail or fax. The comments identified several issues and concerns, summarized below. Following each issue statement, a response is provided that indicates how this issue relates to the DEIS evaluation, and where information on the issue is presented in the document.

Because this document is an environmental evaluation of the implementation of a land use management plan for NAWS, any comments on NAWS staffing and funding, extension of Highway 178, withdrawal of lands from military use, the disposition of previous base property, alternative uses of NAWS lands, and base realignment and closure decisions are not addressed in this DEIS.

- <u>Public Access</u> – Several letters were received regarding public access issues. Twelve respondents were in favor of increasing public access, either for hunting, hiking, equestrian or other recreational opportunities. Several members of the public requested the formalization of an unpaved trail in the southern portion of the G range approach corridor. Two of the respondents also requested increased public access for economic purposes such as film production and tourism.

Response. All of the alternatives considered in the DEIS address non-military uses, including public access for established non-military uses. Newly proposed uses for commercial filming and other purposes will be considered on a case by case basis but will not be specifically addressed further in this EIS. Non-military uses are described in Section 2.2.1.2. Impacts associated with public access are addressed under Cultural Resources (Section 4.5) and Public Health and Safety (Section 4.10).

- Water Resources – Seven letters were received that addressed water resources issues. Four of the letters addressed cooperative pumping and use of groundwater resources. One respondent requested public access to springs that lie within NAWS boundaries. Another letter addressed restrictions on groundwater pumping in potentially contaminated areas. One respondent expressed their appreciation and support for Navy protection of water resources.

  Response. Groundwater resources and quality are discussed in Water Resources (Sections 3.7 and 4.7). Groundwater issues relating to supply and use are discussed in Utilities and Public Services (Sections 3.9 and 4.9).

- Burro and Horse Populations – Five letters were received regarding burro or horse populations at NAWS. All of the respondents were in favor of eliminating or reducing these populations.

  Response. Under all of the alternatives, the Station's goal is the maintenance and care of a structured herd of 168 horses, and the complete removal of burros from the Station, as discussed in Section 3.4.7.

- Grazing – Four respondents had concerns regarding grazing of cattle, horses, and burros on NAWS Ranges. All of the respondents expressed concern about the negative impacts of grazing on desert resources. The respondents also favored some level of control or reduction in grazing activities. Two of the letters suggested an elimination of all burros.

  Response. Under all of the alternatives, including the preferred alternative, wild horse and burro management programs would remain the same. Wild horses and burros would continue to be "live captured" by the Bureau of Land Management (BLM) and placed in an adoption program. Cattle grazing is no longer accommodated on NAWS ranges. Details on grazing issues are discussed in Biological Resources (Section 3.4.7).

- Vegetation and Wildlife – Four of the respondents were concerned over the effects of activities at NAWS on vegetation and wildlife, including endangered species. One commentator expressed concern over the negative effects of guzzlers on wildlife.

  Response. Issues regarding vegetation and wildlife at NAWS are included in Biological Resources (Sections 3.4 and 4.4).

- Cultural Resources – Three comments were related to the protection of cultural resources located within the NAWS ranges. Two of the respondents expressed concern over the lack of security to protect resources and historical sites. Another respondent recommended that access to sites be limited in order for sites to remain undisturbed.

  Response. All of the alternatives considered in the DEIS include consideration of the protection of cultural resources both from military activities and public access. Established standard procedures have been developed to integrate Navy operations and environmental management requirements at NAWS. These guidelines are discussed in Chapter 2 (Section 2.2.1.3). Cultural resources issues are further discussed in Sections 3.5 and 4.5.

- <u>Noise</u> – Three comments were received regarding noise. Two of the respondents stated that noise from overflights is a problem in wilderness areas; one respondent expressed that noise from overflights was not bothersome.

  Response. Issues relating to noise are discussed under Noise (sections 3.2 and 4.2). Complaints received from communities in the Owens Valley or surrounding national park, national forest, and wilderness areas may not result from flight activity associated with NAWS range or airfield operations. Therefore, such comments, including those received from Sequoia National Forest, are out of the Region of Influence (ROI) for noise complaints. However, the Station and Sequoia National Forest have successfully resolved the referenced noise concerns during the intervening period.

- <u>Public Health and Safety</u> – Three comments were received addressing public health and safety issues. Two respondents expressed concern over military overflights. Two respondents addressed security patrols at NAWS, suggesting that there is not enough security to safely implement a land use management plan.

  Response. Security and safety issues addressing range access and airspace safety are discussed in Public Health and Safety (Sections 3.10 and 4.10).

- <u>Hazardous Materials</u> – Three comments were received addressing hazardous materials. One respondent requested that restrictions on land use associated with the release of hazardous materials be addressed. Other respondents raised concerns about public access in contaminated areas and NAWS's ability to clean contaminated ranges.

  Response. Hazardous materials issues are discussed in Hazardous Materials and Wastes (Sections 3.11 and 4.11). Public safety issues related to areas of hazardous materials, including ordnance, are discussed under Public Health and Safety (Sections 3.10 and 4.10).

- <u>Land Ownership</u> – Three letters were received regarding the ownership of NAWS lands. These respondents stated that the Navy and the Bureau of Land Management (BLM) did not "own" the land, rather it belonged to the federal government.

  Response. The California Desert Protection Act (CDPA) reauthorized the continued use of public withdrawn lands at NAWS for military operations for the next 20 years. Under the provisions of the CDPA, the Department of the Interior assigned management responsibility for withdrawn lands to the Navy. A background and history of NAWS is presented in Chapter 1.

- <u>Geologic Considerations</u> – Two comments were received regarding geology and soils. One respondent commented on mineral exploration and development. The second respondent addressed geothermal development in Coso Ranges.

  Response. Mining and mineral exploration is expressly excluded from NAWS by the CDPA and is considered a non-military use incompatible with the NAWS mission. Therefore, no mining activities are proposed under any of the proposed alternatives, and mining issues are not addressed in the DEIS. Geothermal uses are discussed in Land Use (Section 3.1).

- <u>Facility Construction</u> – One respondent suggested that a large-scale recreation project could be constructed on NAWS property. A second respondent expressed support for locating new construction projects in already disturbed areas.

Response. Construction of a large-scale recreation project is not proposed as part of the alternatives discussed in this DEIS. However, recreational uses are discussed in Section 2.2.1.2. There are no construction projects proposed under the alternatives; however, other activities, such as target and test site use, are proposed in already disturbed areas as discussed in Section 2. In addition, the CLUMP provides guidelines for siting new military and non-military land uses on-Station, including construction (see Volume III of this EIS).

- Aesthetics – Two respondents commented on aesthetics issues. One respondent expressed concern regarding off-Station housing; the second letter addressed the condition of excess on-Station housing.

  Response. During the intervening time from the public scoping meetings, the aesthetic concerns relating to Station housing were resolved through the removal (by demolition) of excess housing on-Station and the removal of excess duplexes stored at Bowman and Richmond Roads through a City of Ridgecrest re-development initiative. The issue of aesthetics has subsequently been eliminated from further consideration in this EIS.

- Utilities – One respondent was concerned about the ability of utilities to maintain or operate facilities on NAWS.

  Response. Utility issues are discussed in Utilities and Public Services (Sections 3.9 and 4.9).

- Traffic – One respondent requested that the extension of State Highway (SH) 178 be addressed.

  Response. The SH 178 extension is not planned at this time and is not evaluated in this DEIS. However, other traffic issues and projects related to SH 178 are discussed in section 3.12, Traffic and Circulation, and in Chapter 5, Cumulative Impacts.

- Air Quality – One respondent addressed air quality issues, particularly PM_{10} impacts.

  Response. Air quality issues are addressed in Sections 3.3 and 4.3.

- Socioeconomics – One letter was received that addressed socioeconomic concerns such as job market and population issues.

  Response. Socioeconomic issues and impacts are discussed in Sections 3.8 and 4.8, respectively.

A.3 Briefings

A letter offering briefings was sent prior to the NOA to key agencies (the Air Quality Districts [Kern County, Mojave, and Great Basin], U.S. Fish and Wildlife Service, Department of Toxic Substance Control, California Department of Fish and Game, and the Lahontan Regional Water Quality Control Board) and to other agencies requesting to be kept informed throughout the CLUMP/EIS process. These letters were followed up with phone calls from a NAWS representative.

In following FLPMA guidelines, agency coordination will be conducted with planning agencies, including the BLM, National Park Service, U.S. Forest Service, and Department of Defense installations within the region. A briefing on the Draft CLUMP/EIS was offered to the land use planning offices in the Counties of San Bernardino, Kern, and Inyo, the City of Ridgecrest, and the State Lands Commission. The letter offering these briefings was followed up with a phone call from a NAWS representative.

A letter offering a briefing was sent to Native American tribes in the region. A follow-up consultation meeting was conducted with the TimbiSha Shoshone Tribe as related to the proposed action and provisions in the California Desert Protection Act.

A letter offering a CLUMP/EIS update and briefing was sent to county, city, state, and congressional elected officials. The letters was followed up with a phone call from a NAWS representative. On-Station briefings will be offered through articles in the *Weaponeer* and given as requested.

Community groups and public interest groups have been offered a briefing on the status of the CLUMP/EIS. Inyo Associates, the Ridgecrest Chamber of Commerce Environmental Committee, and the Searles Valley Community Services Council will continue to be offered monthly briefings.

A.4 Public Review Process

Public review is an important part of the NEPA process and provides the public and other interested parties an opportunity to comment on the EIS. The public had 90 days to comment on the DEIS. Comments received on the DEIS are addressed in the Final EIS (FEIS). Chapter 12.0 of the EIS contains additional detail regarding the public review process, including a copy of all written and oral comments received and the U.S. Navy responses to those comments. NEPA provides for a review period of no less than 30 days after publication of the FEIS, prior to a final Record of Decision (ROD). The final ROD will be published in the Federal Register and in local newspapers.

Appendix B

Weapon Systems Tested at NAWS China Lake

APPENDIX B - WEAPON SYSTEMS TESTED AT NAWS CHINA LAKE

(Source for all Tables: US Navy 1998.)

Table B-1. Weapon Systems Tested on Baker Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
B-1 (inert only)	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke
B-1A	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke
B-1D	No	N/A	N/A	N/A	Passive Target
B-1F	Yes	Practice, Gravity, Guided, Inert Cluster, Fuel Air Explosives (FAE)	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke
B-2	Yes	Practice, Gravity, Guided, Inert Cluster, Fire	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke
B-3	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke
LB	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke
Sandy Van	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Unguided	7.62 to 40mm	Flares, Chaff, Smoke

Static and moving land targets are also used on Baker Range target areas.

Table B-2. Weapon Systems Tested on Charlie Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
C-1	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in.	7.62 to 40mm	Flares, Chaff, Smoke
C-2	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in.	7.62 to 40mm	Flares, Chaff, Smoke
C-3 #1	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in.	7.62 to 40mm	Flares, Chaff, Smoke
C-3 #2	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in.	7.62 to 40mm	Flares, Chaff, Smoke
C-3 SAM	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Cruise	7.62 to 40mm	Flares, Chaff, Smoke
North Charlie Target	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in.	7.62 to 40mm	Flares, Chaff, Smoke

Table B-3. Weapon Systems Tested on Airport Lake.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
APL	Yes	Practice, Gravity, Guided, HE Cluster, Fire, FAE	2.75 to 5.0 in., Guided, Anti-radiation, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
HABR	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Guided, Anti-radiation, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Sams Town	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Convoy	Yes	Practice, Gravity, Guided	2.75 to 5.0 in., Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Gunbutts	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Maverick Road	Yes	Practice, Gravity, Guided	2.75 to 5.0 in., Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Vaby	Yes	Practice, Gravity, Guided	2.75 to 5.0 in., Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke

- Much of what goes into Airport Lake is live, i.e., HE.
- Static and moving land targets are used throughout the Airport Lake area.
- Air-to-air missiles and aerial drone targets occasionally impact into this area.

Table B-4. Weapon Systems Tested on George Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
PMT	Yes	Practice, Gravity, FAE, Guided	2.75 to 5.0 in., Guided, Cruise	7.62 to 155 mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
FAE	Yes	Practice, Gravity, Fire, Guided, FAE, HE Cluster	2.75 to 5.0 in., Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Shrike	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Anti-radiation, Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
G-6	No	Guided	2.75 to 5.0 in., Anti-radiation, Guided	7.62 to 155mm	Flares, Chaff, Smoke
Bullpup	Yes	Practice, Gravity, Guided	2.75 to 5.0 in., Anti-radiation, Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Darwin Road	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Guided	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
G-9	No	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in.	7.62 to 40mm	Flares, Chaff, Smoke
GZAP	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Anti-radiation, Guided, Cruise	7.62 to 40mm	Flares, Chaff, Smoke
DZ	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Anti-radiation, Guided, Cruise	7.62 to 155mm	Flares, Chaff, Smoke, Parachutes, Subscale Drones
Kennedy Stands	Yes	N/A	N/A	7.62 to 40mm	Flares, Chaff, Smoke
Renegade Tunnel	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Anti-radiation, Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
OST-1	Yes	Practice, Gravity, Guided, Inert Cluster	2.75 to 5.0 in., Anti-radiation, Guided, Cruise	7.62 to 155mm, Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Green Point	No	Practice	N/A	N/A	Flares, Chaff, Smoke
FLR-3	No	N/A	Surface-to-Surface	N/A	N/A
3- & 5-in. Impact Areas	Yes	N/A	N/A	3 to 5 in. HE Projectiles	N/A

Static targets are used throughout George Range; moving land targets are used in several areas.
Air-to-air missiles and aerial drone targets frequently impact on the northern portion of George Range.
Gun/artillery munitions fall over most of the George range area.

Table B-5. Weapon Systems Tested on Coso Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
Coles Flat	Yes	Guided	Anti-radiation, Cruise	N/A	Flares, Chaff, Smoke
Coles SAM Site	Yes	Practice, Gravity, Guided, Inert Cluster	Anti-radiation, Guided, Cruise	N/A	Flares, Chaff, Smoke
Safeway	Yes	Practice, Gravity, Guided, HE Cluster	Guided, Cruise	Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Darwin Wash	Yes	Practice, Gravity, Guided, Inert Cluster	Anti-radiation, Guided, Cruise	Rocket-Assisted Projectiles	Flares, Chaff, Smoke
Wild Horse Mesa	Yes	Guided	Anti-radiation, Cruise	N/A	Flares, Chaff, Smoke

Table B-6. Weapon Systems Tested on Coso Tactical Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
Coso Military Targets	No	Practice, Gravity, Laser-Guided. All weapons fired into this area are inert.	N/A	N/A	N/A

Table B-7. Weapon Systems Tested on Randsburg Wash Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
Towers	Yes	N/A	2.75 in., Guided	7.62 to 155mm	Flares
5 in. Impact Area	Yes	N/A	N/A	3- to 5-in. Projectiles	N/A
Charlie Airfield	Yes	Practice, Gravity, Guided, LGTRs	2.75 to 5 in., Cruise	7.62 to 40mm	Flares, Chaff, Smoke

Table B-8. Weapon Systems Tested on Mojave B North Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
Wingate Airfield	Proposed	Practice, Gravity, Guided, LGTRs	2.75 to 5 in., Cruise	7.62 to 40mm, Mortars	Flares, Chaff, Smoke
Convoy	Yes	Practice, Gravity, Guided, LGTRs	2.75 to 5 in., Cruise	7.62 to 40mm, Mortars	Flares, Chaff, Smoke

Table B-9. Weapon Systems Tested on Mojave B South Range.

Target	HE Use	Bombs	Rockets/Missiles	Guns	Other
Superior Valley	Proposed	Practice, Gravity, Guided (Bullseye Target only)	2.75 to 5 in., Cruise	7.62 to 40mm, Mortars	Flares, Chaff, Smoke
Superior Valley All others	No	Practice, Gravity, Guided	2.75 to 5 in., Cruise	7.62 to 40mm, Mortars	Flares, Chaff, Smoke

Table B-10. Propulsion Test Complex, Skytop

Test Bay	Static Test	Rockets/Missiles	Static Firing	Other
I – III, VI - VII	R&D and Rocket Motor Test Stands for all size Motors to Fleet Ballistic Missile; Static Firing	Subscale to 84”	Max of 1.5M Lbs. of Thrust	Horizontal or Vertical
IV	R&D and Tactical Rocket Motors; Static Firing	Subscale to 30”	Max of 200,000 Lbs. of Thrust	Horizontal or Vertical
VIII	R&D and Tactical Rocket Motors; Plume Measurement Capability Facility with Electronic Characterization Capability	Subscale to 31”	Max of 400,000 Lbs. of Thrust	Horizontal or Vertical
T-Range	Rocket Motors, Inert Component: Thermal Dynamic Evaluation	Subscale to 20”	Max of 100,000 Lbs. of Thrust	Horizontal

Source: US Navy 2001
Limited to 300,000 lbs. Net Explosive Weight (NEW)

Table B-11 Warhead and Safety Test Area

Test Sites	Static Test	Rockets/Missiles	Warhead/R&D	Other
Barricade 1 – 8, Area R	Warhead, Weapon System Components, R&D; Detonation	All Tactical (2.75" and Larger with Limit *	2.75", Predator, etc/Bulk Energetic Material	Commercial and Foreign National Tests
Burro Canyon	Warheads, Weapon System Components, Bombs, R&D; Detonation, Drop Test	All Strategic and Tactical **	2.75"; 2,000-lb. Bombs, Proto-Type Warheads, etc.	Environmental Compliant Test Site for Full Scale Helicopter with Weapons Systems
CT-1	All-Up-Weapon Systems, Components, Bombs, R&D; Slow Cook-Off	All Tactical (2.75" and Larger with Limit ***	2.75"; 2,000-lb. Bombs, Proto-Type Warheads, etc.	Environmental Compliant Test Sites
CT-4	All-Up-Weapon Systems, Components, Bombs, R&D; Fast Cook-Off, Bullet Impact, Drop Tower	All Tactical (2.75" and Larger with Limit ****	2.75"; 2,000-lb. Bombs, Proto-Type Warheads, etc.	Environmental Compliant Test Sites

Source: US Navy 2001
* Limited to 200 lbs. NEW
** Limited to 20,000 lbs. NEW
*** Limited to 2,000 lbs. NEW
**** Limited to 5,000 lbs. NEW

Table B-12 Environmental and Non-Destructive Test Complex

Test Bay	Static Test	Rockets/Missiles	Static Firing	Other
12100, 15954	Environmental Ovens	RDT&E Subscale to All-Up-Weapon System (limited to Forklift Capability)	None; *	Temperatures and Humidity 200 Degrees F to - 100 Degrees F
12140, 12160, 12170	Vibration/Shock Tests	RDT&E Subscale to All-Up-Weapon System	None; **	Weapon Flight; Vehicle and Shipboard Transportation and Handling
12100	Salt Fog Spray	RDT&E Subscale to All-Up Weapons to 6' Long by 3' Wide	None; *	Shipboard and Deployed Weapons Exposure to Salt Water Environment
12140	Rain Exposure	RDT&E Subscale to All-Up Weapons	None; **	Deployed Weapons Exposure to Rain

				Environment
15790	X-ray - 420 KVP, 250 KVP, 320 KVP	RDT&E Subscale to All-Up Weapons to 5" Diameter Long by 14' Wide	None; ***	Weight Limitation 110 Lbs.
15800	Betatron	RDT&E Subscale to All-Up Weapons to 26 ' Long by 74" Wide (Weight Limitation 32,000 Lbs.)	None; ***	Weight Limitation 32,000 Lbs. Facility Gantry Crane or Mobile Crane to 120 Ton
15988	High Energy Computed Tomography; L 6000 (9, 16 MEV)Varian Linatron	RDT&E Subscale to All-Up Weapons to 30 ' Long by 96" Wide (Weight Limitation 130,000 Lbs.)	None; ****	Weight Limitation 130,000 Lbs. with Facility Gantry Crane
16026	160 KVP, L 3000 (3,9, 9 MEV) and 1000 (6 MEV) Varian Linatron, Flash X-ray 360 KVP	RDT&E Evaluation of Portable Real Time Radiography (RTR)	None	Evaluation and Training with Portable X-ray Systems

Source: US Navy 2001
* Limited to 5,000/30,000 lbs. NEW
** Limited to 8,000/30,000 lbs. NEW
*** Limited to 60,000 lbs. NEW
**** Limited to 300,000 lbs. NEW

Appendix C

Noise

APPENDIX C – NOISE

INTRODUCTION TO APPENDIX

The following document is a compilation of two noise studies conducted by the Wyle Laboratories for the NAWS CLUMP/EIS Project. The first study addresses the characterization of noise sources related to aircraft operations at the airfield and on the ranges, and ordnance use at targets and test sites throughout the NAWS ranges. Aircraft operations on the NAWS ranges included both subsonic and supersonic flights. The second study was a supplemental analysis of airfield flight operations and supersonic range flights. This supplemental analysis was performed to analyze the potential noise effects of increasing F/A 18 E/F operations at the airfield, and to analyze the potential effects of single event supersonic operations over the NAWS ranges. The results of the supplemental analysis were used to determine the airfield noise contours for current conditions. The first study was completed in December 1998 with a revision to Chapter 3 - Supersonic Flight Events in the Range Airspace of NAWS China Lake - in July 1999. The second study was completed in May 2001 with a follow-up in November 2001. Chapter 1 of this document is a combination of the two studies up to Section 1.6; Sections 1.6 through 1.9 are from the 1998 study only; Chapter 2 is from the 2001 study only; and Chapter 3 again combines both studies with the 2001 focus on the single event sonic boom. Where possible each study is referenced throughout the combined chapters at the ends of paragraphs. If the information was the same in both studies, the reference reads “Wyle 1998, 2001.” If an update was made to the 2001 entries, then the reference reads “Wyle, November 2001.” Appendix C1 provides the “landscape” tables as noted in Chapter 2, and Appendix C2 provides the references to these studies.

1.0 NOISE

1.1 Introduction

In an effort to minimize the adverse effects of training and military development, noise studies are conducted at various Navy facilities throughout the United States and overseas. The noise exposure contours developed through these studies are incorporated into Air Installation Compatible Use Zone (AICUZ) studies, Range Compatible Use Zone (RACUZ) studies, or other environmental documents. Noise studies are used to promote the compatibility of Navy activities with neighboring land uses surrounding the installation. (Wyle 1998, 2001)

The purpose of this chapter is to document the on- and off-Station noise environment at Naval Air Weapons Station (NAWS) China Lake related to all existing and proposed military operations, including NAWS airfield flight operations, range air operations by aircraft, range land-based ordnance operations, and range supersonic air operations. These activities result from the extensive research and testing, as well as military training, which take place on the air and land ranges of the installation. Although ground troop training exercises do take place on the ranges of China Lake, the noise impact associated with such activities would be negligible when compared to those generated by aircraft events, and were therefore, not included in this analysis. This report identifies both the on-Station and off-Station existing and projected noise environment generated by such research, testing, and training at NAWS. Data generated in this report are to be used to support the development of the China Lake Draft Environmental Impact Statement (DEIS) and the AICUZ/RACUZ. (Wyle 1998, 2001)

The results of this study provide a comprehensive analytical tool to evaluate existing and potential noise impacts when planning operational, environmental, and land-use actions. It may also be used by the installation to provide surrounding local governments a valid means to identify the noise environment from military testing and training activities conducted in areas under their jurisdictional control. Local governments may benefit from this information by assessing community noise mitigation needs and promoting compatible land-use development in appropriate off-Station areas near the installation. (Wyle 1998, 2001)

1.2 Noise Metrics

Noise represents one of the most prominent environmental issues associated with military operations. At NAWS, aircraft overflights and the use of explosive ordnance can be identified as the primary contributors to the noise environment. An assessment of noise requires a general understanding of how sound is measured and how it affects people and the natural environment. This section provides a brief overview of noise metrics and their use. (Wyle 1998, 2001)

1.2.1 Noise from Airfield Operations

The State of California uses the Community Noise Equivalent Level (CNEL) in units of the decibel (dB) as a noise measure for assessing aircraft noise exposures.[1] CNEL is an average sound level generated by all aviation-related operations during an average 24-hour period with the sound levels of evening noise events emphasized by adding a 5-dB weighting and nighttime noise events emphasized by adding a 10-dB weighting. Evening is defined as the period from 1900 to 2200 hours local, while nighttime is defined as the period from 2200 to 0700 hours local the following morning. The weightings account for the generally lower background sound levels and greater community sensitivity to noises during these hours. (Wyle 1998, 2001)

Individual, single noise events are described in terms of the Sound Exposure Level (SEL or L_{AE}) in units of dBs. SEL takes into account the amplitude of a sound and the length of time during which each noise event occurs. It thus provides a direct comparison of the relative intrusiveness among single noise events of different intensities and duration. (Wyle 1998, 2001)

Both SEL and CNEL employ A-weighted sound levels. "A-weighted" denotes the adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to that sound energy. (Wyle 1998, 2001)

The primary noise metric used for aircraft operations in this Environmental Impact Statement (EIS) is the onset rate-adjusted monthly A-weighted day-night average sound level (L_{dnmr}). This noise metric is based on an averaging period equal to one calendar month and, when available, uses the month of the year with the highest number of operations. This cumulative noise metric was developed after laboratory studies found that an overflight's annoyance rating is dependent on the event's onset rate, as well as its sound exposure level.[2, 3,4,5] (Wyle 1998)

1.2.2 Noise from Range Operations

High-energy impulsive sounds, such as those produced by artillery fire, shell bursts, surface blasting, and cratering charges, are analyzed differently than other noise sources, such as aircraft. This is because of the significantly higher energy created at low frequencies by these blasts. This low-frequency component can induce structural vibrations, which may generate additional annoyance to people, beyond the audibility of the sound created by the blast. The report by the Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) Working Group 84[6] recommends the C-weighted Day-Night Average Sound Level, (CDNL or L_{Cdn}), for high-energy impulsive sounds. (Wyle 1998)

In this EIS, measured noise levels of individual blast events are expressed in terms of the C-weighted Sound Exposure Level (CSEL) and C-weighted Energy-Equivalent Sound Level (L_{eq}). For an individual noise event, the CSEL takes into account the amplitude of the signal and the length of time during which the event occurred. Mathematically, CSEL represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. The L_{eq} is the level of the continuous constant sound that would contribute to the environment the same amount of C-weighted acoustic energy as did the actual time-varying source. L_{eq} is referred to as the "average" sound level and should not be confused with the arithmetic average sound level. An L_{eq} can be measured directly or can be calculated by logarithmic addition of the CSEL of individual noise events. Both of these procedures were used in the noise analysis. (Wyle 1998)

The CDNL is a specific type of $L_{eq,}$ which integrates noise levels over a 24-hour period with 10 dBs added to noise levels measured at nighttime, 2200 to 0700 hours. When there are no operations between the hours of 1900–2200, the C-weighted CDNL would be equivalent to CNEL. For the purposes of this EIS, CDNL was consistently used to describe blast noise. (Wyle 1998)

1.2.3 Sonic Boom

Sonic boom is an impulsive noise similar to the initial crack of thunder. The boom is caused when an object moves faster than the speed of sound. An aircraft traveling through the atmosphere continuously produces pressures waves similar to water waves caused by a ship. When the aircraft exceeds the speed of sound, these pressure waves coalesce and form shock waves. These shock waves travel forward of the point where they were generated. These shock waves may propagate to the ground depending on the speed of the aircraft and atmospheric conditions. The sonic boom heard on the ground is the sudden onset and release of pressure buildup in the shock waves. The change, or peak, in pressure caused by sonic boom is historically measured in terms of pounds per square foot (psf). This magnitude of the sonic boom is referred to as the peak overpressure and is the basic descriptor of sonic boom. The actual magnitude of most sonic booms generated by military aircraft is only a few psf. It should be noted that absolute pressure at sea level is 2,117 psf or 14.7 pounds per square inch (psi). (Wyle 2001)

For single event assessment of sonic boom, no standard metric has been agreed upon. However, most studies have correlated the peak overpressure of sonic boom with potential damage to structures. It is the potential of damage that is the primary concern for assessing single event impacts of sonic booms. (Wyle 2001)

1.3 Regulatory Background

The Noise Control Act of 1972 was enacted by Congress and, in part, directed the Administrator of the Environmental Protection Agency (EPA) to "publish information on the levels of environmental noise, the attainment and maintenance of which in defined areas under various conditions are requisite to protect the public health and welfare with an adequate margin of safety." It also states, in part "...that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare…" and that federal agencies "...(1) having jurisdiction over any property or facility, or (2) engaged in any activity resulting, or which may result, in the emission of noise, shall comply with federal, state, interstate, and local requirements…." (Wyle 1998, 2001)

Based on these requirements, the EPA published a report entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety (1974)*.[7] This report provided two noise metrics that allow the effects of environmental noise to be described in a uniform manner. These metrics are the Long-Term Equivalent A-Weighted Sound Level (L_{eq}) and the Day-Night Average Sound Level (DNL), symbolized as L_{dn}. Many federal and state agencies, including the Department of Defense, accept the DNL as the standard for describing environmental noise impact. (Wyle 1998, 2001)

In 1977 the National Academy of Science's Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) Working Group 69 published *Guidelines for Preparing Environmental Impact Statements on Noise*.[8] These guidelines are used to determine the various noise environments potentially requiring an EIS. The Quiet Communities Act of 1978 was enacted by Congress to promote various measures that allow local, state, and federal agencies to implement noise control programs, conduct experimental noise studies, and develop techniques for the control of noise, among other things. (Wyle 1998, 2001)

The Federal Interagency Committee on Urban Noise (FICUN) was formed in 1979 and published *Guidelines for Considering Noise In Land-Use Planning and Control*.[9] These guidelines complement federal agency criteria by providing for the consideration of noise in all land-use planning and interagency/intergovernmental processes. The FICUN established DNL as the most appropriate descriptor for all noise sources. *Guidelines for Noise Impact Analysis*,[10] was published in 1982 by the EPA to provide all types of decision-makers with analytic procedures to uniformly express and quantify impacts from noise. The American National Standards Institute (ANSI) endorsed DNL in 1990 as the “acoustical measure to be used in assessing compatibility between various land uses and outdoor noise environment.” In 1992 the Federal Interagency Committee on Noise (FICON) reaffirmed the use of L_{dn} as the principal aircraft noise descriptor in the document entitled *Federal Agency Review of Selected Airport Noise Analysis Issues*.[11] (Wyle 1998, 2001)

1.4 Computerized Noise Exposure Models

Four computer programs were used to compute the noise exposure of aircraft operating around the airdrome and in restricted area airspace, and the noise exposure from blast on the NAWS ranges. NOISEMAP[12,13] and MR_NMAP[14] were used to predict the noise exposure generated by military aircraft operations around the airdrome and in restricted airspace, respectively. MicroBNOISE[13] was used to predict the blast noise exposure (Wyle 1998). PCBoom3 was used to predict sonic booms generated by supersonic operations (Wyle 2001).

These computer programs provide a relative measure of change in noise around military installations. NOISEMAP, MR_NMAP, BNOISE and PCBoom3 are most accurate for comparing “before-and-after” noise effects, which would result from proposed changes or alternative noise control actions, when the calculations are made in a consistent manner. They allow noise predictions for such proposed actions without the actual implementation and noise monitoring of those actions. These models also have the flexibility of calculating sound levels at any specific point so that noise impacts at representative locations can be obtained directly. (Wyle 1998, 2001)

1.4.1 NOISEMAP

Analysis of aircraft noise exposure around military airbases are normally accomplished using a group of computer programs, collectively called NOISEMAP.[12, 13] The NOISEMAP suite of computer programs has been developed by the U.S. Air Force which serves as the lead Department of Defense agency for aircraft modeling, and consists of BASEOPS, OMEGA10, OMEGA11, NOISEMAP itself, NMPLOT, and NOISEFILE. NOISEFILE is a noise database for models of civilian and military aircraft. Also, the engine power setting the interpretation rules employed in NOISEFILE were based on the 1997 noise measurements on the F/A-18E/F at Patuxent River, Maryland. These rules govern how noise level values are estimated for modeled engine power settings that are different from the reference engine power setting contained in NOISEFILE. The BASEOPS program allows for entry of runway coordinates, airfield information, flight tracks, flight profiles (power, altitudes, and speeds) along each track by each aircraft, numbers of flight operations, run-up coordinates, run-up profiles, and run-up operations. The OMEGA10 program calculates the SELs for each model of aircraft, taking into consideration the specified speeds, engine thrust settings, and environmental conditions appropriate to each type of flight operation. The OMEGA11 program calculates maximum A-weighted sound levels associated with run up operations for each model of aircraft, taking into consideration the engine thrust settings and environmental conditions. The core NOISEMAP program, Version 6.5, then incorporates the number of daytime, evening, and nighttime operations, flight paths, and profiles of the aircraft to calculate CNEL at many points on the ground around the facility. NMPLOT Version 3.5, which is a government standard noise contour plotting program developed by the U.S. Air Force, is used to draw contours of equal CNEL for overlay onto land-use maps. (Wyle 1998, 2001)

1.4.2 MR_NMAP

MR_NMAP is a model, based on NOISEMAP technology, used for predicting aircraft noise from aircraft operating in Military Operating Areas (MOAs), Ranges/Restricted Areas, and on Military Training Routes (MTRs). The MR_NMAP program is functionally a collection of "building block" noise models assembled to model the noise environment. The models contained in MR_NMAP together are representative of the way aircraft fly in military airspace. There are three general representatives: broadly distributed operations as generally occur on ranges, distributed parallel tracks as occur along MTRs, and specific tracks as occur in target areas. MR_NMAP uses aircraft noise levels from OMEGA10 and NOISEFILE, summing these in a manner similar to NOISEMAP. The resultant values of L_{dnmr} are developed into noise contours using NMPLOT. (Wyle 1998)

1.4.3 MicroBNOISE

Analysis of the blast noise exposure created from activities, such as artillery fire and blasting, along with the definition of compatible land uses around military facilities, is normally accomplished using a group of computer-based programs known as BNOISE. The personal computer version of those programs is called MicroBNOISE. BNOISE was created to work in conjunction with the Army's Installation Compatible Use Zone (ICUZ) Program to identify incompatible land uses on areas surrounding an installation.[15] BNOISE is a collection of computer programs which can produce C-weighted CNEL[*] contours for blasting activities or military operations with impulsive noise sources (e.g., artillery, explosions or demolition charges, and weapon blasts). The programs include EDITOR, which serves as a command line user interface to the model; TABGEN, which creates tables of dB values produced at given distances by a 5 lb. C-4 explosive charge; LCDN, which uses the dB versus distance tables to calculate a grid of CDNL levels for the given weapon operations; and NMPLOT to draw the noise contours. (Wyle 1998)

1.4.4 PCBoom3

PCBoom3 (Plotkin, 1996) is a PC-based program that computes single event sonic boom footprints from any supersonic vehicle exercising any maneuver in a real atmosphere, including winds. The user specifies the aircraft, the maneuver, and the atmosphere. The program calculates the sonic boom propagation using acoustic ray tracing methodology. The primary output is the sonic boom footprint in terms of contours of equal overpressure on the ground, relative to the aircraft's position. PCBoom3 also generates sonic boom signatures, the pressure time history of the boom at a particular location on the ground. Spectra of these signatures are also computed. (Wyle 2001)

1.5 Existing Airfield Operations and Noise Exposure

1.5.1 Airfield Flight Operations

Airfield flight operations presented in Table 1.5-1 for the conditions were provided by NAWS personnel and are representative of Calendar Year (CY) 1998 tempo of operations.[16] These operations are distributed based on 305 days of Air Traffic Activity Analyzer (ATAA) data as recorded by Air Traffic Control (ATC) personnel at the airfield.[16,18] The ATAA is a device used by ATC personnel to count the number of operations conducted by various types of aircraft. It also records operation type, runway usage, and temporal period (day, evening, or night). For the purposes of this analysis, it was assumed that the operations shown in this table would provide an accurate assessment of the conditions. Annual flight operations (counting patterns as two operations) amount to approximately 27,000 operations. (Wyle 1998, 2001)

[*]The program's default daily noise metric is (C-weighted) DNL but it can produce CNEL simply by the user entering "equivalent" daytime operations equal to the daytime operations plus 3.16 times the evening operations.

ATAA aircraft categories, along with a summary of generic flight operation types, are also shown in Table 1.5-1. Note that Touch-and-Go operations and Field Carrier Landing Practice (FLCP) operations are counted as one operation for noise modeling purposes. Also, the F/A-18 category includes A-4 jet, Navy/Marine (VM) jet, and "Other Military" (OM) jet operations per the ATAA data[16, 18]. Based on the noise contribution and the level of activity for each aircraft category depicted in Table 1.5-1, four specific aircraft types were modeled. They are the F/A-18C/D, F/A-18E/F, EA-6B, and the AV-8B. These aircraft account for 13,307 operations (counting patterns as one operation) or about 74 percent of the total operations reported for NAWS over the 305-day period of CY 1998. F/A-18C/D and F/A-18E/F represent 48 percent and 52 percent of all F/A-18 operations, respectively. The remaining 26 percent consist of propeller aircraft (15 percent), helicopters (7 percent), general aviation (3 percent), and heavy aircraft (1 percent), which do not contribute significantly to overall noise levels in comparison to the three types listed above. By extrapolating the 305 days of modeled flight operations to a full year, approximately 15,925 annual flight operations are modeled to represent the conditions (closed pattern counted as one operation). (Wyle 1998, November 2001)

Operations shown in Table 1.5-1 were subsequently broken down into specific operation types based on inputs received from NAWS personnel and shown in Table 1.5-2 for each modeled aircraft type[16, 18]. In particular, arrival operations were split among two types of arrival procedures: straight-in arrivals and "break" arrivals. The "break" arrival operations were further broken down into two distinct types: standard overhead break arrivals and carrier break arrivals. NAWS personnel indicated that F/A-18C/D, F/A-18E/F and EA-6B aircraft utilizing the break arrival conduct the standard overhead break arrival 60 percent of the time and the carrier break arrival the remaining 40 percent. AV-8B aircraft conduct the standard overhead break 74 percent of the time and the carrier break 26 percent of the time when utilizing the break arrivals. (Wyle 1998, 2001)

To prepare noise contours, the noise model requires the number of operations on a daily basis. Aircraft noise surveys conducted by Naval Facility Engineering Command (NAVFACENGCOM) call for the identification of the number of operations on an "average busy day", or a typical day when the field is in full operation. A day is considered to be a "busy" day when its total operations are at least 50 percent of the annual average daily operations. The average busy-day number of operations is then determined by calculating the mean of the operations on all of the busy-days over a period of one year. For the 305 days of ATAA data, it was determined that 188 of these days were "busy". Scaling to 365 days of data would yield 225 busy days. Since 96 percent of the total operations occur on "busy" days, average busy-day operations were calculated by multiplying the data shown in Table 1.5-2 by a factor of 0.96 and then dividing by the number of busy-days (188)[16, 18]. (Wyle 1998, 2001)

1.5.2 Runway and Flight Track Utilization

Table 1.5-3 lists the runway utilization percentages by aircraft type and operations type, as provided by NAWS personnel.[16, 18] As shown in this table, AV-8B aircraft utilize the runways differently than do the modeled F/A-18 and EA-6B aircraft. Runway 08 and Runway 03 are virtually never used (accounting for less than 1 percent of all operations) and thus were not modeled. For the F/A-18 and EA-6B modeled aircraft, Runway 21 is utilized the majority of the time, accounting for an average of 75 percent of the operations. The majority of AV-8B flight operations are conducted on Runway 26, accounting for an average of 71 percent of the total AV-8B airfield operations.[16,18] The F/A-18E/F aircraft operations would utilize the runway and flight tracks in the same manner as the F/A-18C/D. (Wyle 1998, 2001)

Table 1.5-1

Baseline Airfield Flight Operations

ATAA Aircraft Category	Operation Type	Reported Annual Operations (based on 305 days of ATAA data)			
		Day	Evening	Night	Total
F/A-18C/D**	Departures	3096	169	84	3349
	Arrivals	3209	218	29	3456
	Touch & Go	1814	208	39	2061
	FCLP	183	45		228
F/A-18E/F	Departures	344	19	9	372
	Arrivals	356	25	3	384
	Touch & Go	202	23	4	229
	FCLP	20	5		25
EA-6B (A-6 ATAA type)	Departures	482	31	4	517
	Arrivals	557	62	3	622
	Touch & Go	654	63	1	718
	FCLP	128	71	1	200
AV-8B	Departures	443	26	14	483
	Arrivals	366	18	13	397
	Touch & Go	248	13	5	266
	FCLP				
VM Propeller*	Departures	1094	13	41	1148
	Arrivals	1091	34	13	1138
	Touch & Go	143	36	7	186
	FCLP				
VM Heavy*	Departures			4	4
	Arrivals			7	7
	Touch & Go			7	7
	FCLP				
VM Helicopter*	Departures	352	16	11	379
	Arrivals	299	27	4	330
	Touch & Go	531	54		585
	FCLP				
OM Propeller*	Departures	64	4	2	70
	Arrivals	72			72
	Touch & Go	4			4
	FCLP				
OM Heavy*	Departures	4	2		6
	Arrivals	7		2	9
	Touch & Go	13			13
	FCLP				
GA*	Departures	181	16	34	231
	Arrivals	188	25	9	222
	Touch & Go	73	82		155
	FCLP				
F/A-18C/D**	Total	8302	640	152	9094
F/A-18E/F	Total	922	72	16	1010

Table 1.5-2

Modeled Baseline Flight Operations at NAWS China Lake (based on 305 days of ATAA data)

ATAA Aircraft Category	Operation Type	Day	Evening	Night	Total
F/A-18C/D	Departures	3096	169	84	3349
	SI Arrivals	625	87	9	721
	OH Arrivals	1545	79	12	1636
	CB Arrivals	1039	52	8	1099
	Touch & Go	1814	208	39	2061
	FCLP	183	45		228
	TOTAL	**8302**	**640**	**152**	**9094**
F/A-18E/F	Departures	344	19	9	372
	SI Arrivals	69	10	1	80
	OH Arrivals	172	9	1	182
	CB Arrivals	115	6	1	122
	Touch & Go	202	23	4	229
	FCLP	20	5		25
	TOTAL	**922**	**72**	**16**	**1010**
EA-6B	Departures	482	31	4	517
	SI Arrivals	41	18	1	60
	OH Arrivals	308	26	1	335
	CB Arrivals	208	18	1	227
	Touch & Go	654	63	1	718
	FCLP	128	71	1	200
	TOTAL	**1821**	**227**	**9**	**2057**
AV-8B	VFR Departures	443	26	14	483
	SI Arrivals	23		3	26
	OH Arrivals	253	14	7	274
	CB Arrivals	90	4	3	97
	Touch & Go	248	13	5	266
	FCLP				
	TOTAL	**1057**	**57**	**32**	**1146**
All Aircraft Total		**12102**	**996**	**209**	**13307**

Note: Patterns counted as one operation
SI=Straight In, OH=Overhead, CB=Carrier Break, FCLP=Field Carrier Landing Practice.

Table 1.5-3

Runway Utilization Percentage by Aircraft

F/A-18C/D, F/A-18E/F & EA-6B					
Runway	**Departure**	**Overhead Arrival**	**Carrier Break Arrival**	**Straight-In Arrival**	**Touch & Go/ FCLP**
14	13.40%	21.40%	1.20%	13.80%	7.80%
21	72.40%	65.20%	90.80%	64.20%	84.20%
26	7.80%	5.40%	6.40%	5.60%	6.80%
32	6.40%	8.00%	1.60%	16.40%	1.20%

AV-8B					
Runway	**Departure**	**Overhead Arrival**	**Carrier Break Arrival**	**Straight-In Arrival**	**Touch & Go/ FCLP**
14	5.20%	13.00%	0.40%	15.60%	9.60%
21	13.60%	23.80%	24.40%	14.20%	13.00%
26	79.20%	62.60%	70.60%	67.00%	76.40%
32	2.00%	0.60%	4.60%	3.20%	1.00%

Note: Runways 03 and 08 are used less than 1 percent of the time and were Therefore omitted from this table.
Source: NAWS China Lake

Figures 1.5-1 through 1.5-4 depict the flight tracks utilized in this analysis as provided by NAWS personnel.[16, 18] Except for the departures on Runway 21, each runway has just one flight track per operation type. The departure tracks on Runway 21 consist of one standard departure track (21D1) and one noise abatement departure track (21D2). Of all departures that utilize Runway 21, 15 percent follow the “hot range” departure, which calls for an immediate left turn to the south after leaving the runway. The remaining 85 percent utilize the noise abatement departure, which dictates that the aircraft remain on runway heading for 2.5 nautical miles before turning to the south. All remaining tracks for all operation types on each runway are utilized 100 percent of the time, based on the runway utilization percentage. (Wyle 1998, 2001)

The flight tracks shown in Figure 1.5-3 are utilized by aircraft executing both standard overhead break arrivals and carrier break arrivals; however, the break altitude for each arrival differs, relative to the altitude above ground level (AGL) at which the operation is commenced. Standard overhead break arrivals are conducted at 1,400 feet AGL, whereas the carrier break arrivals are completed at 800 feet AGL. Likewise, the flight tracks depicted for Touch-and-Go and FCLP operations are identical in pattern width and length. The pattern altitude however, for Touch-and-Go operations is 900 feet AGL; the pattern altitude for FCLP operations is 600 feet AGL. (Wyle 1998, 2001)

By applying the runway and flight track utilization percentages discussed in the sections above, the modeled average busy-day flight operations are calculated and are presented in Table 1.5-4. This table includes the average busy-day operations by aircraft type, flight track, and temporal period. This table shows a grand total of approximately 68 average busy-day flight operations for conditions, which consists of 24 departures, 24 arrivals, and 20 closed pattern operations (Touch-and-Go and FCLP). Note that the closed pattern operations in this table are counted as one operation for entry into NOISEMAP. Of the total average busy-day operations, less than 2 percent are conducted during the nighttime (2200–0700). (Wyle 1998, 2001)

1.5.3 Pre-Flight and Maintenance Run-Up Operations

Pre-flight run-ups are not typically performed by F/A-18, EA-6B, or AV-8B aircraft at NAWS, and thus none were modeled. (Wyle 1998, 2001)

Single-engine maintenance run-up operation data was provided for the F/A-18C/D, F/A-18E/F and EA-6B aircraft. F/A-18E/F aircraft comprises 52 percent of all F/A-18 run up operations with the remaining 48 percent being F/A-18C/D run up operations. Table 1.5-5 depicts the aircraft type, power setting, orientation, and duration of the modeled run-ups provided by NAWS. A total of 135 run ups are modeled for the conditions.[16,18] All run-ups listed in this table were conducted at the High-Power Turn-Up Area shown in Figure 1.5-5. This table shows that the majority of both F/A-18 and EA-6B run-ups occur during the day and evening time periods, with less than 5 percent of the total annual run-ups conducted during the nighttime period. (Wyle 1998, November 2001)

1.5.4 Aircraft Flight Profiles, Noise Data, and Climatological Data

Aircraft flight profiles (aircraft power settings, altitudes above runway level,* and airspeeds on each flight track) were obtained from reference 17 and verified by NAWS personnel. Profile differences between the F/A-18C/D and the F/A-18E/F include variations in power settings, speeds and altitudes per references 16 and 18. For the purposes of this analysis, supplemental F/A-18E/F noise data measured in 1997 at Patuxent River, Maryland, by Wyle Laboratories were used (Wyle, November 2001). NOISEFILE contains applicable reference noise data for all of the aircraft analyzed in this study. Since weather is an important factor in the propagation of noise, NOISEMAP requires the daily average temperature and relative humidity for each month to determine the appropriate values to acoustically represent the given year. The appropriate values for entry into NOISEMAP for the existing conditions at the air station, as obtained from reference 17, are 81 degrees Fahrenheit and 25 percent relative humidity. (Wyle 1998, November 2001)

* NOISEMAP Version 6.5 requires altitudes above the elevation of the runway and assumes the local terrain is flat. Modeled altitude profiles in this report account for the 2,283-ft elevation Mean Sea Level (MSL) of the airfield and are stated in terms of above ground level (AGL).

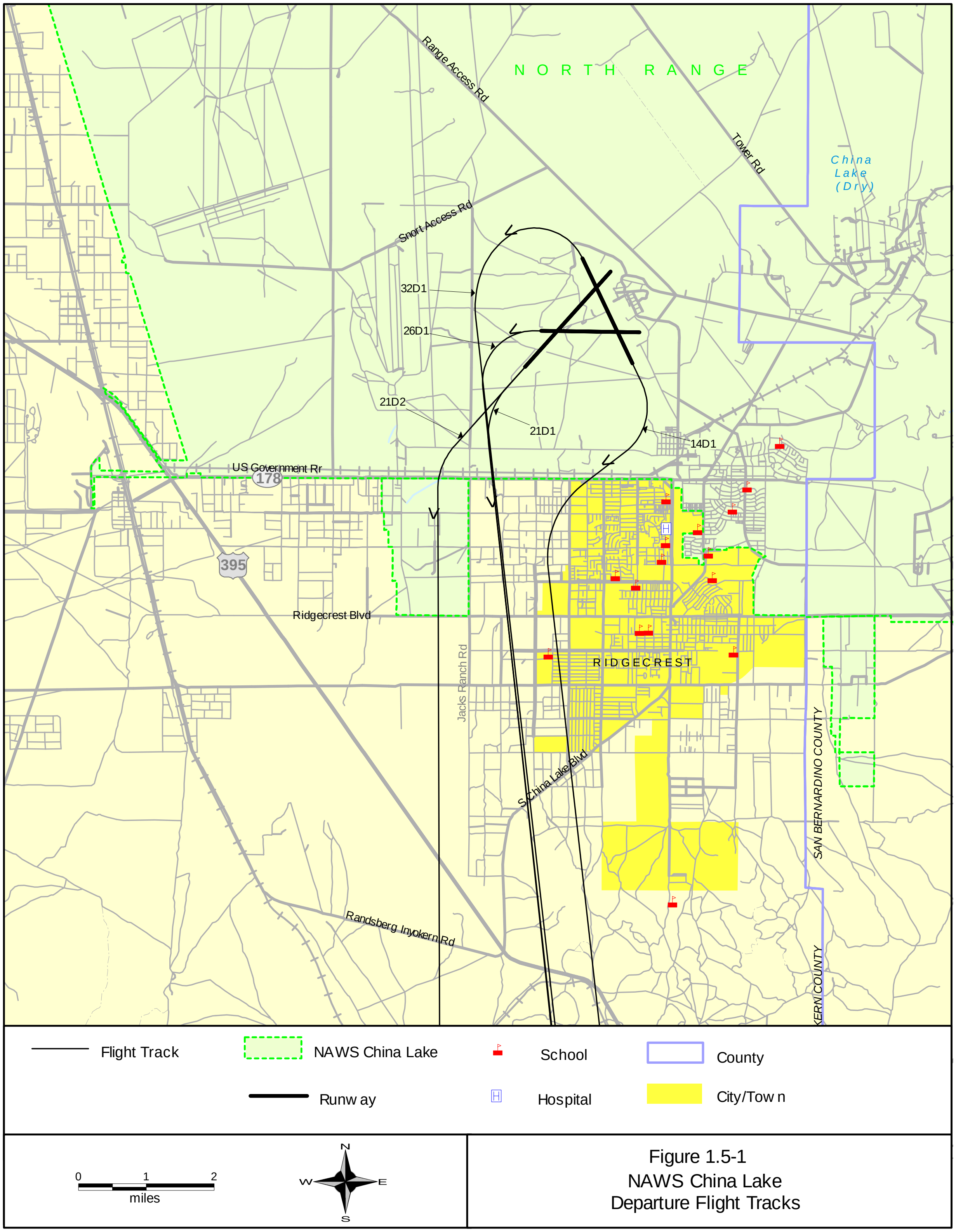

Figure 1.5-1
NAWS China Lake
Departure Flight Tracks

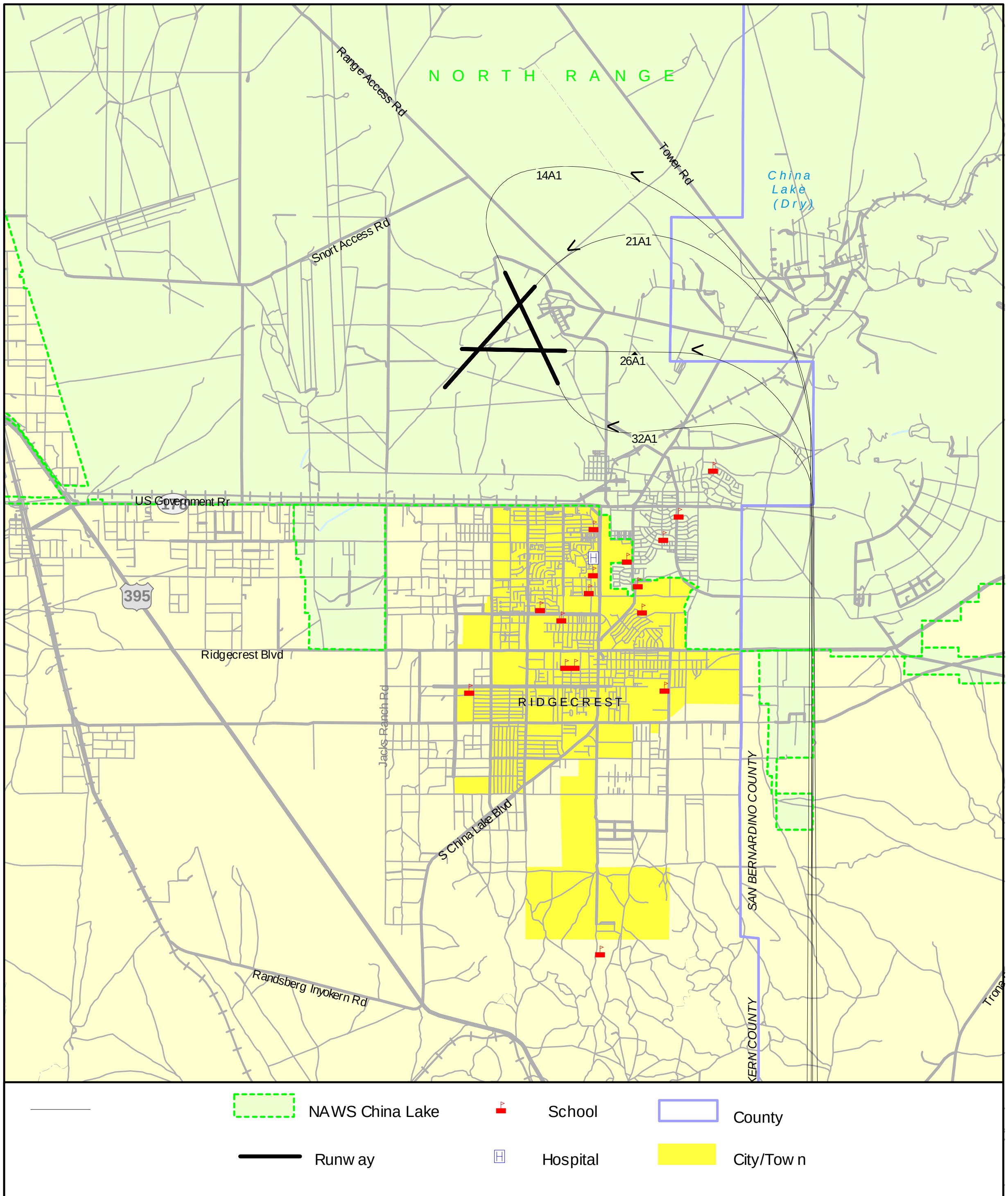

Figure 1.5-2
NAWS China Lake
Straight-In Arrival Flight Tracks

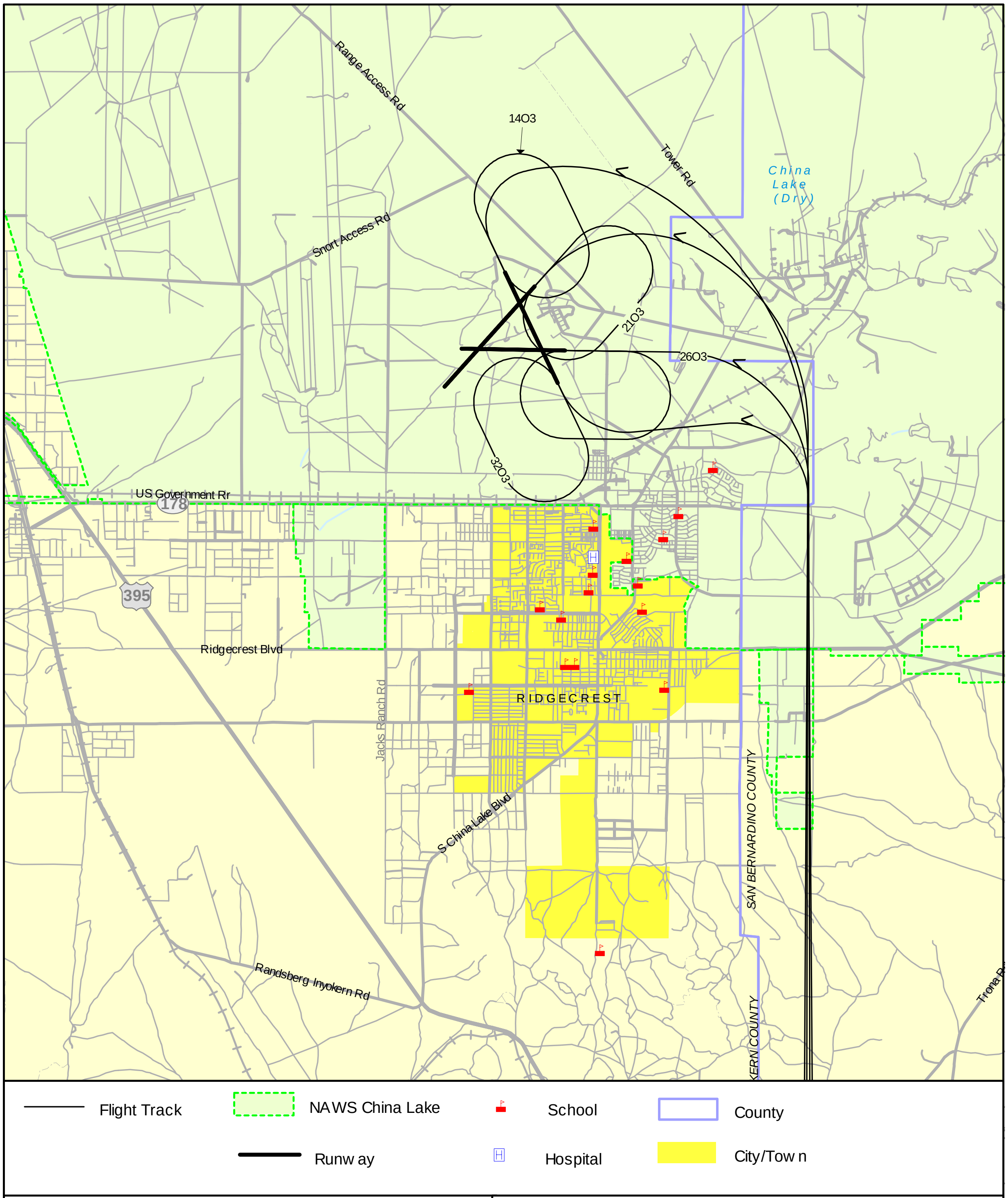

Figure 1.5-3
NAWS China Lake
Overhead Break/Carrier Break
Arrival Flight Tracks

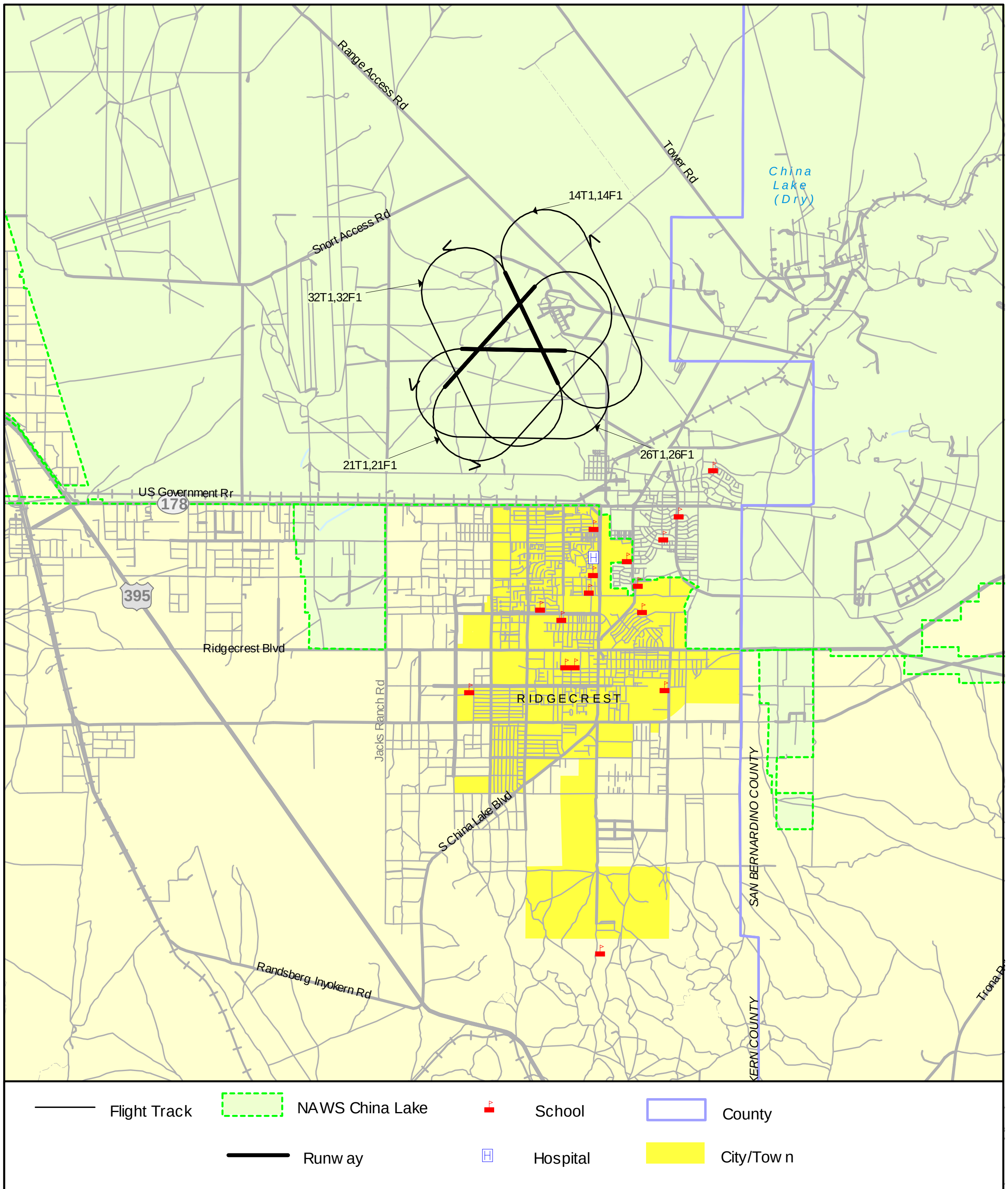

Figure 1.5-4
NAWS China Lake
Touch and Go/FCLP
Flight Tracks

Table 1.5-5
Single-Engine Maintenance Run-Up Operations at High-Power Turn-Up Area for Baseline Conditions

Aircraft Type	Magnetic Heading (Degrees)	Power Setting	Duration (Minutes)	Annual Ops	Percent Utilization			Modeled Average Busy-Day Operations			
					Day	Evening	Night	Day	Evening	Night	Total
F/A-18C/D	230	idle	15	27	49%	49%	2%	0.02	0.02	0	0.04
		mil	2.5	27	49%	49%	2%	0.02	0.02	0	0.04
		AB	2.5	27	49%	49%	2%	0.02	0.02	0	0.04
F/A-18E/F	230	idle	15	3	49%	49%	2%	0.02	0.02	0	0.04
		mil	2.5	3	49%	49%	2%	0.02	0.02	0	0.04
		AB	2.5	3	49%	49%	2%	0.02	0.02	0	0.04
EA-6B	230	idle	15	15	45%	45%	10%	0.02	0.02	0	0.04
		mil	2	15	45%	45%	10%	0.02	0.02	0	0.04

AB = Afterburner Power mil = Military Power Source: NAWS China Lake

1.5.5 Existing Airfield Noise Exposure

Using the data described in Sections 1.5.1 through 1.5.4, NOISEMAP Version 6.5 was used to calculate and plot average busy day 65-dB through 85-dB CNEL contours for the conditions as shown in Figure 1.5-6. The contours extend from the air station in various directions of travel. The 65-70 dB and 70-75-dB CNEL contours extend off base to the south of the airfield along departure flight tracks. The main contributor to the contours outside the base boundary is the F/A-18C/D aircraft departures to the south. The 70-dB CNEL contour extends off base at two areas along the southern base boundary. The smaller area occurs in the city of Ridgecrest. The larger area occurs west of Ridgecrest and east of Jacks Ranch Road. In these areas the dominant noise source are F/A-18 C/D departures. Also, along the southern boundary, the 65-dB CNEL contour has three separate areas occurring off base. The smallest occur south of Ridgecreast Blvd. and west of Jacks Ranch Road. To the east of this area, the other areas occur east of Jacks Ranch Road and in the northwest portion of the City of Ridgecrest. In these areas the dominant noise source is departures. (Wyle 1998, 2001)

Table 1.5-6 shows the impacts in terms of acreage and estimated population within contour bands at 5-dB increments for the conditions at NAWS. The computed contour areas, dwelling units, and population estimates exclude NAWS airfield boundaries. (Wyle 1998, 2001)

For the purposes of this report, noise exposure is defined as the number of off-facility land acreage and estimated number of dwellings and population within CNEL contours. For population and dwelling estimates, data was obtained from the U.S. Census Bureau 1990 census for Kern and San Bernadino counties in different forms. For Kern County, a synthesis of 1990 PL-94-171 Redistricting Census Data (provided by Kern Council of Governments) and 1990 series Census Bureau Topographically Integrated Geographic Encoding and reference Encoding and Referencing (TIGER) files (1995 version) at the Census Block level were used. The differences between the release dates is not of concern because TIGER/Line data released by the Census Bureau do not contain revised block group polygons except where errors exist. For San Bernadino County, Census block-groups were extracted from the 1990 (TIGER) files, while demographic data was extracted from the Summary Tape File 1A (STF1A). To compute the noise exposure (impact), the TIGER, STF1A data, and NOISEMAP noise contours are first imported into the MapInfo Geographic Information System computer program. (Wyle 1998, 2001)

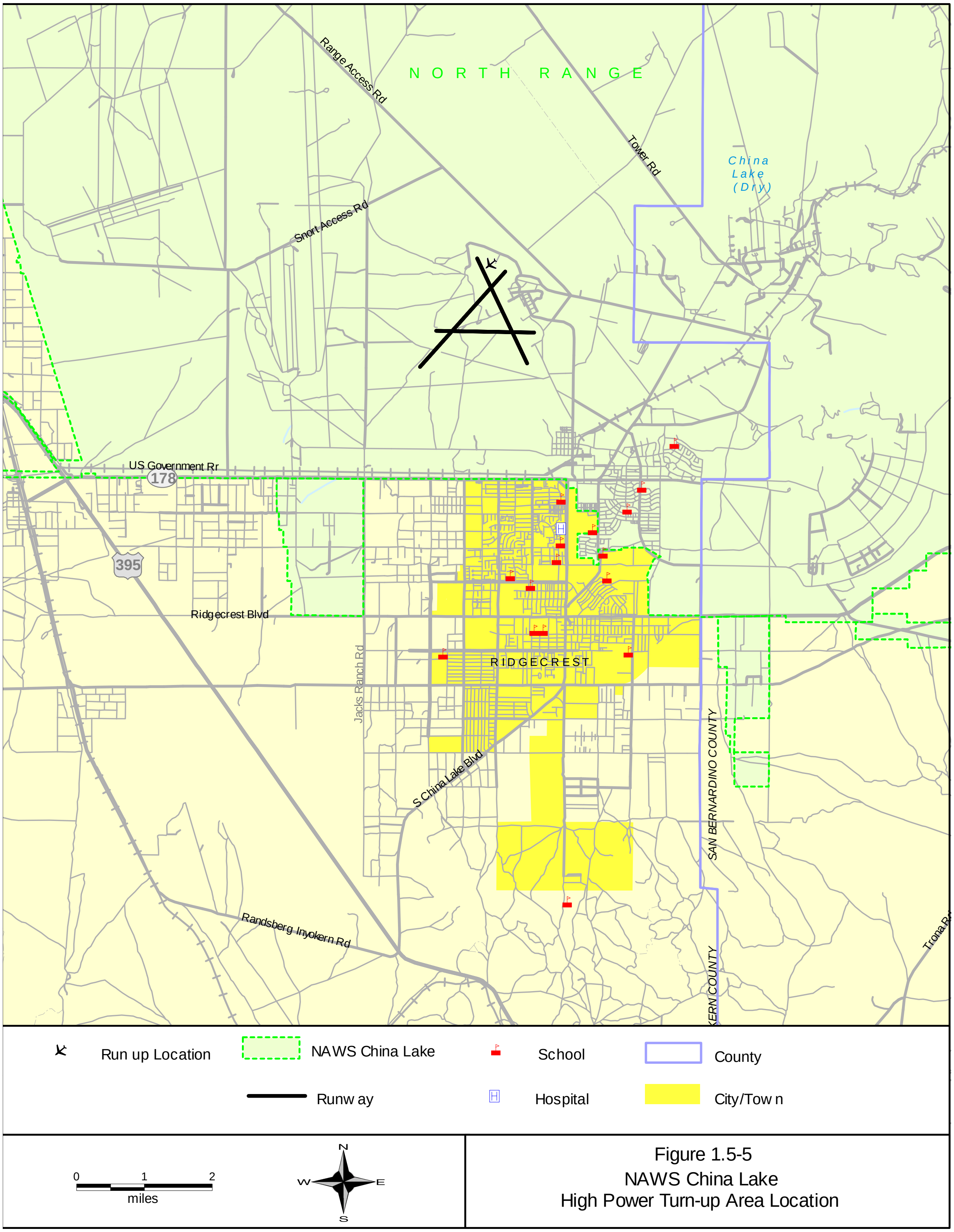

Figure 1.5-5
NAWS China Lake
High Power Turn-up Area Location

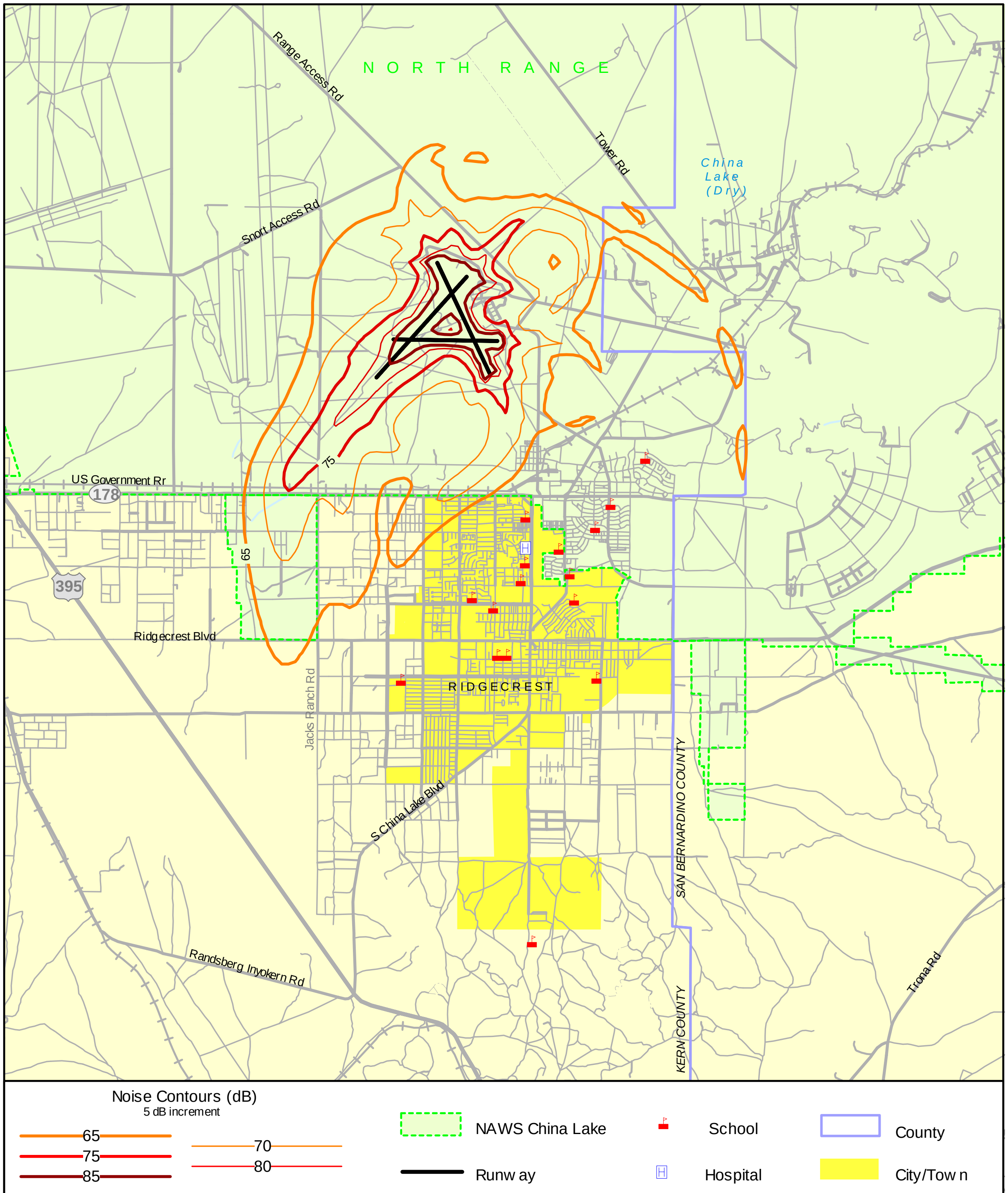

Figure 1.5-6
NAWS China Lake
Average Busy-Day CNEL Contours for
Baseline Airfield Operations

Table 1.5-6
Estimated Off-Base Land Areas, Dwellings, and Populations Within Average Busy-Day CNEL Noise Exposure Contours for Baseline Airfield Conditions at NAWS China Lake*

DNL Contour Bands	Item	Baseline
65-70 dB	Acres Dwelling Units Population	889 489 1075
70-75 dB	Acres Dwelling Units Population	
75-80 dB	Acres Dwelling Units Population	

*NAWS China Lake and bodies of water excluded.
**Estimates based on 1990 U.S. Census using population density methods

Note: Table updated from Wyle November 2001 report.

The population and dwelling density (i.e., number per acre) of each block or block-group is calculated and then multiplied by the off-facility land acreage of the noise contour or contour band (e.g., 65–70 dB) of interest. This methodology assumes a uniform population and dwelling unit distribution throughout each corresponding block or block-group. Land areas surrounding the station however, are not uniformly developed. Except for the population within the surrounding cities, the population density, as defined by the number of people per acre, may be quite low. Because of this, the population and dwelling data reported herein, based on the density method, is most useful for determining relative change in impact between noise contours of different operational conditions and/or scenarios. (Wyle 1998, 2001)

The total area within the 65-dB to 70-dB CNEL contour is approximately 889 acres, excluding the base area. The estimated off-Station population and dwelling units impacted within the 65-dB to 70-dB CNEL contours, using the method described above, is 1,075 people and 489 units, respectively. There is no impact within the 70-dB to 75-dB CNEL contour band in terms of population and the associated off-Station land area and dwelling units. (Wyle 1998, November 2001)

1.6 Range Area Flight Operations and Noise Exposure

1.6.1 Range Radar Data and Processing

The Airspace Surveillance unit of the Weapons Division attached to NAWS provided 59 days of radar data. The radar data spanned a 92-day period from 19 August 1996 through 18 November 1996. The 33 missing days of radar data typically were weekend days when flight activity associated with the Range Complex was either minimal or non-existent. (Wyle 1998)

The radar data originated from five Airspace Surveillance Radar (ASR) Type 8 locations. Table 1.6-1 lists the five ASRs for which data was provided. Each of these ASRs scans at a rate of 1 revolution per 4.7 seconds. Figure 1.6-1 shows the locations of the ASRs relative to NAWS. Each of the ASRs used a 14.5 E magnetic variation. (Wyle 1998)

Table 1.6-1
Radar Site Locations

Radar		**Location**		
No.	**Name**	**Latitude**	**Longitude**	**Altitude (Ft, MSL)**
2	QOV Owens	036° 37’ 05” N	118° 01’ 47” W	3,677
3	QPM Panamint	036° 02’ 03” N	117° 16’ 12” W	1,196
4	QVY Searles	035° 48’ 13” N	117° 20’ 42” W	1,651
5	QIW Indian Wells	035° 39’ 25” N	117° 50’ 11” W	2,465
9	QVP Velvet Peak	035° 03’ 36” N	117° 00’ 54” W	4,219

The radar data consisted of the following parameters for each scan of each ASR: time, ASR identification (ID), range of the aircraft from the ASR, magnetic bearing of the aircraft relative to the ASR, true altitude, beacon code, aircraft type, and number of aircraft (ships) in the flight. The time was provided in units of Universal Mean Time (UMT). The ASR ID was provided as the same number shown in the left-most column of Table 1.6-1. (Wyle 1998)

1.6.1.1 Radar Data Processing

The first step in the data processing was to convert the semi-fixed format ASCII files in which the radar data was contained to fixed format to ease subsequent data processing. (Wyle 1998)

The second step was to reformat and sort the ASCII data to the Noise Data Acquisition and Display System (NDADS) Version 2.0 binary Radar Tracking (RAT) format. The RAT format requires the radar data to be sorted by “flight” and by time where “flight”, in this case, initially denotes each unique combination of beacon code, aircraft type, and number of ships. Flight is further defined as that unique combination of beacon code, aircraft type, and number of ships whose data points do not contain a lapse of more than 30 minutes. A flight would be broken into as many multiples as there were lapses of more than 30 minutes. (Wyle 1998)

The RAT format also calls for the time to be in terms of seconds past midnight, local daylight time. Eight hours were added to the UMT to convert to local standard time and one hour was added if the data was dated before 27 October 1996 to convert it to local daylight saving time. Data dated on or after 27 October 1996 through 18 November 1996 needed only the 8-hour UMT-to-local conversion. (Wyle 1998)

A flight was discarded if it contained less than or was equal to one trajectory point. A flight was discarded if its aircraft type was non-military or not applicable to the noise study. Table 1.6-2 contains the list of excluded aircraft types. A flight was also discarded if none of its trajectory points passed within the overall Region of Interest shown in Figure 1.6-1. (Wyle 1998)

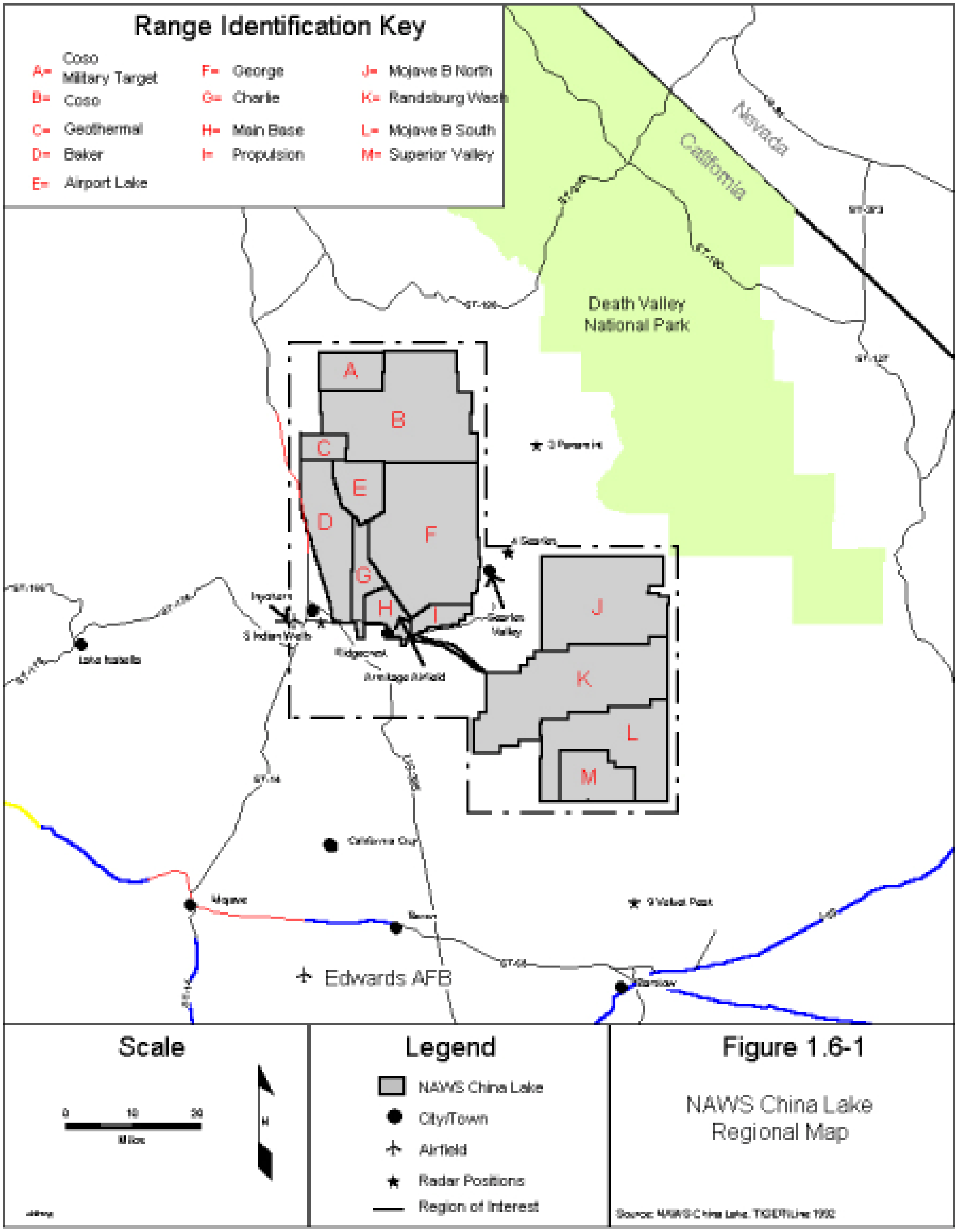

Figure 1.6-1

NAWS China Lake Regional Map

Table 1.6-2

Excluded Aircraft Types

Type	**Description**
B206	Bell Jet Ranger Helicopter
BC20	Beechcraft King Air (Twin Turboprop)
B76	Beechcraft Duchess 76 (Twin-Engine Piston)
CIV	Generic Civilian Aircraft
C172	Cessna 172 (Single-Engine Piston)
C206	Cessna Twin Piston
DH6	DHC-6 Twin Otter (Twin Turboprop)
EXP	Experimental
PA23	Piper Apache (Twin-Engine Piston)
PA28	Piper Cherokee (Single-Engine Piston)
UAV	Unmanned Air Vehicle
VAV	Unmanned Air Vehicle

The RAT format also requires the coordinates of the tracking data to be in a Cartesian coordinate system with one origin. The origin was chosen with the ASR ID of #5 (Indian Wells) which is located near Inyokern Airport. This radar site had the most tracking data points of the five in the study and was also chosen as the origin for radar data processing for WR 95-9.[19] (Wyle 1998)

As the ASR locations provide tracking for aircraft which are potentially up to 90 nautical miles (nm) from the ASR, conversion of the tracking data must account for the curvature of the Earth. The spheroid model with parameters of the World Geodetic Survey (WGS) 1984 datum was employed to perform such a conversion. The magnetic bearing of each valid tracking point was converted to true bearing by adding the magnetic variation of 14.5 degrees to the magnetic bearing. With true bearing (and range converted to feet), the aircraft position relative to the Indian Wells ASR was determined via a spheroid-based translation algorithm. The algorithm provides the latitude/longitude coordinates of the data point, which then is projected into the user’s Cartesian coordinate system via a trapezoidal projection. (Wyle 1998)

In order to determine the velocity of the aircraft at each tracking point, a finite difference (forward, central, and backward) technique using two neighboring data points was used. (Wyle 1998)

1.6.1.2 *Aircraft Above Ground Level Conversion*

Radar data for NAWS specified aircraft altitude in terms of Mean Sea Level (MSL). For the purposes of computing noise contours at ground level, it was necessary to convert the MSL altitudes to altitudes AGL. (Wyle 1998)

Radar data altitudes were corrected using USGS Three Arc Second Digital Elevation Model (DEM) data. DEM data format is a grid of elevation point in a coordinate system local to the area of interest. The values of the DEM data were used to correct each point of radar data collected. (Wyle 1998)

1.6.1.3 *Modeled Flight Operations*

In order to determine the number of operations at NAWS from the given radar data, it was necessary to filter the radar data to remove civilian aircraft, miscellaneous military aircraft, and inconsistent radar data. Civilian aircraft were not modeled, as their number of operations and acoustic contribution was considered insignificant. Miscellaneous military aircraft, listed in Table 1.6-2, were also considered insignificant based on acoustic signature and number of operations. Inconsistent radar data was identified as any radar point for a single track, which was greater than 15,000 feet from the previous radar point. (Wyle 1998)

After filtration, the data was analyzed to determine which airspace units (ranges) were utilized. In the majority of the ranges there were few discernible patterns, therefore no consistent flight tracks could be identified (Figure 1.6-2). In these cases, flight operations were modeled as occurring throughout the range boundaries, and thus were analyzed using three-dimensional logical gating. This type of gating tabulates aircraft time spent above a given range within given altitude limits. As an aircraft entered the range boundary within the altitude limits, the gate was triggered, and the time spent in that range was counted until the aircraft left the range or exceeded the altitude limits, at which point the time counter was stopped. If the aircraft re-entered the 3-dimensional gate, the gate was reopened and time spent was appended to the previous value. (Wyle 1998)

Each aircraft event over a range from an altitude of zero to 50,000 feet was modeled for the time calculated in this manner. The range of altitudes for this type of analysis was zero–2,000 feet, 2,000–3,000 feet, 3,000–4,000 feet, 4,000–5,000 feet, 5,000–10,000 feet, and 10,000–50,000 feet AGL. Time per event was then averaged for all events in each altitude band. (Wyle 1998)

In the case of Coso Military Target and Superior Valley, where the ranges were relatively small and the aircraft flew circular patterns within all available space, the same method was employed. Operations within Baker and Charlie ranges were more defined at altitudes of zero–2,000 feet AGL. Rather than using the three-dimensional gating system alone, closed pattern flight operations were also identified. In Baker Range, operations used several identifiable closed patterns. Aircraft using these closed patterns made multiple passes and flew each available flight track. To fully evaluate these operations, Baker Range was divided into two regions: Baker North and Baker South. On Charlie Range, aircraft using these closed patterns were evaluated by the number of laps flown around each pattern. Like Baker, Charlie Range was also divided into two regions: Charlie North and Charlie South. (Wyle 1998)

1.6.1.4 *MRNMAP Methodology*

The 92 days of radar data was used to represent "typical" range operations. This data was extrapolated to 12 months by multiplying the number of operations of each type of aircraft by 3.967 to provide "typical" annual flight operations. Using the aircraft operations data shown in Table 1.6-3, along with typical engine thrust settings and airspeeds for each aircraft type, Onset-Rate Adjusted Day-Night Average Sound Levels (L_{dnmr}) were calculated using the MR_NMAP computer program to estimate the noise exposure on each individual range and also Main Base. The operations for Main Base exclude all activity below 2,000 feet AGL, which were assumed, for modeling purposes, to be included in the AICUZ operations. L_{dnmr} levels for each area are depicted in Table 1.6-4. (Wyle 1998)

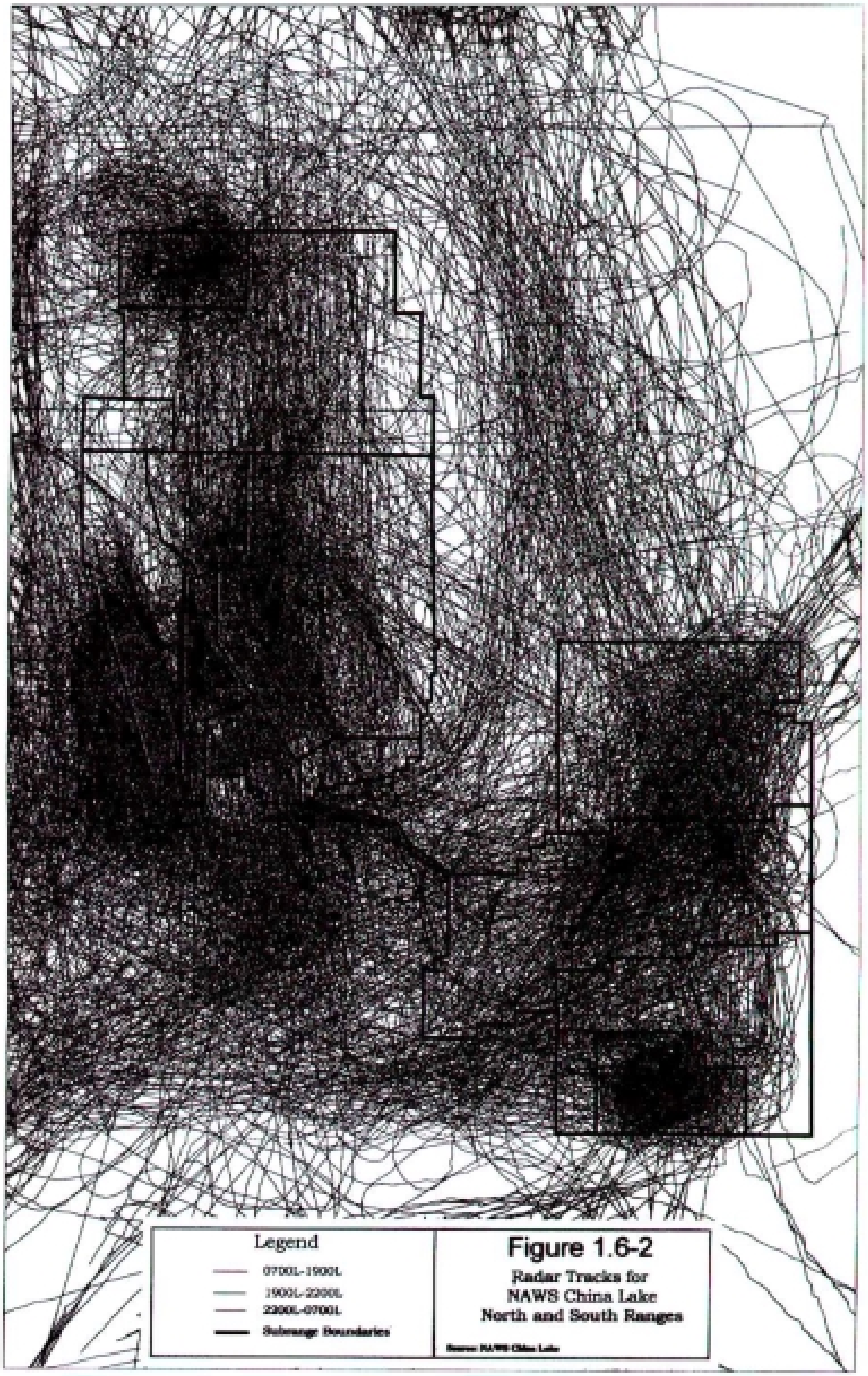

Figure 1.6-2
Radar Tracks for
NAWS China Lake
North and South Ranges

Source: NAWS China Lake

Table1.6-3. Annual Flight Operations by Range

(a) Airport Lake

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1 100%RPM 100 KIAS	0–2000	16			24
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			1
A-6 90%RPM 250 KIAS	0–2000				
	2000–3000	4			42
	3000–4000	4			41
	4000–5000	4			6
	5000–10,000				
	10,000+				
UH-1 100%RPM 80 KIAS	0–2000	24			3
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-46 94%Q-BPA	0–2000				
	2000–3000				

130 KIAS	3000–4000	4			37
	4000–5000	4			42
	5000–10,000	4			43
	10,000+				
F/A-18	0–2000	60			13
85%RPM	2000–3000	56			23
400 KIAS	3000–4000	56			17
	4000–5000	67			13
	5000–10,000	99	4	4	22
	10,000+	159	28		16
F-16	0–2000	4			13
87%NC	2000–3000	4			1
450 KIAS	3000–4000	4			1
	4000–5000				
	5000–10,000	16			9
	10,000+	12			28
C-130	0–2000				
970 CTIT	2000–3000				
200 KIAS	3000–4000				
	4000–5000				
	5000–10000				
	10,000+	4			1
AV-8	0–2000	12			12
75%RPM	2000–3000	12			9
350 KIAS	3000–4000	4			27

	4000–5000	8			20
	5000–10,000	24			21
	10,000+	36			16
F-14 85%NC 400 KIAS	0–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			1
	10,000+				
F-4 98%RPM 550 KIAS	0–2000	4			8
	2000–3000	4			9
	3000–4000				
	4000–5000				
	5000–10,000	12			43
	10,000+	12			21

Table 1.6-3 (Continued)

(b) Baker North

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1	0–250	24			20
100%RPM	250–500	8			8
100KIAS	500–1000	4			1
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			6
UH-1	0–250	8			16
100%RPM	250–500	4	4		4
80KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-53	0–250				
90%Q-BPA	250–500				

150KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	4			11
CH-46	0–250	16			14
94%Q-BPA	250–500	8			33
130KIAS	500–1000	20			55
	1000–2000				
	2000–3000				
	3000–4000	4			37
	4000–5000	8			20
	5000–10,000	8			21
	10,000+				
F/A-18	0–250				
85%RPM	250–500	8			8
400KIAS	500–1000	32			7
	1000–2000	63		4	10
	2000–3000	52			14
	3000–4000	56		4	9
	4000–5000	32		4	6
	5000–10,000	111	16		9
	10,000+	230	24	8	17

Table 1.6-3 (Continued)

(b) Baker North (Continued)

Aircraft	**Altitude**	**Annualized Operations**			**Ave. Time**
Type	**Band (ft. AGL)**	**Day**	**Eve**	**Night**	**in Area (min.)**
F-16	0–250				
87%NC	250–500				
450KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	8			19
	10,000+	16			24
C-130	0–250				
970 C TIT	250–500				
200KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	4			1
AV-8	0–250				
75%RPM	250–500	4			5

350KIAS	500–1000	8			3
	1000–2000	28			9
	2000–3000	16			7
	3000–4000	12			1
	4000–5000	12			1
	5000–10,000	48			20
	10,000+	95			17
F-14	0–250				
85%NC	250–500	4			4
400KIAS	500–1000	4			1
	1000–2000	4			7
	2000–3000	4			6
	3000–4000				
	4000–5000				
	5000–10,000	8			27
	10,000+	24			8
F-4	0–250				
98%RPM	250–500				
550KIAS	500–1000				
	1000–2000	4			1
	2000–3000	4			1
	3000–4000	4			16
	4000–5000				
	5000–10,000	12			1
	10,000+	8			1

Table 1.6-3 (Continued)

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Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations**			**Ave. Time in Area (min.)**
		Day	**Eve**	**Night**	
AH-1	0–250	4			29
100%RPM	250–500	8			18
100KIAS	500–1000	8			9
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
UH-1	0–250	8	4		2
100%RPM	250–500	8	4		1
80KIAS	500–1000	4	4		1
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-53	0–250				
90%Q-BPA	250–500	4			9

150KIAS	500–1000	4			13
	1000–2000	8			7
	2000–3000	8			6
	3000–4000	4			1
	4000–5000				
	5000–10,000	4			15
	10,000+	4			15
CH-46	0–250	4			11
94%Q-BPA	250–500	4			12
130KIAS	500–1000	4			11
	1000–2000	4			12
	2000–3000	8			6
	3000–4000	8			7
	4000–5000	4			2
	5000–10,000	8			19
	10,000+				
F/A-18	0–250	4			6
85%RPM	250–500	48			10
400KIAS	500–1000	79	4		14
	1000–2000	143	4	4	13
	2000–3000	167	4	4	13
	3000–4000	179	8	4	11
	4000–5000	163	4	4	16
	5000–10,000	262	20	4	18
	10,000+	254	16	8	29

Table 1.6-3 (Continued)

© Baker South (Continued)

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations**			**Ave. Time in Area (min.)**
		Day	**Eve**	**Night**	
F-16	0–250	4			10
87%NC	250–500	4			10
450KIAS	500–1000	4			10
	1000–2000	4			10
	2000–3000	4			9
	3000–4000	4			11
	4000–5000	4			11
	5000–10,000	8			23
	10,000+	16			24
C-130	0–250				
970 C TIT	250–500				
200KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			1
	10,000+				
AV-8	0–250	28			9
75%RPM	250–500	44			10

350KIAS	500–1000	119			9
	1000–2000	139			16
	2000–3000	155			19
	3000–4000	139			21
	4000–5000	139			22
	5000–10,000	147			26
	10,000+	127			22
F-14	0–250	12			6
85%NC	250–500	16			9
400KIAS	500–1000	16			22
	1000–2000	24			21
	2000–3000	28			20
	3000–4000	28			21
	4000–5000	28			19
	5000–10,000	28			32
	10,000+	28			29
F-4	0–250				
98%RPM	250–500				
550KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000	8			1
	4000–5000	4			1
	5000–10,000				
	10,000+				

Table 1.6-3 (Continued)

(d) Charlie North

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations Day**	**Eve**	**Night**	**Ave. Time in Area (min.)**
AH-1	0–250	36			34
100%RPM	250–500	8			6
100KIAS	500–1000	4			1
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			3
UH-1	0–250	12			8
100%RPM	250–500	8			7
80KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-46	0–250	28			38
94%Q-	250–500	24			37

BPA					
130KIAS	500–1000	20			67
	1000–2000	4			32
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			37
	10,000+				
F/A-18	0–250	8			24
85%RPM	250–500	12			11
400KIAS	500–1000	12			15
	1000–2000	28		4	9
	2000–3000	16	4		20
	3000–4000	20		4	10
	4000–5000	16			5
	5000–10,000	36	12	4	4
	10,000+	28	12	4	13
F-16	0–250				
87%NC	250–500				
450KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			2
	10,000+	16			6

Table 1.6-3 (Continued)

(d) Charlie North (Continued)

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations**			**Ave. Time in Area (min.)**
		Day	**Eve**	**Night**	
C-130	0–250				
970 C TIT	250–500				
200KIAS	500–1000				
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000		4		1
	10,000+	4			1
AV-8	0–250	4			1
75%RPM	250–500	8			2
350KIAS	500–1000	16			3
	1000–2000	4			3
	2000–3000				
	3000–4000	8			1
	4000–5000	4			1
	5000–10,000	4			1
	10,000+	4			1

Table 1.6-3 (Continued)

(e) Charlie South

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations			Ave. Time in Area (min.)
		Day	Eve	Night	
AH-1	0–250	63			35
100%RPM	250–500	24			18
100KIAS	500–1000	8			10
	1000–2000	4			1
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			4
UH-1	0–250	28			27
100%RPM	250–500	32	4		12
80KIAS	500–1000	8			2
	1000–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-53	0–250				
90%Q-BPA	250–500				
150KIAS	500–1000	4			1

	1000–2000				
	2000–3000	4			1
	3000–4000	4			1
	4000–5000				
	5000–10,000	4			1
	10,000+				
CH-46	0–250	32			69
94%Q-BPA	250–500	40			53
130KIAS	500–1000	28			60
	1000–2000	4			1
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			42
	10,000+				
F/A-18	0–250	12			23
85%RPM	250–500	28		4	7
400KIAS	500–1000	159	12	12	6
	1000–2000	381	52	12	14
	2000–3000	337	24	4	9
	3000–4000	159	40		11
	4000–5000	75	32		9
	5000–10,000	111	36		13
	10,000+	246	32	8	17

Table 1.6-3 (Continued)

(e) Charlie South (Continued)

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations**			**Ave. Time in Area (min.)**
		Day	**Eve**	**Night**	
F-16 87%NC 450KIAS	0–250				
	250–500				
	500–1000				
	1000–2000	12			1
	2000–3000	4			1
	3000–4000				
	4000–5000	4			1
	5000–10,000	12			1
	10,000+	24			18
A-6 90%RPM 250 KIAS	0–250				
	250–500				
	500–1000	4			1
	1000–2000	4			1
	2000–3000	4			1
	3000–4000				
	4000–5000	4			1
	5000–10,000				
	10,000+				
C-130 970 C TIT	0–250				
	250–500	8	4		19

200KIAS	500–1000	8	4		54
	1000–2000	8	4		54
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4	4		25
	10,000+	4			2
AV-8	0–250	8			1
75%RPM	250–500	24			3
350KIAS	500–1000	44			10
	1000–2000	139	4		11
	2000–3000	95			8
	3000–4000	56			3
	4000–5000	56			2
	5000–10,000	52	4		12
	10,000+	32			3
F-14	0–250				
85%NC	250–500	4			3
400KIAS	500–1000	8			2
	1000–2000	8			1
	2000–3000	8			1
	3000–4000	4			1
	4000–5000				
	5000–10,000				
	10,000+				

Table 1.6-3 (Continued)

(e) Charlie South (Continued)

F-4	0–250				
98%RPM	250–500				
550KIAS	500–1000				
	1000–2000				
	2000–3000	4			1
	3000–4000	4			1
	4000–5000	4			1
	5000–10,000	4			1
	10,000+				
T-38	0–250				
90%RPM	250–500				
300KIAS	500–1000	4			1
	1000–2000	4			46
	2000–3000	4			1
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				

Table 1.6-3 (Continued)

(f) Coso

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations**			**Ave. Time in Area (min.)**
		Day	**Eve**	**Night**	
AH-1	0–2000	12			4
100%RPM	2000–3000				
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
UH-1	0–2000	24			19
100%RPM	2000–3000	4			2
80 KIAS	3000–4000	4			22
	4000–5000	4			24
	5000–10,000	4			20
	10,000+	4			2
A-6	0–2000	4			48
90%RPM	2000–3000	4			47
250 KIAS	3000–4000	4			46
	4000–5000	4			14
	5000–10,000	4			11
	10,000+				

C-12	0–2000				
100%RPM	2000–3000				
150 KIAS	3000–4000	4			1
	4000–5000	4			1
	5000–10,000	4			1
	10,000+				
CH-46	0–2000				
94%Q-BPA	2000–3000				
130 KIAS	3000–4000	4			1
	4000–5000	4			20
	5000–10,000	4			1
	10,000+	4			1
F/A-18	0–2000	63			8
85%RPM	2000–3000	56			5
400 KIAS	3000–4000	56			7
	4000–5000	52			7
	5000–10,000	115	12	8	18
	10,000+	222	24	4	19
F-16	0–2000	4			8
87%NC	2000–3000	4			1
450 KIAS	3000–4000				
	4000–5000				

	5000–10,000	12			38
	10,000+	16		8	19
C-130	0–2000				
970 CTIT	2000–3000				
200 KIAS	3000–4000	4			3
	4000–5000	4			2
	5000–10000	4			25
	10,000+	4			1
AV-8	0–2000	16			19
75%RPM	2000–3000				
350 KIAS	3000–4000				
	4000–5000	4			6
	5000–10,000	32			20
	10,000+	48			26

Table 1.6-3 (Continued)

(f) Coso (Continued)

F-14	0–2000	4			27
85%NC	2000–3000	4			26
400 KIAS	3000–4000	4			27
	4000–5000	4			28
	5000–10,000	4	4		35
	10,000+		4		52
F-4	0–2000				
98%RPM	2000–3000				
550 KIAS	3000–4000				
	4000–5000				
	5000–10,000	8			31
	10,000+	8			34

Table 1.6-3 (Continued)

(g) Coso Target

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1 100%RPM 100 KIAS	0–2000	12			39
	2000–3000	4			2
	3000–4000	4			1
	4000–5000				
	5000–10,000				
	10,000+				
A-6 90%RPM 250 KIAS	0–2000	4			1
	2000–3000	4			43
	3000–4000	4			11
	4000–5000				
	5000–10,000				
	10,000+				
C-12 100%RPM 150 KIAS	0–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			2
	10,000+				

F-16	0–2000				
87%NC	2000–3000				
450 KIAS	3000–4000				
	4000–5000				
	5000–10,000	4			7
	10,000+				
UH-1	0–2000	20			18
100%RPM	2000–3000	4			31
80 KIAS	3000–4000	4			27
	4000–5000	4			26
	5000–10,000	4			11
	10,000+	4			4
CH-46	0–2000	4			10
94%Q-BPA	2000–3000	4			10
130 KIAS	3000–4000	4			39
	4000–5000	4			39
	5000–10,000	4			41
	10,000+	4			21
F/A-18	0–2000	111			12
85%RPM	2000–3000	111			14
400 KIAS	3000–4000	115			15
	4000–5000	119			8
	5000–10,000	147			11

	10,000+	210	20		14
AV-8	0–2000	44			4
75%RPM	2000–3000	20			13
350 KIAS	3000–4000	28			8
	4000–5000	16			14
	5000–10,000	48			13
	10,000+	48			17
F-4	0–2000				
98%RPM	2000–3000				
550 KIAS	3000–4000				
	4000–5000				
	5000–10000				
	10,000+	8			6

Table 1.6-3 (Continued)

(h) Geothermal

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1 100%RPM 100 KIAS	0–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			1
A-6 90%RPM 250 KIAS	0–2000	4			1
	2000–3000	4			1
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
UH-1 100%RPM 80 KIAS	0–2000	4			1
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000	4			1
	10,000+				
CH-46 94%Q-	0–2000				
	2000–3000				

BPA					
130 KIAS	3000–4000	4			19
	4000–5000	4			19
	5000–10,000				
	10,000+				
F/A-18	0–2000	4			1
85%RPM	2000–3000	4			7
400 KIAS	3000–4000	4			39
	4000–5000	4			24
	5000–10,000	12			1
	10,000+	32	12	4	1
F-16	0–2000				
87%NC	2000–3000				
450 KIAS	3000–4000				
	4000–5000	4			1
	5000–10,000	4			1
	10,000+	4			1
AV-8	0–2000	8			7
75%RPM	2000–3000				
350 KIAS	3000–4000				
	4000–5000				
	5000–10000	4			1
	10,000+	12			27

Table 1.6-3 (Continued)

(i) George

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Annualized Operations Eve	Annualized Operations Night	Ave. Time in Area (min.)
UH-1	0–2000	28			17
100%RPM	2000–3000				
80 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-53	0–2000				
90%Q-BPA	2000–3000				
150 KIAS	3000–4000				
	4000–5000				
	5000–10,000	4			11
	10,000+	4			1
A-6	0–2000	4			46
90%RPM	2000–3000	4			48
250 KIAS	3000–4000	4			54
	4000–5000	4			53
	5000–10,000	4			55
	10,000+				

AH-1	0–2000	20			40
100%RPM	2000–3000				
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			3
C-12	0–2000	4			1
100%RPM	2000–3000	4			4
150 KIAS	3000–4000	4			3
	4000–5000				
	5000–10,000				
	10,000+				
CH-46	0–2000	4			2
94%Q-BPA	2000–3000	4			1
130 KIAS	3000–4000	4			13
	4000–5000				
	5000–10,000	4			31
	10,000+				
F/A-18	0–2000	167	20		2
85%RPM	2000–3000	139	16	4	6
400 KIAS	3000–4000	167	12	8	12
	4000–5000	151	8	12	19

	5000–10,000	198	12	16	26
	10,000+	246	32	4	31
F-16 87%NC 450 KIAS	0–2000	4			14
	2000–3000	12			5
	3000–4000	12			2
	4000–5000	4			1
	5000–10,000	16			44
	10,000+	20			45
C-130 970 CTIT 200 KIAS	0–2000	4			10
	2000–3000	4	4		1
	3000–4000	8	4		3
	4000–5000	8	4		5
	5000–10000	16	4		20
	10,000+	4			41
AV-8 75%RPM 350 KIAS	0–2000	32			21
	2000–3000	24			23
	3000–4000	24			24
	4000–5000	20			33
	5000–10,000	44			25
	10,000+	32			24
F-14 85%NC 400 KIAS	0–2000				
	2000–3000	4			1
	3000–4000	4			1

	4000–5000	4			54
	5000–10,000	4			72
	10,000+	4	4		52
F-4	0–2000	12			1
98%RPM	2000–3000	12			1
550 KIAS	3000–4000	16			5
	4000–5000	12			12
	5000–10,000	12			47
	10,000+	12			47

Table 1.6-3 (Continued)

(j) Main Base

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1	0–2000				
100%RPM	2000–3000	4			1
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000	16			1
	10,000+	16			4
CH-53	0–2000				
90%Q-BPA	2000–3000				
150 KIAS	3000–4000				
	4000–5000				
	5000–10,000	4			6
	10,000+	4			2
F/A-18	0–2000				
85%RPM	2000–3000	151	36		2
400 KIAS	3000–4000	40	12		6
	4000–5000	24	8		4
	5000–10,000	95	4	8	11

	10,000+	131	24	4	23
F-16	0–2000				
87%NC	2000–3000				
450 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	16			36
C-130	0–2000				
970 CTIT	2000–3000		4		1
200 KIAS	3000–4000	4			1
	4000–5000	4			1
	5000–10,000	12	4		30
	10,000+	4			47
AV-8	0–2000				
75%RPM	2000–3000	40			5
350 KIAS	3000–4000	24			1
	4000–5000	4			1
	5000–10,000	16			3
	10,000+	8			18
F-14	0–2000				
85%NC	2000–3000				
400 KIAS	3000–4000				
	4000–5000				

	5000–10,000	4			1
	10,000+		4		87
A-6	0–2000				
90%RPM	2000–3000	4			1
250 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
T-38	0–2000				
90%RPM	2000–3000				
300 KIAS	3000–4000	4			1
	4000–5000	4			1
	5000–10000	4			1
	10,000+				

Table 1.6-3 (Continued)

(k) Propulsion

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1	0–2000	12			1
100%RPM	2000–3000				
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
UH-1	0–2000	36			3
100%RPM	2000–3000				
80 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
CH-53	0–2000				
90%Q-BPA	2000–3000				
150 KIAS	3000–4000				
	4000–5000				
	5000–10,000	4			7

	10,000+	4			2
F/A-18	0–2000				
85%RPM	2000–3000	12	8		1
400 KIAS	3000–4000	4	8		5
	4000–5000		8		1
	5000–10,000	52	4		15
	10,000+	111	24	4	31
F-16	0–2000				
87%NC	2000–3000				
450 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	4			51
C-130	0–2000				
970 CTIT	2000–3000	4			1
200 KIAS	3000–4000	4			1
	4000–5000				
	5000–10000	4	4		6
	10,000+				
AV-8	0–2000	8			1
75%RPM	2000–3000	8			1
350 KIAS	3000–4000	8			1
	4000–5000	8			1

	5000–10,000	8			19
	10,000+	12			44
F-14	0–2000				
85%NC	2000–3000				
400 KIAS	3000–4000				
	4000–5000				
	5000–10,000	4			71
	10,000+	4	4		64
F-4	0–2000				
98%RPM	2000–3000				
550 KIAS	3000–4000	4			17
	4000–5000				
	5000–10,000	4			5
	10,000+	8			27

Table1.6-3 (Continued)

(l) Mojave B North

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations Day**	**Eve**	**Night**	**Ave. Time in Area (min.)**
UH-1	0–2000	8			4
100%RPM	2000–3000	12			13
80 KIAS	3000–4000	8			2
	4000–5000				
	5000–10,000				
	10,000+				
F/A-18	0–2000	103		8	11
85%RPM	2000–3000	123	4	8	13
400 KIAS	3000–4000	107	24		13
	4000–5000	119	4		14
	5000–10,000	274	24		16
	10,000+	401	8	12	15
F-16	0–2000				
87%NC	2000–3000				
450 KIAS	3000–4000				
	4000–5000				
	5000–10,000	20			6
	10,000+	20			26

AV-8	0–2000				
75%RPM	2000–3000	4			1
350 KIAS	3000–4000	4			1
	4000–5000	4			1
	5000–10,000	20			21
	10,000+	24			40
F-14	0–2000				
85%NC	2000–3000				
400 KIAS	3000–4000		4		1
	4000–5000	4			11
	5000–10000	8			11
	10,000+	8			7

Table 1.6-3 (Continued)

(m) Mojave B South

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations**			**Ave. Time in Area (min.)**
		Day	**Eve**	**Night**	
AH-1	0–2000				
100%RPM	2000–3000	4			8
100 KIAS	3000–4000	4			8
	4000–5000				
	5000–10,000	4			11
	10,000+	4			26
UH-1	0–2000	4			53
100%RPM	2000–3000	4			48
80 KIAS	3000–4000	4			47
	4000–5000				
	5000–10,000				
	10,000+				
CH-46	0–2000				
94%Q-BPA	2000–3000	4			4
130 KIAS	3000–4000	4			1
	4000–5000	4			1
	5000–10,000	4			1
	10,000+	8			13
F/A-18	0–2000	99	4		13

85%RPM 400 KIAS	2000–3000	107	8	16	6
	3000–4000	79		16	3
	4000–5000	115	8	4	2
	5000–10,000	175	16	32	6
	10,000+	337	12	52	11
F-16 87%NC 450 KIAS	0–2000	8			1
	2000–3000				
	3000–4000	4			1
	4000–5000	8			6
	5000–10,000	24			6
	10,000+	16			4
C-130 970 CTIT 200 KIAS	0–2000	4			1
	2000–3000	4			7
	3000–4000	4			1
	4000–5000				
	5000–10000				
	10,000+				
AV-8 75%RPM 350 KIAS	0–2000				
	2000–3000				
	3000–4000	4			1
	4000–5000	12			7
	5000–10,000	28			8
	10,000+	40			28
F-14 85%NC	0–2000				
	2000–3000				

400 KIAS	3000–4000				
	4000–5000		4		1
	5000–10,000				
	10,000+				
OH-58	0–2000			4	3
100%RPM	2000–3000				
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				
T-38	0–2000				
90%RPM	2000–3000	4			1
300 KIAS	3000–4000	8			1
	4000–5000	8			1
	5000–10,000	4			1
	10,000+	4			15

Table1.6-3 (Continued)

(n) Randsburg Wash

Aircraft Type	**Altitude Band (ft. AGL)**	**Annualized Operations Day**	**Eve**	**Night**	**Ave. Time in Area (min.)**
AH-1 100%RPM 100 KIAS	0–2000	4			1
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	4			1
UH-1 100%RPM 80 KIAS	0–2000	12			35
	2000–3000	4			48
	3000–4000	4			54
	4000–5000	4			3
	5000–10,000				
	10,000+				
CH-46 94%Q-BPA 130 KIAS	0–2000				
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+	4			1
F/A-18 85%RPM 400 KIAS	0–2000	123		8	12
	2000–3000	163	28	4	8
	3000–4000	190	20	0	10
	4000–5000	167	12	0	11
	5000–10,000	282	20	4	14

	10,000+	417	16	20	15
F-16 87%NC 450 KIAS	0–2000	16			1
	2000–3000	16			1
	3000–4000	16			1
	4000–5000	16			1
	5000–10,000	20			16
	10,000+	24			25
C-130 970 CTIT 200 KIAS	0–2000	8			6
	2000–3000	8			26
	3000–4000	8			29
	4000–5000	8			31
	5000–10000	4			5
	10,000+	4			1
AV-8 75%RPM 350 KIAS	0–2000	12			12
	2000–3000	8			1
	3000–4000	12			14
	4000–5000	20			6
	5000–10,000	28			14
	10,000+	56			27
OH-58 100%RPM 100 KIAS	0–2000	4		4	1
	2000–3000				
	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				

Table 1.6-3 (Continued)

(o) Superior Valley

Aircraft Type	Altitude Band (ft. AGL)	Annualized Operations Day	Eve	Night	Ave. Time in Area (min.)
AH-1	0–2000				
100%RPM	2000–3000	4			5
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000	4			12
	10,000+	4			27
CH-46	0–2000				
94%Q-BPA	2000–3000				
130 KIAS	3000–4000				
	4000–5000				
	5000–10,000	8			6
	10,000+	8			13
F/A-18	0–2000	16			11
85%RPM	2000–3000	48	4	12	10
400 KIAS	3000–4000	75	8	32	8
	4000–5000	115	4	32	6
	5000–10,000	163	12	48	9
	10,000+	250	12	44	11
F-16	0–2000				
87%NC	2000–3000	28			14
450 KIAS	3000–4000	36			17
	4000–5000	36			18
	5000–10,000	28			24
	10,000+	4			1

AV-8	0–2000				
75%RPM	2000–3000	8			17
350 KIAS	3000–4000	24			15
	4000–5000	32			15
	5000–10,000	36			17
	10,000+	36			13
T-38	0–2000	8			1
90%RPM	2000–3000	36			11
300 KIAS	3000–4000	40			12
	4000–5000	40			11
	5000–10000	40			12
	10,000+	4			21
C-130	0–2000				
970 CTIT	2000–3000	4			13
200 KIAS	3000–4000	4			18
	4000–5000	4			18
	5000–10000	4			11
	10,000+				
OH-58	0–2000				
100%RPM	2000–3000			4	1
100 KIAS	3000–4000				
	4000–5000				
	5000–10,000				
	10,000+				

Table 1.6-4

Existing Condition L_{dnmr} for Individual Ranges

NORTH RANGE	**L_{dnmr}**
Airport Lake	51
Baker North	<45
Baker South	54
Charlie North	56
Charlie South	54
Coso	<45
Coso Target	47
George	<45
Main Base	<45
Propulsion Lab	<45
SOUTH RANGE	**L_{dnmr}**
Mojave B North	<45
Mojave B. South	<45
Randsburg Wash	<45
Superior Valley	<45

Where noise levels were calculated to be less than 45 dB, the noise levels is given as “<45.” This annotation was used because in calculating time-average sound levels, the reliability of the results varies at lower levels. This arises from the increasing variability of individual aircraft sound levels at the longer distances due to atmospheric effects on sound propagation and to the presence of other sources of noise. Time-average outdoor sound levels less than 45 dBs are well below any currently accepted guidelines for aircraft noise compatibility. As discussed in the Appendix, most of the guidelines for the acceptability of aircraft noise are on the order of 65 dB and higher. (Wyle 1998)

1.7 Ordnance Operations and Noise Exposure

1.7.1 Data Collection Procedure for Ordnance Noise Modeling

NAWS plays an active role in the research, development, test, and evaluation (RDT&E) of weapons systems and ordnance for all branches of DoD. Because of the nature of this activity, which takes place on the China Lake ranges, it is important to evaluate the impact on the surrounding environment during these operations. In order to estimate the impulsive noise generated from such activities, the Department of the Army's BNOISE program was used for this study. BNOISE requires the following data as input: the number and types of weapons and ordnance fired, the grid point location of the firing and target points, and the trinitrotoluene (TNT) equivalent for each weapon along with the propellant charge, if needed, and type of ordnance modeled (i.e., inert, high-explosive, illumination, etc.). Although some of the explosive ordnance discussed and modeled in the following sections may originate from aircraft, all modeled events occur at ground level. (Wyle 1998)

Calculations made by BNOISE are based on TNT scaling laws. The number of pounds of TNT required to produce an equivalent explosion for each of the munitions is input into the model. This data was obtained from the Explosive Ordnance Disposal (EOD) unit at the Marine Corps Air Ground Combat Center Twentynine Palms, CA, which actively maintains TNT equivalence records. These equivalents are used in the internal weapon file in BNOISE. (Wyle 1998)

All ordnance expenditures for operations conducted at NAWS on the North and South Ranges were obtained from range operations personnel[18] at China Lake. All firing and target point locations associated with these operations were obtained from the *Draft China Lake Range Management Plan*, May 1996[19] and from China Lake range operations personnel. (Wyle 1998)

1.7.2 North Range

Because NAWS is an RDT&E facility, and because RDT&E activities vary greatly from year to year based on the need and availability of tests to be conducted, ordnance types and expenditures used on the ranges at China Lake vary dramatically from year to year. It is not a rarity to record expenditures of an ordnance type of 1,000 rounds for a particular year and then record expenditures the very next year of zero. Depending on the type of weapon or ordnance and the type of testing, a program may go on for years without firing a single round of ordnance. (Wyle 1998)

Also, although NAWS is a weapons test facility, it is estimated that nearly 80 percent of the ordnance fired or dropped on the China Lake ranges is inert, meaning there is no "live", high-explosive (HE) warhead. HE rounds are only used when it is deemed essential for a test. The low utilization of HE ordnance has been made possible by the increased use of simulation and modeling in the research and testing stage of many programs, as well an increased use of inert ordnance. (Wyle 1998)

The North Range is divided into several sub-ranges. Each range has a safety buffer associated with it that allows for the use of several sub-ranges at a time. Therefore, tests are conducted on the range which best meets the requirements of the individual program, or, because many of the ranges can support the same type of test, whichever range the schedule permits. When a test requires a larger test safety buffer than can be provided by a single sub-range however, additional sub-ranges may become active, possibly encompassing the entire North Range, in order to complete the test. Most live ordnance firing in the North Range is accomplished in the George or Airport Lake Ranges because of the large safety area associated with each. (Wyle 1998)

In addition to the safety buffers developed by users of the range, natural features of the land tend to add to the safety and security of individual sub-ranges at China Lake. For example, George Range is the primary weapons test range at China Lake. It is located on the desert floor of the northeastern portion of the Indian Wells Valley, and is surrounded by the Argus Mountains on the east and the Coso Mountains on the north. These natural buffers create added safety and security on the range, as well as excellent positions for test equipment. (Wyle 1998)

The George Range also houses the Ordnance Operations Division. Activity in this division is conducted at such areas as Burro Canyon and Skytop Static Test Facility. These facilities perform a variety of tests dealing with solid rocket motors, warheads, and various other explosives, which, at times, produce large-scale detonations. Most tests conducted in these areas however, are known as "cook-offs" rather than explosive detonations, meaning a detonation of the test material is not planned. (Wyle 1998)

Charlie Range contains the 4.1 mile long Supersonic Naval Ordnance Research Track (SNORT), which also supports a wide array of test scenarios (Section 1.8). Some of the tests conducted at the SNORT involve such scenarios as ejectable components tests and crew escape systems. These tests may also involve large-scale detonations, depending on the type of test conducted. (Wyle 1998)

Coso Range contains Upper Cactus Flats and Lower Cactus Flats, both are mass detonation facilities located in the northwest corner of the North Range, which are used in supporting large-scale, high-explosives safety testing. Upper Cactus Flats has been approved since 1994, for testing up to and including 150,000 lbs. of Net Explosive Weight (NEW). Lower Cactus is used for smaller scale testing. Tests conducted in these two areas may involve an activity known as sympathetic detonation. This exercise involves the detonation of one or more types of ordnance in an effort to determine if a group of "acceptor" ordnance will also detonate. This type of testing may require a wide array of ordnance types, as well as a large amount of each type. (Wyle 1998)

1.7.2.1 *Annual Ordnance Expenditures on the Sub-Ranges*

Annual expenditure data received from range operations personnel and from the individual sub-ranges consists of data over several years. Expenditure data for the air, ground, and other tests, including inert bomb drops and missile and artillery firing, conducted in the North Range was obtained for FY1992 through FY1995. This data is shown in Table 1.7-1. All data included in this table was not modeled however, due to the insignificant contribution or impact it would have on the noise environment at NAWS. Ordnance expenditure data for the remaining areas of interest were based on the following: Burro Canyon EOD, CY1994 through CY1996; "B" Mountain EOD Facility, CY1993 through CY1996; Area R, Burro Canyon Test Facility and Cactus Flats, FY1993 through FY1996. Ordnance expenditures were also cross-referenced with a spreadsheet, activity log for FY1994 through FY1996. All activity at NAWS was modeled as occurring from 0700–1900 hours. (Wyle 1998)

Because of the difference in time periods for which information was obtained, and because ordnance expenditures may cycle up and down from year to year, an "average year expenditure" was calculated based on the number of years of available data. For example, if three years of information was available for a particular range, with zero rounds expended the first year, 100 rounds expended the second year, and 20 rounds expended the third year, the "average year" would be modeled using 40 rounds per year. This rationale was applied to all data provided for analysis of blast activity. This "average year expenditure" was used to model the ordnance expended on each of the sub-ranges during CY1996. (Wyle 1998)

Table 1.7-1

North Range Cumulative Annual Ordnance Expenditures for Air and Ground Tests

Air Tests	Munition	FY94	FY95
Rockets*	2.75" Zuni	167	33
Gun Ammo	Small Arms*	1,000	0
	20mm & 25mm*	0	11,460
	30mm*	0	11,460
	40mm*	2,562	0
	105mm	1,799	0
Missiles*	AGM-114	0	34
	AGM-122	1	5
	AGM-123	0	0
	AGM-154	0	5
	AGM-45	1	0
	AGM-65	9	2
	AGM-88	6	3
	AIM-120	4	5
	AIM-7	4	5
	AIM-9	7	4
Cruise Missiles*		4	4
Guided Bombs*	Walleye	15	30
Cluster Bombs*	Rockeye	108	47
Practice Bombs*	BDUs, Mk76	5,140	2,901
Mk80 Series Bombs		722	509
Mk77*		20	0
Flares*		970	302

Ground Tests	Munition	FY94	FY95
Gun Ammo	Small Arms*	0	600
	20mm & 25mm*	42,950	49,531
	105mm	0	0
	120mm	795	686
	155mm	170	281
	5” Gun	403	397
Chaff*	SEA GNAT	0	17
Missiles*	Redeye	30	0
	Sraw/Predator	1	2
	Stinger	9	7
	BOA	0	1
	MMPT	1	2
Flares*		138	0

Ground Tests	Munition	1993	1994	1995
Miscellaneous Ordnance	TNT (lbs.)	12,079	309,845	88,196
	Mk82	140	0	180
	Mk83	0	0	15
	Mk84	0	0	0
	ITOW	18	14	15
	Viper*	12	19	13
	Rockeye*	5	0	1
	Gator Mines*	14	0	0
	Grenades*	19	1	0
	Mk118*	4	0	0
	EFP*	9	4	3
	Mk103*	0	0	8
	Mk107*	0	0	8

	Mk55 Mines*	0	0	6
	BLU 98 Mines*	0	4	0
	81mm round	0	192	900
	105mm round	1,410	124	128
	155mm round	104	3	16
	COMP B (lbs.)	150	298	0
	C-4 (lbs.)	1	0	0
	Barrel Charge	11	1	4

* Not modeled.

Table 1.7-2 contains the data obtained for all sub-ranges of interest by year, either by calendar year or fiscal year. Table 1.7-3 contains the "average-year" totals, which were calculated using the method described above and used to model all blast activity at NAWS using BNOISE. (Wyle 1998)

1.7.2.2 *Noise Exposure Due to Blast Activities on Sub-Ranges*

Using the data described in Section 1.7.2, BNOISE and NMPLOT were used to calculate and plot the 60-dB© through 85-dB© CDNL contours at increments of 60, 65, 70, 75, 80, and 85 dB©, for the average year operations on each of the sub-ranges at NAWS. (Wyle 1998)

George Range

Figure 1.7-1 contains the CDNL noise contours associated with the average year ordnance expenditure on George Range. Figure 1.7-1 also shows that the CDNL contours produced by the average year operations do not extend off the base boundary at any point. Therefore, the off-Station population impacted by the blast operations occurring in George Range is zero. (Wyle 1998)

Charlie Range

Figure 1.7-2 contains the CDNL noise contours associated with the average year ordnance expenditure on Charlie Range. Figure 1.7-2 also shows that the CDNL contours produced by the average year operations do not extend off the base boundary at any point. Therefore, the off-Station population impacted by the blast operations occurring in Charlie Range is zero. (Wyle 1998)

Table 1.7-2

Sub-Range Cumulative Annual Ordnance Expenditures in the North Range

Sub-Range	Area/Facility	Ordnance Type	Calendar Year (Unless Noted Otherwise)					
			1991	**1992**	**1993**	**1994**	**1995**	**1996**
Baker								
Area R**	Area R Test Facility	TNT Equivalent (lbs.)			603	30	927	2,864
Charlie	SNORT	TNT Equivalent (lbs.)	5,900	2,240	3,000	0	0	
George	Burro Canyon Test Facility**	TNT Equivalent (lbs.)			3,578	5,513	1,271	2,528
	Burro Canyon EOD Facility	TNT Equivalent (lbs.)				303,023	85,944	451,898
	B Mountain EOD Facility	TNT Equivalent (lbs.)			34	20	54	1,262
	Tower 11**	105mm round		14	23	0	0	
	Tower 11**	120mm round		275	919	795	686	
	Tower 11**	155mm round		0	10	170	281	
	G-2**	5” Gun round		259	331	202	199	
Coso**	Upper Cactus Flats	Mk82				0	180	0
		Mk83				0	15	0
		Mk103				0	8	0
		Mk107				0	8	0
		Mk55 Mines				0	6	0
		155mm round				0	16	0
	Lower Cactus Flats	155mm round			26	1	0	0
		COMP B Flaked			150 lbs.	20 lbs.	0	0

		3.2 Barrel Charge			11	1	4	0
		C-4			1.25 lbs.	0	0	0
		Mk82			8	0	0	23
		Mk84			0	0	0	1
		105mm round			0	28	0	0
		81mm round			0	12	0	0
		Cast COMP B			0	293 lbs.	0	0
Airport Lake**		105mm round		0	940	1799	0	
		5" Gun round***		259	331	202	199	
Coso Target								
Propulsion Lab	Skytop	Explosive (lbs. TNT)						
	CT-1	Explosive (lbs. TNT)			40	259		
	CT-4	Explosive (lbs. TNT)			4,824	1,000		
	CT-6	Explosive (lbs. TNT)						

* Calendar Year expenditures

** Fiscal Year expenditures

= Data Not Available

*** Fired from George Range with impact in Airport Lake.

Source: NAWS China Lake Site Visit, October 1996. (Ref.20.)

Table 1.7-3

Modeled Average Year Live Ordnance Expenditures by Sub-Range

Sub-Range	**Area/Facility (if applicable)**	**Ordnance Type**	**Modeled Average Year Expenditure**
Baker			
Area R	Area R Test Facility	TNT Equivalent (lbs.)	1,106
Charlie	SNORT	TNT Equivalent (lbs.)	2,228
George	Burro Canyon Test Facility	TNT Equivalent (lbs.)	3,223
	Burro Canyon EOD Facility	TNT Equivalent (lbs.)	280,288
	B Mountain EOD Facility	TNT Equivalent (lbs.)	343
		105mm round	9
		120mm round	669
		155mm round	115
		5" Gun round	247
Coso	Upper Cactus	Mk82	60
		Mk83	5
		Mk103	2
		Mk107	2
		Mk55 Mines	2
		155mm	5
	Lower Cactus	155mm round	7
		COMP B Flaked	43
		3.2 Barrel Charge	4
		C-4	1

		Mk82	8
		Mk84	1
		105mm round	7
		81mm round	3
		Cast COMP B	73
Airport Lake	N/A	105mm round	685
		5” Gun round	247
Coso Target			
Propulsion Lab	Skytop	None	None
	CT-1		
	CT-4		
	CT-6		

Source: NAWS China Lake Site Visit, October 1996.

[shaded box] = Data Not Available

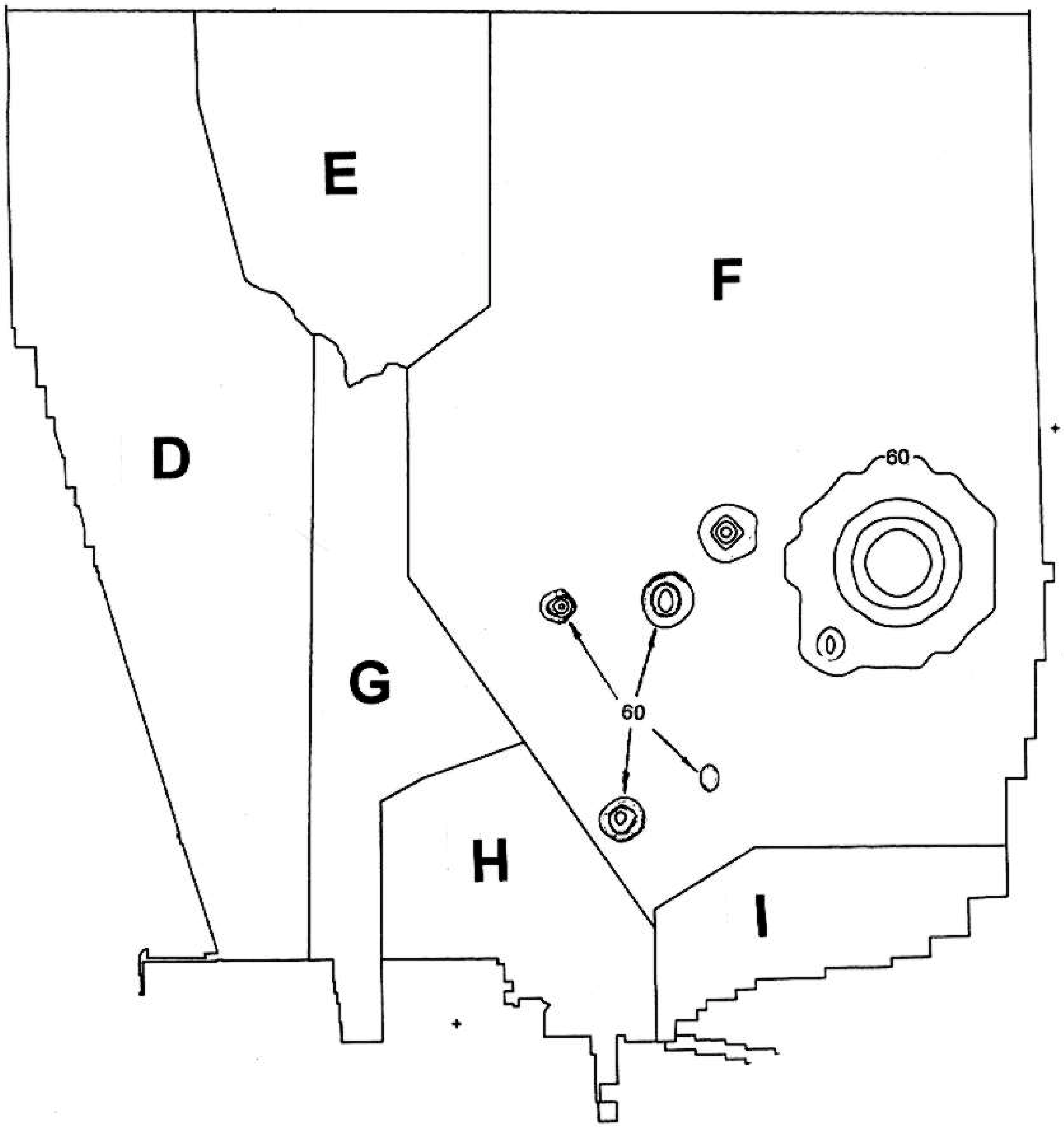

Figure 1.7-1. CDNL Noise Contours on George Range

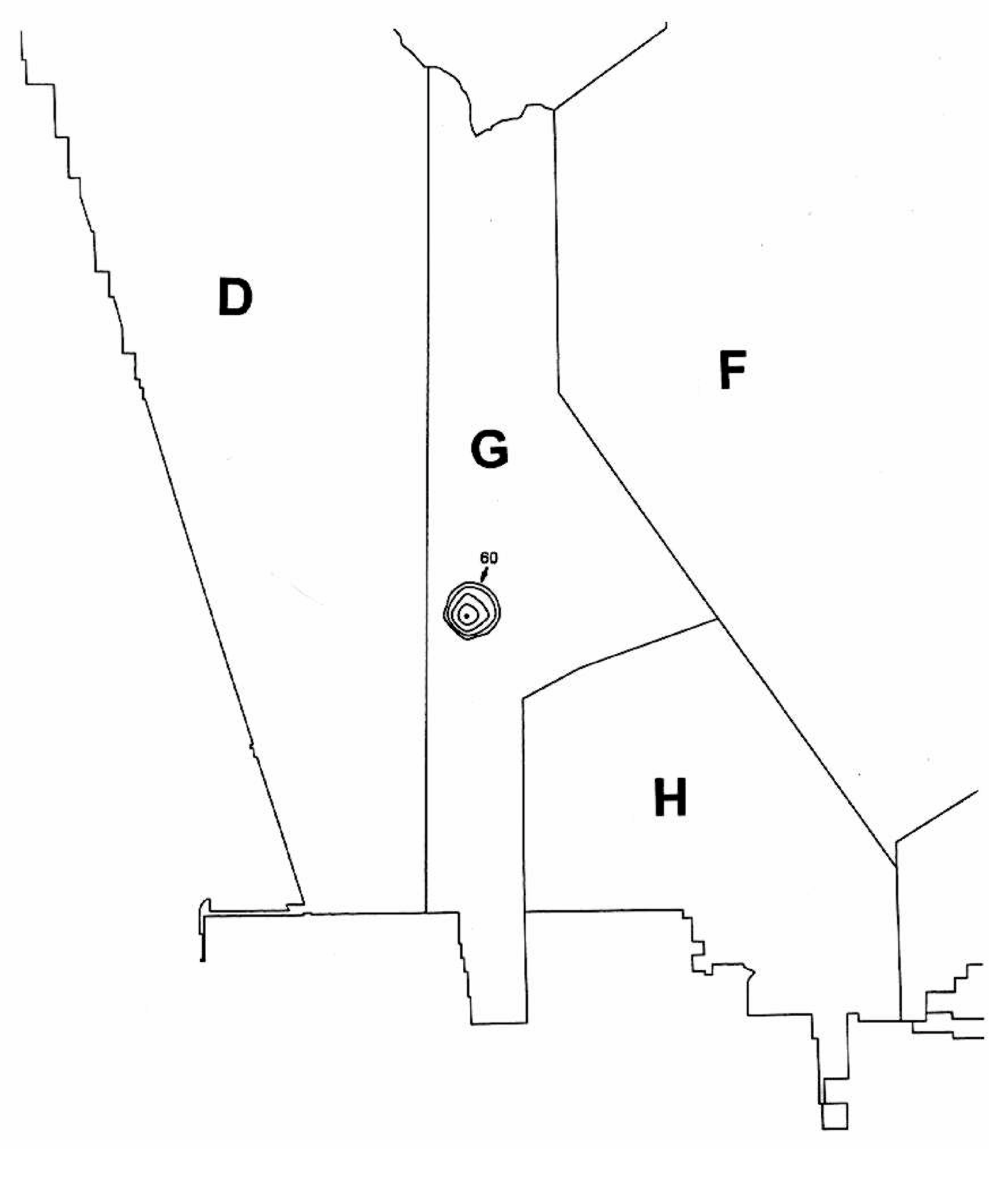

Figure 1.7-2. CDNL Noise Contours on Charlie Range

Airport Lake

Figure 1.7-3 contains the CDNL noise contours associated with the average year ordnance expenditure at Airport Lake. Figure 1.7-3 also shows that the CDNL contours produced by the average year operations do not extend off the base boundary at any point. Therefore, the off-Station population impacted by the blast operations occurring at Airport Lake is zero. (Wyle 1998)

Although rare in occurrence, extremely large explosive tests are conducted on the ranges. For example, in 1989, the Airport Lake Range was utilized for a mass detonation test of 500,000 lbs. of equivalent TNT. Although this occurs only rarely and on a single-event basis, the impulsive noise created by such an event can become quite powerful. Table 1.7-4 shows the L_{Cdn} levels and $SEL_{©}$ values at a specified distance (d) from the point of detonation for this particular test. (Wyle 1998)

Also shown in the table are the peak overpressures denoted as P_{peak} and the peak sound pressure levels, L_{pk}. The descriptor peak represents the instant in time when the pressure wave from the explosion reaches its maximum value. At a distance of 20,000 feet from the point of detonation (35° 55' 00" N, 117° 45' 00" W), the predicted L_{Cdn} is 83 dB©. Although this predicted 83-dB© contour falls off of the Airport Lake boundary on the east, west, and south borders, it does, however, remain well within the boundary of the NAWS North Range. (Wyle 1998)

Table 1.7-4

Airport Lake 500,000 lb. Single-Event Detonation

d (Feet)	P_{peak} (psi)	L_{pk}	$SEL_{©}$	L_{Cdn}
500	20	196	176	127
1,000	8	189	169	120
2,000	2.5	178	158	109
5,000	0.7	167	147	98
10,000	0.3	160	140	91
20,000	0.12	152	132	83

Cactus Flats and Upper Cactus

Figure 1.7-4 contains the CDNL noise contours associated with the average year ordnance expenditure on Cactus Flats and Upper Cactus. Figure 1.7-4 also shows that the CDNL contours produced by the average year operations do not extend off the base boundary at any point. Therefore, the off-Station population impacted by the blast operations occurring on Cactus Flats and Upper Cactus is zero. (Wyle 1998)

Area R

Figure 1.7-5 contains the CDNL contours associated with the average year ordnance on Area R. Figure 1.7-5 also shows that the CDNL contours produced by the average year operations do not extend off the base boundary. Therefore, the off-Station population impacted by the above operations occurring in Area R is zero. (Wyle 1998)

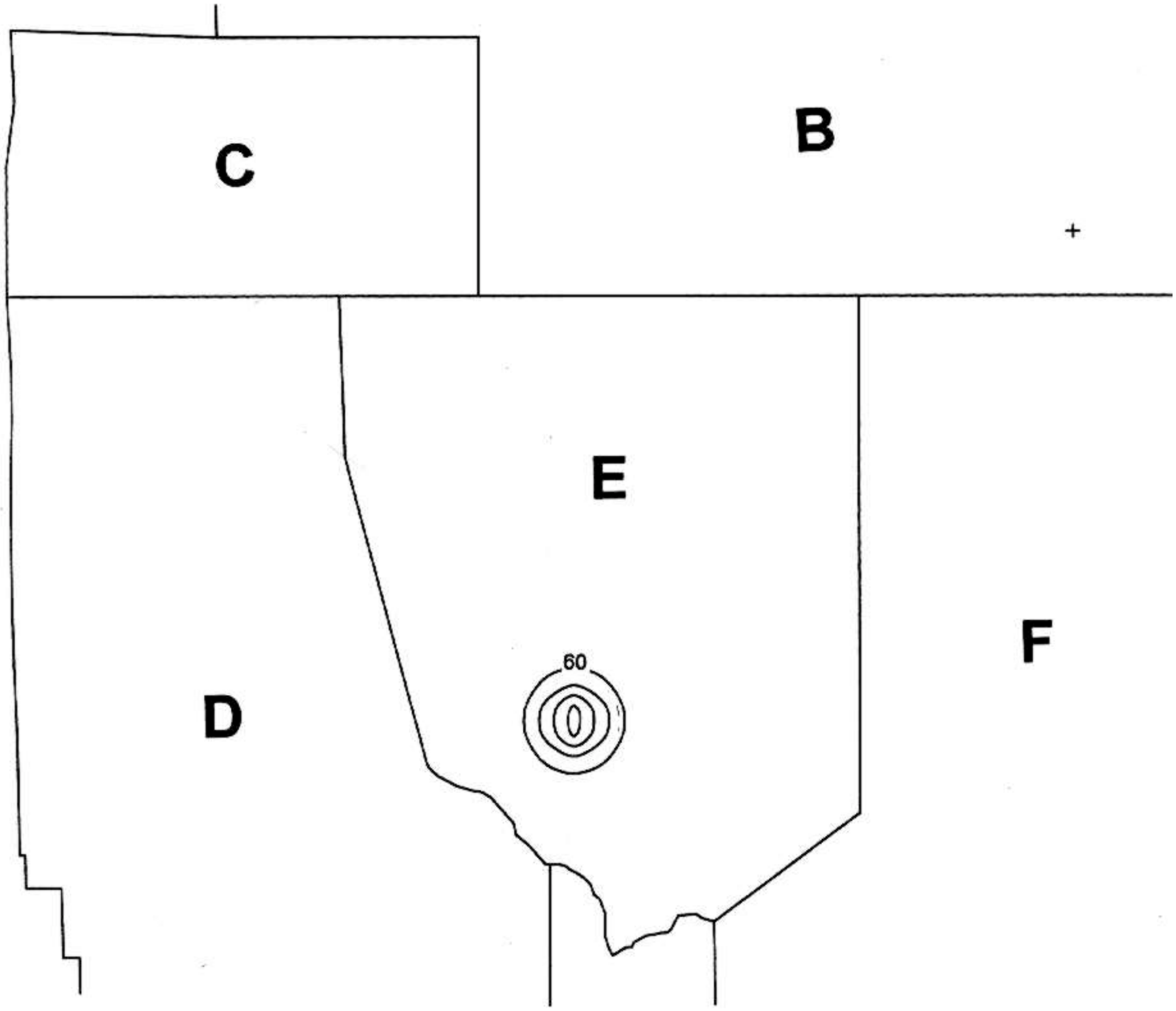

Figure 1.7-3. CDNL Noise Contours at Airport Lake

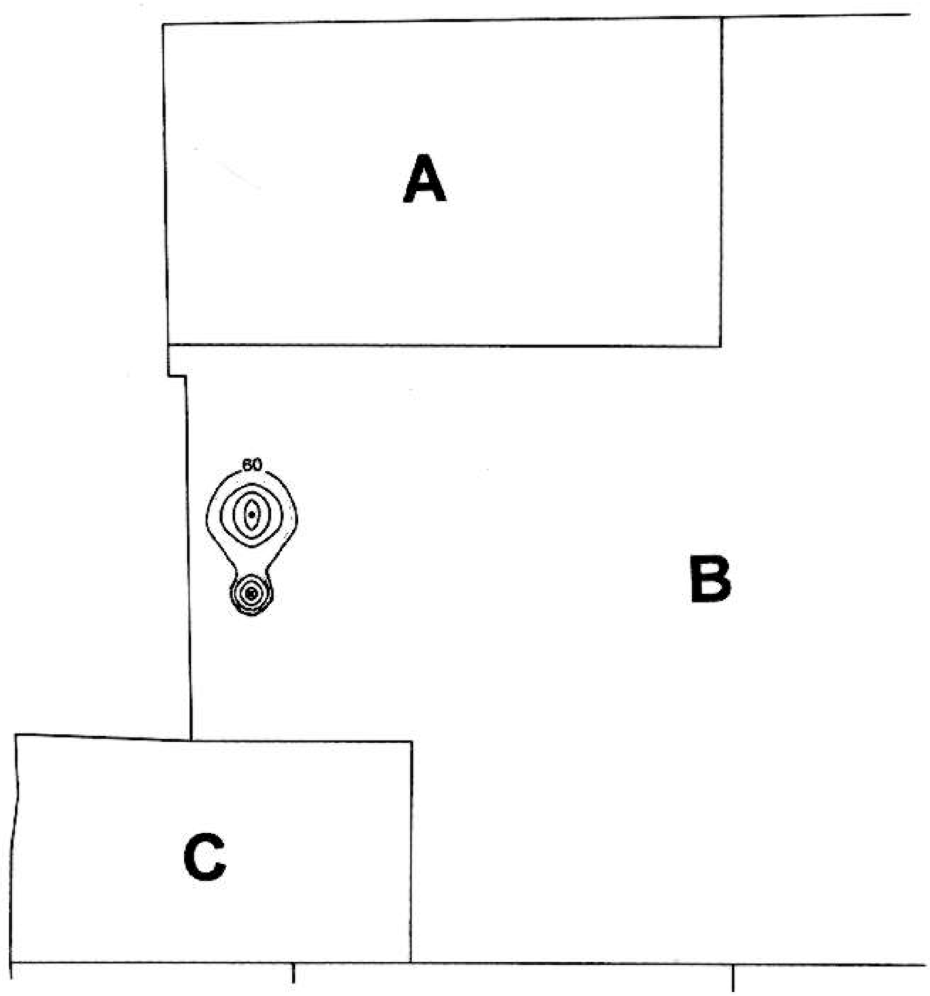

Figure 1.7-4. CDNL Noise Contours on Cactus Flats and Upper Cactus

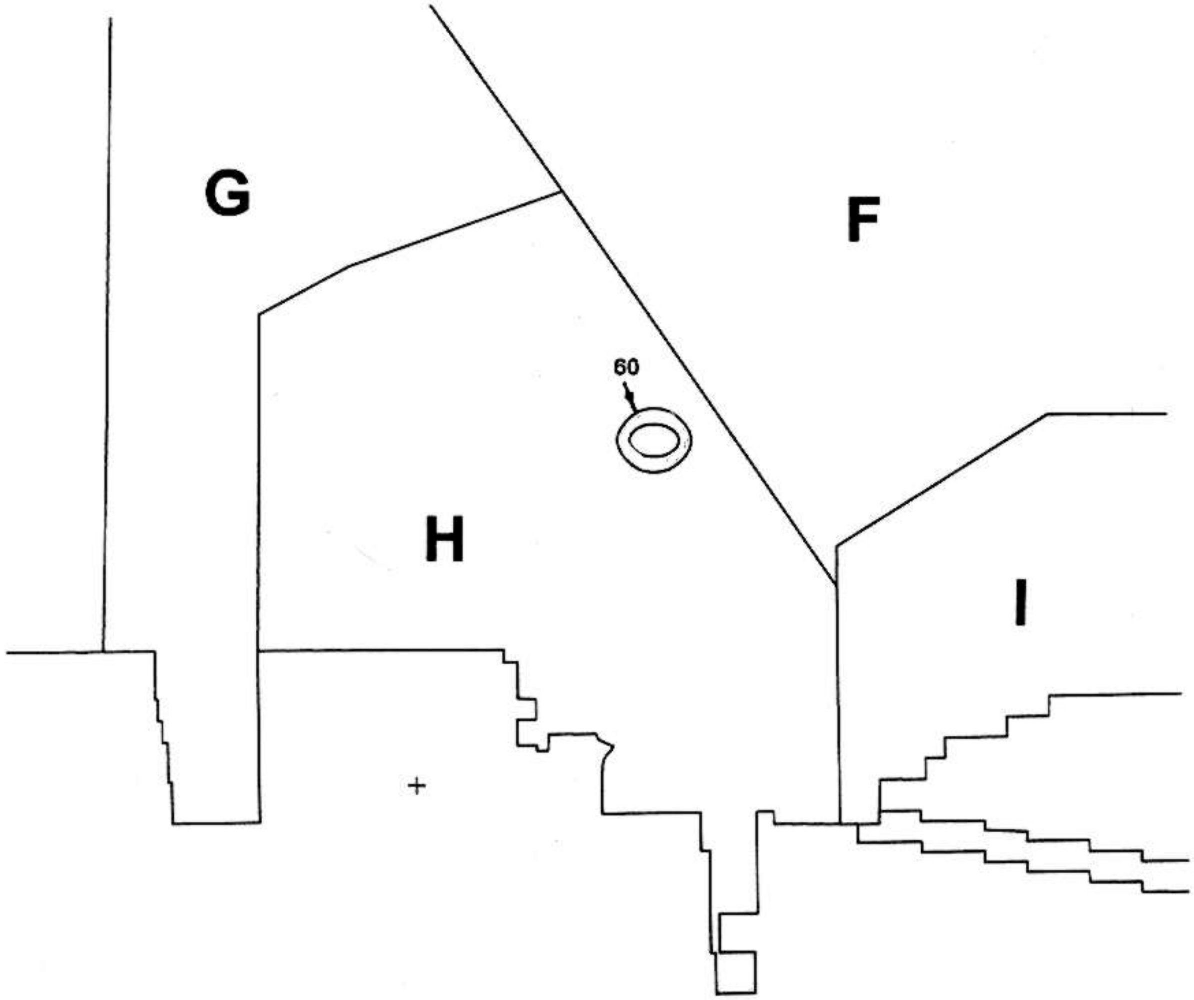

Figure 1.7-5. CDNL Noise Contours on Area R

1.7.3 South Range

The main activity within the South Range occurs in the Electronic Combat Range (ECR). Various types of electronic combat testing take place on the ECR, including the development and evaluation of tactics against surface-to-air threats. Mojave B North and South are also part of the South Range. These areas support a variety of testing scenarios, including air-to-air gunnery and air-to-ground ordnance delivery. The remaining component in the South Range is the Superior Valley Tactical Training Range. This range is primarily an air-to-surface weapons delivery testing and training range. Since 1995, all ordnance delivered to the range at Superior Valley has been inert. No live ordnance detonations were modeled in the South Range. (Wyle 1998)

1.8 Supersonic Naval Ordnance Research Track Operations

The Supersonic Naval Ordnance Research Track (SNORT), located in Charlie Range, is a dual-rail track 4.1 miles long, which is used to support a sled that is propelled by solid rocket motors. The sled is a moving test bed used by researchers at NAWS to support a wide variety of testing scenarios. The speed of the sled can be adjusted by the number of motors used to propel it down the track; and can be propelled by the rocket motors up to supersonic speeds. (Wyle 1998)

The noise calculations for SNORT operations are based on an empirical fit to rocket noise data presented by Sutherland at the 15th AIAA Aeroacoustic Conference.[20] The data used in the empirical model is derived from a number of studies published on rocket noise measurements made in the late ’50s and early ’60s. A computational implementation of this model (SNORTM) was developed to estimate the noise levels for SNORT operations. The model assumes the sound source (rocket sled) is omni-directional and the decrease in noise level is only due to spherical spreading. Excluded from the noise model is the reduction in noise level from lateral attenuation. There are no known algorithms for determining this quantity however, and, therefore, it was not included in the model. This factor causes the model to over predict the noise levels by several dBs at distances far from the test track, thus producing a conservative noise calculation. (Wyle 1998)

Table 1.8-1 presents the different types of motors fired at the SNORT facility during the analysis period and their exhaust velocity and average thrusts. The noise model uses these quantities in calculating the sound power. Table 1.8-2 presents the number and types of motors fired between 1991 and 1995. This data was averaged over the 5-year period and was entered into the model to compute the day-night average sound level. (Wyle 1998)

Figure 1.8-1 contains the CNEL noise contours, in increments of 60, 65, 70, 75, 80, and 85 dB, associated with the noise of the rocket motors as it propels the sled down track. The noise as a result of the blast occurring at the end of the track is calculated in the blast section, Section 1.7. (Wyle 1998)

1.9 Overall Noise Exposure for Existing Operations at NAWS

1.9.1 Calculation of Overall Noise Exposure on the North and South Ranges

In order to evaluate the overall noise exposure of all activity at NAWS, noise contours developed using NOISEMAP, MrNMAP, BNOISE, and SNORTM were added together using a grid which covers the entire expanse of the NAWS boundary. The resultant 60-dB and greater CNEL contours are shown in Figure 1.9-1, at increments of 60, 65, 70, 75, 80, and 85 dB. (Wyle 1998)

Table 1.8-1

SNORT Motor Information

Motor Type	ExhaustVelocity feet/second	Average Thrust Lbf
Redeye	7,760	252
Zuni Mk16	6,440	6,530
HVAR	6,923	5,400
Sidewinder Mk 17-1	6,730	3,972
Sparrow Mk 38 Mod 1	7,986	7,085
Shrike Mk 39 Mod 7	7,454	5,470
2.2 KS 11000	5,732	11,600
Hawk XM22E8	7,567 / 6,569	13,000 / 1,740
Nike M5E1 (M88)	6,279	42,235
Improved Honest John	6,923	99,700

Table 1.8-2

Annual SNORT Facility Motor Expenditures

Motor Type	1991	1992	1993	1994	1995	5-Year Avg. Firings
Redeye	1	18	17	0	9	9
Zuni Mk16	103	140	174	95	66	116
HVAR	68	100	216	93	345	164
Sidewinder Mk 17-1	4	2	0	0	18	5
Sparrow Mk 38 Mod 1	0	0	4	0	5	2
Shrike Mk 39 Mod 7	0	0	0	0	3	1
2.2 KS 11000	6	1	0	0	4	2
Hawk XM22E8	0	0	0	0	7	1
Nike M5E1 (M88)	28	40	249	98	108	105
Improved Honest John	0	6	0	0	0	1

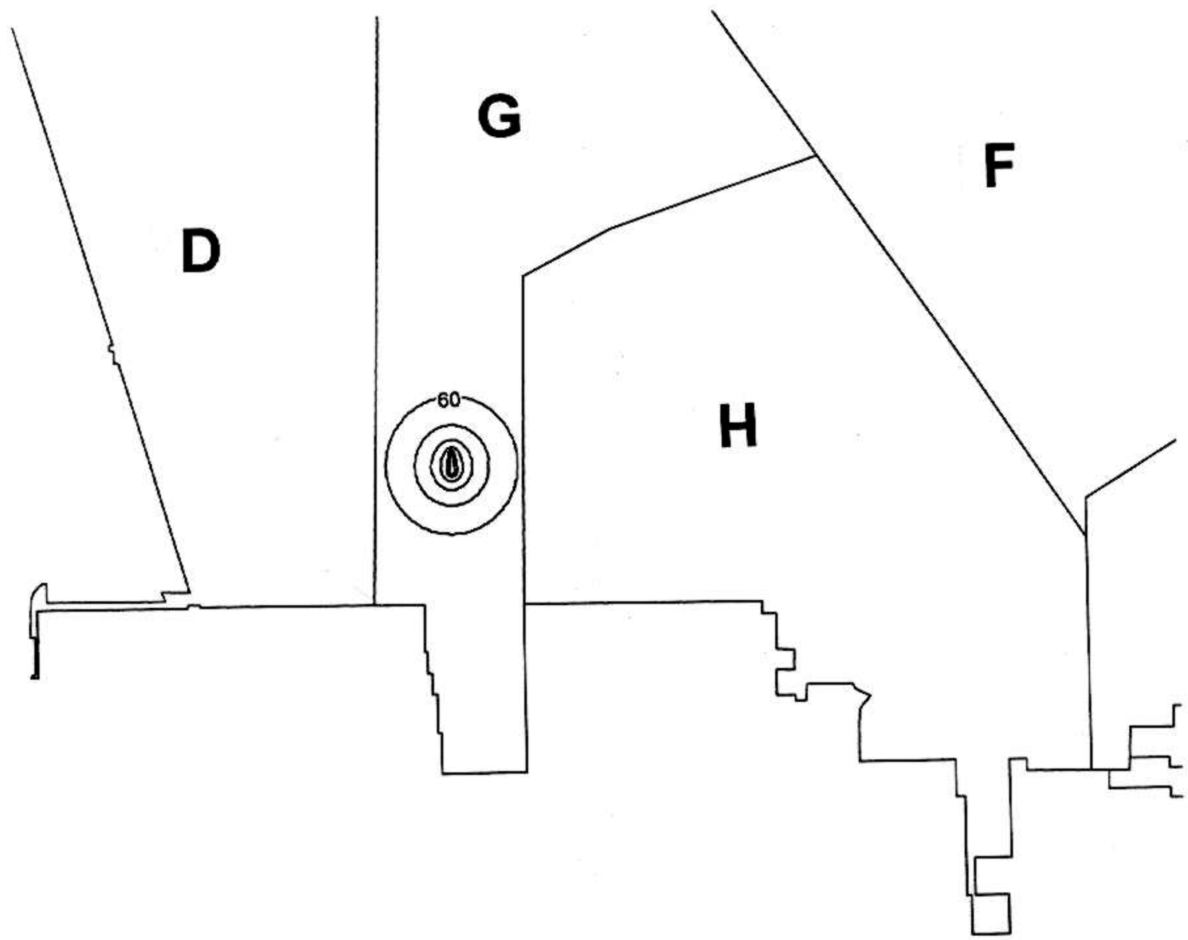

Figure 1.8-1. Noise Contours Due to Supersonic Naval Ordnance

TRACK Operations

1.9.2 Overall Noise Exposure from Existing Military Activities on the North Range

Figure 1.9-1 presents the overall CNEL contours for all military activity on the North Range and its sub-ranges, including the existing supersonic flight events presented in Section 5.1 of this report. Although an average of 7,200 flight hours (as derived from the average number of minutes per sortie at each altitude band contained in Table 1.6-3, Annual Flight Operations on Ranges) was spent in the restricted area airspace above the North Range by various DoD aircraft annually, the majority (54 percent) of that flight activity by all users was above 5,000 feet AGL. This activity contributes very little relative to the annual noise contours of the entire range airspace. As such, the CNEL levels on the ground are dominated by other uses of the range, namely operations associated with the airfield and blast noise. (Wyle 1998)

Activities contributing most significantly to the 60-dB CNEL and greater contour are those of the Burro Canyon blast operations in central George Range and the airfield activity (departures, arrivals, Touch-and-Go's, and FCLPS) on the Main Base. The noise levels of all other operations on North Range combined produce noise levels extending off base of less than 60-dB CNEL. (Wyle 1998)

1.9.3 Overall Noise Exposure from Existing Military Activities on the South Range

Similar to the North Range, although only an average of 1,600 flight hours (as derived from the average number of minutes per sortie at each altitude band contained in Table 1.6-3, Annual Flight Operations on Ranges) were spent in the restricted area airspace above South Range by various DoD aircraft annually, the majority (63 percent) of that flight activity by all users was above 5,000 feet AGL. As such, these flight operations contribute very little relative to the annual noise contours of the entire range airspace. The CNELs on the ground are all less than 45 dB. (Wyle 1998)

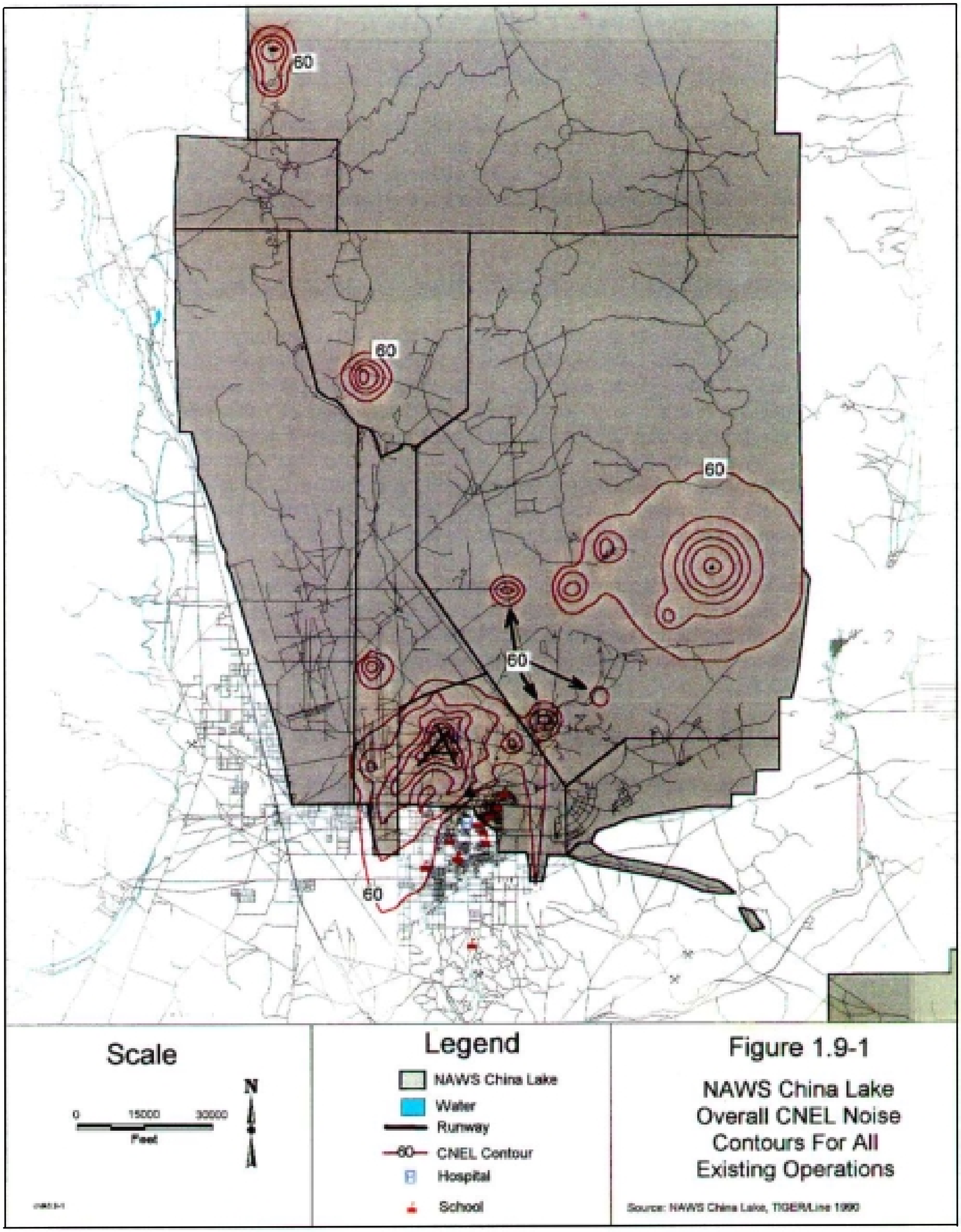

Figure 1.9-1
NAWS China Lake Overall CNEL Noise Contours For All Existing Operations

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2.0 Proposed Alternatives for Airfield Operations

The purpose of this section is to assess the noise impacts associated with the two proposed alternatives at NAWS. Section 2.1 discusses the airfield operations and noise exposure related to the Limited Expansion Alternative at NAWS, while Section 2.2 discusses airfield operations and noise exposure related to the Moderate Expansion Alternative. (Wyle 2001)

2.1 Airfield Operations and Noise Exposure for the Limited Expansion Alternative

2.1.1 Airfield Flight Operations

Based on input received from NAWS personnel, under the Limited Expansion Alternative, airfield flight operations would increase by 15 percent over the operation levels.[16] In addition to this change, F/A-18E/F aircraft operations would increase to 52 percent of all F/A-18 operations at NAWS, with the remaining 48 percent being F/A-18C/D flight operations. Overall, the F/A-18E/F aircraft would account for approximately 30 percent of the airfield operations at NAWS. Table 2.1-1 provides the airfield flight operations for this alternative. (Wyle, November 2001)

Table 2.1-2 provides the modeled airfield operations for this alternative by aircraft type for the F/A-18C/D, F/A-18E/F, EA-6B, and AV-8B aircraft. Note that the operations contained in this table are based on the 305 days of ATAA data as presented in Section 1.5 of this document, scaled to reflect the 15 percent increase in airfield flight operations. By applying the factor of ATAA days (305) of data to one calendar year (365) as discussed in Section 1.5, modeled flight operations would increase from 15,925 to 18,313 annual operations (counting patterns as one operation for noise modeling purposes). (Wyle 2001)

To prepare noise contours, the noise model requires the number of operations on a daily basis. Using the procedure described in Section 1.5, average busy day operations for the Limited Expansion Alternative as presented in Table 2.1-3 was computed (see page C1-1). (Wyle 2001)

2.1.2 Runway and Flight Track Utilization

All operational parameters utilized for the conditions, including runway and flight track utilization, would remain the same under this alternative. By applying the runway and flight track utilization percentages discussed in Section 1.5, the modeled average busy-day flight operations are calculated and are presented in Table 2.1-3 for the Limited Expansion Alternative (see page C1-1). This table includes the average-busy day operations by aircraft type, flight track, and temporal period. This table shows a grand total of approximately 78 average busy-day flight operations for this alternative. Note that the closed pattern operations in this table are counted as one operation for purposes of entry into NOISEMAP. Of the total average busy-day operations, less than 2 percent are conducted during the nighttime (2200–0700). (Wyle 2001)

2.1.3 Pre-Flight and Maintenance Run-Up Operations

The modeled aircraft would not typically conduct pre-flight run-ups; therefore, none were modeled. (Wyle 2001)

In addition to the increase in flight operations of 15 percent over conditions, high-power maintenance run-up operations would also increase by 15 percent. Table 2.1-4 contains the modeled average busy-day high-power maintenance run-up operations by aircraft type for the Limited Expansion Alternative. Note that F/A-18E/F would comprise approximately 52 percent of the total F/A-18 run-up operations, with the remaining 48 percent accomplished by the C/D models. A total of 156 run-up operations would occur at the high-power run-up area under this alternative. Of the 156 run-ups, approximately 67 percent, or 105 run-ups, would be conducted by F/A-18 aircraft, with the remaining 33 percent, or 51 run-ups, completed by EA-6B aircraft. The day/evening/night utilization rates would remain unchanged. (Wyle 2001)

Table 2.1-1
Airfield Flight Operations for the Limited Expansion Alternative

ATAA Aircraft Category	Operation Type	Reported Annual Operations (based on 305 days of ATAA data)			
		Day	Evening	Night	Total
F/A-18C/D**	Departures	1898	103	51	2052
	Arrivals	1967	133	18	2118
	Touch & Go	1112	127	25	1264
	FCLP	113	27		140
F/A-18E/F	Departures	2056	111	56	2223
	Arrivals	2132	144	20	2296
	Touch & Go	1205	138	27	1370
	FCLP	121	31		152
EA-6B (A-6 ATAA type)	Departures	555	36	5	596
	Arrivals	640	72	3	715
	Touch & Go	753	73	1	827
	FCLP	148	82	1	231
AV-8B	Departures	510	30	16	556
	Arrivals	422	21	14	457
	Touch & Go	285	15	6	306
	FCLP				
VM Propeller*	Departures	1,258	14	47	1,319
	Arrivals	1,254	39	14	1,307
	Touch & Go	164	41	8	213
	FCLP				
VM Heavy*	Departures			4	4
	Arrivals			8	8
	Touch & Go			8	8
	FCLP				
VM Helicopter*	Departures	405	19	12	436
	Arrivals	343	31	4	378
	Touch & Go	611	62		673
	FCLP				
OM Propeller*	Departures	74	4	2	80
	Arrivals	82			82
	Touch & Go	4			4
	FCLP				
OM Heavy*	Departures	4	2		6
	Arrivals	8		2	10
	Touch & Go	14			14
	FCLP				
GA*	Departures	208	19	39	266
	Arrivals	216	29	10	255
	Touch & Go	84	95		179
	FCLP				
F/A-18C/D**	Total	5,090	390	94	5,574
F/A-18E/F	Total	5,514	424	103	6,041
EA-6B	Total	2,096	263	10	2,369
AV-8B	Total	1,217	66	36	1,319
VM Propeller*	Total	2,676	94	69	2,839
VM Heavy*	Total			20	20
VM Helicopter*	Total	1,359	112	16	1,487
OM Propeller*	Total	160	4	2	166
OM Heavy*	Total	26	2	2	30
GA*	Total	508	143	49	700
GRAND TOTAL		18,646	1,498	401	20,545

NOTES: (1) VM denotes Navy/Marine; OM denotes "Other Military"; GA denotes General Aviation.
(2) Patterns are counted as one operation.
(3) All VM and OM jet operations include full-stop VFR and IFR arrivals, whereas full-stop VFR and IFR arrivals have been ignored for all other aircraft.

* Not Modeled.
** Includes A-4, VM Jet and OM Jet

Table 2.1-2

Modeled Flight Operations for the Limited Expansion Alternative at NAWS China Lake (based on 305 days of ATAA data)

ATAA Aircraft Category	Operation Type	Day	Evening	Night	Total
F/A-18C/D	Departures	1898	103	51	2052
	SI Arrivals	382	53	6	441
	OH Arrivals	948	47	8	1003
	CB Arrivals	637	33	4	674
	Touch & Go	1112	127	25	1264
	FCLP	113	27		140
	TOTAL	**5090**	**390**	**94**	**5574**
F/A-18E/F	Departures	2056	111	56	2223
	SI Arrivals	415	58	6	479
	OH Arrivals	1026	51	8	1085
	CB Arrivals	691	35	6	732
	Touch & Go	1205	138	27	1370
	FCLP	121	31		152
	TOTAL	**5514**	**424**	**103**	**6041**
EA-6B	Departures	555	36	5	596
	SI Arrivals	47	21	1	69
	OH Arrivals	354	30	1	385
	CB Arrivals	239	21	1	261
	Touch & Go	753	73	1	827
	FCLP	148	82	1	231
	TOTAL	**2096**	**263**	**10**	**2369**
AV-8B	VFR Departures	510	30	16	556
	SI Arrivals	27		3	30
	OH Arrivals	291	16	8	315
	CB Arrivals	104	5	3	112
	Touch & Go	285	15	6	306
	FCLP				
	TOTAL	**1217**	**66**	**36**	**1319**
All Aircraft Total		**13917**	**1143**	**243**	**15303**

Note: Patterns counted as one operation

SI=Straight In, OH=Overhead, CB=Carrier Break, FCLP=Field Carrier Landing Practice.

Table 2.1-4
Single-Engine Maintenance Run-Up Operations at High-Power Turn-Up Area for the Limited Expansion Alternative at NAWS China Lake

Aircraft Type	Magnetic Heading (Degrees)	Power Setting	Duration (Minutes)	Annual Ops	Percent Utilization Day	Evening	Night	Modeled Average Busy-Day Operations Day	Evening	Night	Total
F/A-18C/D	230	idle	15	18	49%	49%	2%	0.02	0.02	0	0.04
		mil	2.5	18	49%	49%	2%	0.02	0.02	0	0.04
		AB	2.5	18	49%	49%	2%	0.02	0.02	0	0.04
F/A-18E/F	230	idle	15	19	49%	49%	2%	0.02	0.02	0	0.04
		mil	2.5	19	49%	49%	2%	0.02	0.02	0	0.04
		AB	2.5	19	49%	49%	2%	0.02	0.02	0	0.04
EA-6B	230	idle	15	19	45%	45%	10%	0.02	0.02	0	0.04
		mil	2	19	45%	45%	10%	0.02	0.02	0	0.04

AB = Afterburner Power mil = Military Power Source: NAWS China Lake

2.1.4 Aircraft Flight Profiles, Noise Data, and Climatological Data

All flight profiles, noise data, and climatological data utilized in modeling the conditions at the NAWS airfield in Section 1.5 would remain unchanged in the projected conditions. Modeled flight profile differences between the F/A-18C/D and the F/A-18E/F include variations in power setting, airspeed, and altitude profile. NOISEFILE contains reference data for all four modeled aircraft types. (Wyle 2001)

2.1.5 Airfield Noise Exposure for the Limited Expansion Alternative

Using the data described in Sections 2.1.1 through 2.1.4, NOISEMAP Version 6.5 was used to calculate and plot the 65-dB through 85-dB CNEL contours for the average busy day conditions in Figure 2.1-1. Comparing the contours, the CNEL contour areas for the Limited Expansion Alternative retain the same shape as contour bands for the baseline conditions. The increase in contour size for the Limited Expansion Alternative is solely due to the increase in the operation levels by 15 percent over baseline conditions. Overall, Table 2.1-5 compares the impacts in terms of acreage and estimated population within contour bands at 5-dB increments of the baseline conditions and the Limited Expansion Alternative at NAWS. (Wyle, November 2001)

The computed contour areas, dwelling units, and population estimates exclude NAWS. As mentioned in Section 1.5, the population and dwelling data reported herein, based on the population density methodology, is most useful for determining relative change in impact between noise contours of different operational conditions and/or scenarios. (Wyle 2001)

The estimated total area within the 65-dB to 70-dB CNEL contour would be 1,235 acres, excluding the base boundaries. This is approximately 40 percent larger than the off-Station area impacted within the same contour band under the baseline conditions. The estimated off-Station population and dwelling units within the 65-dB to 70-dB CNEL contour area, using methodology described in Section 1.5, would be 1,374 people and 616 units, respectively. The off-Station population impacted is approximately 28 percent more compared to the baseline conditions. Overall, the 65-dB to 70-dB CNEL contours under the Limited Expansion Alternative has expanded off-Station to cover approximately 18 acres. The off-Station population and dwelling units within the 70-dB to 75-dB CNEL contour band would be approximately 9 people and 4 housing units, respectively. No off-Station impacts are anticipated within contour area of CNEL 75+-dB. (Wyle, November 2001)

Table 2.1-5
Estimated Off-Base Land Areas, Dwellings, and Populations Within Average Busy-Day CNEL Noise Exposure Contours for Baseline Airfield Conditions and the Limited Expansion Alternative at NAWS China Lake*

DNL Contour Bands	Item	Baseline	Limited Expansion Alternative	Difference
65-70 dB	Acres	889	1235	**346**
	Dwelling Units	489	616	127
	Population	1075	1374	299
70-75 dB	Acres	57	18	-39
	Dwelling Units	29	4	-25
	Population	69	9	-60
75-80 dB	Acres			
	Dwelling Units			
	Population			

*NAWS China Lake and bodies of water excluded.
**Estimates based on 1990 U.S. Census using population density methods

2.2 Airfield Operations and Noise Exposure for the Moderate Expansion Alternative

2.2.1 Airfield Flight Operations

Based on input received from NAWS personnel, under the Moderate Expansion Alternative conditions, airfield flight operations would increase by 25 percent over the baseline operation levels.[16] F/A-18E/F aircraft operations would remain at 52 percent of all F/A-18 operations at NAWS with the remaining 48 percent being F/A-18C/D flight operations. Overall, the F/A-18E/F aircraft would account for approximately 30 percent of the airfield operations at NAWS. Table 2.2-1 provides the airfield flight operations for this alternative. (Wyle, November 2001)

Table 2.2-2 provides the modeled airfield operations for this alternative by aircraft type for the F/A-18C/D, F/A-18E/F, EA-6B, and AV-8B aircraft. Note that the operations contained in this table are based on the 305 days of ATAA data presented in Section 1.5 of this document, scaled to reflect the 25 percent increase in airfield flight operations. By extrapolating the 305 ATAA days of data to one calendar year (365) as discussed in Section 1.5, modeled annual flight operations would increase from 15,925 to 19,907 annual operations (counting patterns as one operation for noise modeling purposes). (Wyle 2001)

To prepare noise contours, the noise model requires the number of operations on a daily basis. Using the procedure described in Section 1.5, average busy day operations were computed for the Moderate Expansion Alternative as presented in Table 2.2-3 (see page C1-2). (Wyle 2001)

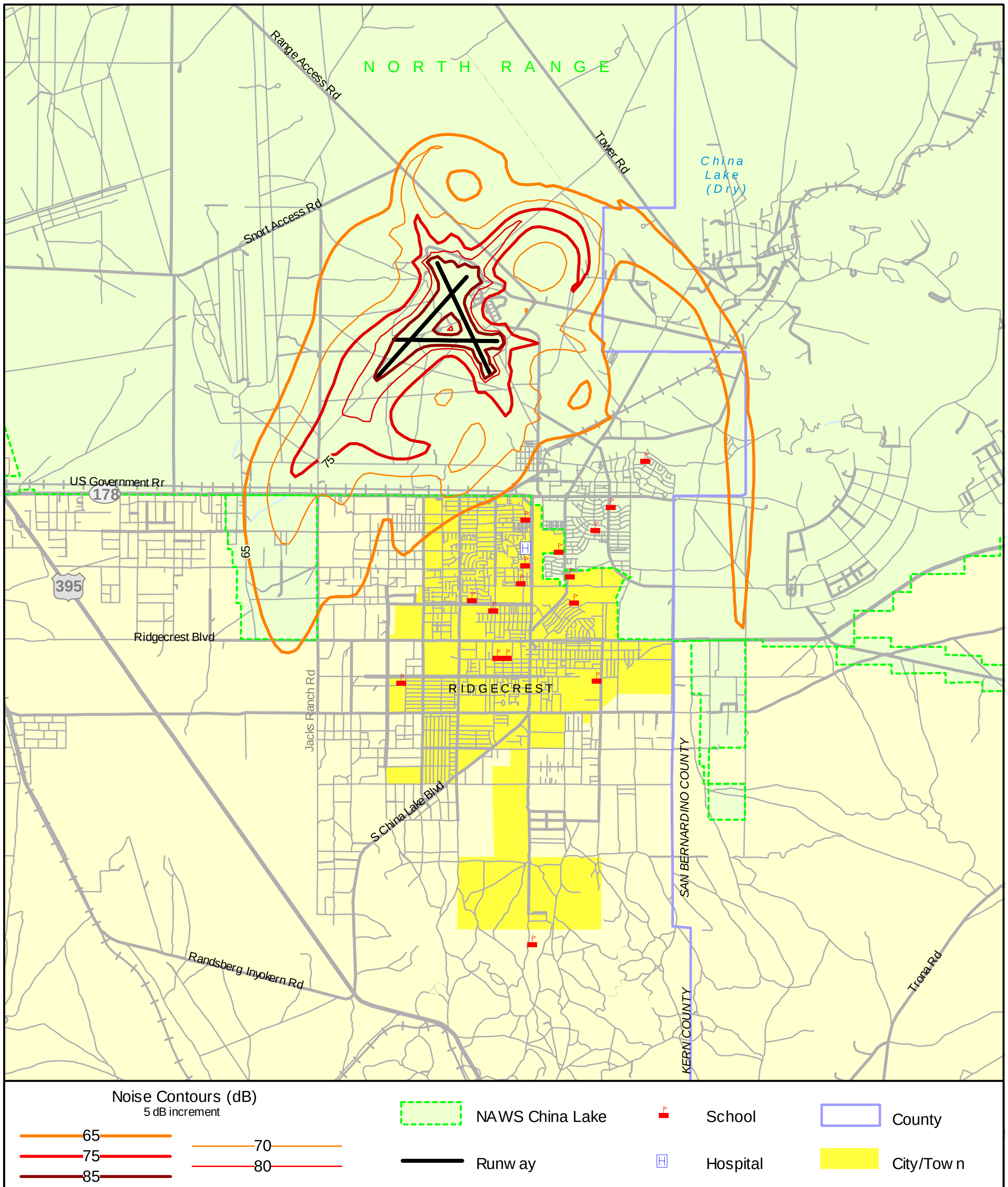

Figure 2.1-1
NAWS China Lake
Average Busy-Day CNEL Contours for
Limited Expansion Alternative

Table 2.2-1

Airfield Flight Operations for the Moderate Expansion Alternative

ATAA Aircraft Category	Operation Type	Reported Annual Operations (based on 305 days of ATAA data)			
		Day	Evening	Night	Total
F/A-18C/D**	Departures	2063	112	56	2231
	Arrivals	2139	145	20	2304
	Touch & Go	1209	139	27	1375
	FCLP	123	29		152
F/A-18E/F	Departures	2235	121	60	2416
	Arrivals	2317	157	23	2497
	Touch & Go	1310	150	29	1489
	FCLP	132	34		166
EA-6B (A-6 ATAA type)	Departures	603	39	6	648
	Arrivals	695	76	3	774
	Touch & Go	818	79	1	898
	FCLP	160	89	1	250
AV-8B	Departures	554	32	18	604
	Arrivals	458	24	15	497
	Touch & Go	310	17	7	334
	FCLP				
VM Propeller*	Departures	1,368	16	51	1,435
	Arrivals	1,363	42	16	1,421
	Touch & Go	179	45	9	233
	FCLP				
VM Heavy*	Departures			4	4
	Arrivals			9	9
	Touch & Go			9	9
	FCLP				
VM Helicopter*	Departures	440	20	13	473
	Arrivals	373	34	4	411
	Touch & Go	664	67		731
	FCLP				
OM Propeller*	Departures	80	4	2	86
	Arrivals	89			89
	Touch & Go	4			4
	FCLP				
OM Heavy*	Departures	4	2		6
	Arrivals	9		2	11
	Touch & Go	16			16
	FCLP				
GA*	Departures	226	20	42	288
	Arrivals	235	31	11	277
	Touch & Go	92	103		195
	FCLP				
F/A-18C/D**	Total	5,534	425	103	6,062
F/A-18E/F	Total	5,994	462	112	6,568

Table 2.2-2

Modeled Flight Operations for the Moderate Expansion Alternative at NAWS China Lake (based on 305 days of ATAA data)

ATAA Aircraft Category	Operation Type	Day	Evening	Night	Total
F/A-18C/D	Departures	2063	112	56	2231
	SI Arrivals	416	58	7	481
	OH Arrivals	1030	51	9	1090
	CB Arrivals	693	36	4	733
	Touch & Go	1209	139	27	1375
	FCLP	123	29		152
	TOTAL	**5534**	**425**	**103**	**6062**
F/A-18E/F	Departures	2235	121	60	2416
	SI Arrivals	451	63	7	521
	OH Arrivals	1115	56	9	1180
	CB Arrivals	751	38	7	796
	Touch & Go	1310	150	29	1489
	FCLP	132	34		166
	TOTAL	**5994**	**462**	**112**	**6568**
EA-6B	Departures	603	39	6	648
	SI Arrivals	51	22	1	74
	OH Arrivals	384	32	1	417
	CB Arrivals	260	22	1	283
	Touch & Go	818	79	1	898
	FCLP	160	89	1	250
	TOTAL	**2276**	**283**	**11**	**2570**
AV-8B	VFR Departures	554	32	18	604
	SI Arrivals	29		3	32
	OH Arrivals	316	18	9	343
	CB Arrivals	113	6	3	122
	Touch & Go	310	17	7	334
	FCLP				
	TOTAL	**1322**	**73**	**40**	**1435**
All Aircraft Total		**15126**	**1243**	**266**	**16635**

Note: Patterns counted as one operation
SI=Straight In, OH=Overhead, CB=Carrier Break, FCLP=Field Carrier Landing Practice.

2.2.3 Pre-Flight and Maintenance Run-Up Operations

The modeled aircraft would not typically conduct pre-flight run-ups; therefore, none were modeled. (Wyle 2001)

In addition to the increase in flight operations of 25 percent over baseline conditions, high-power maintenance run-up operations would also increase by 25 percent.[16] Table 2.1-4 contains the modeled average busy-day high-power maintenance run-up operations by aircraft type for the Moderate Expansion Alternative. Note that the F/A-18E/F would comprise approximately 52 percent of the total F/A-18 run-up operations, with the remaining 48 percent accomplished by the C/D models. A total of 168 run-up operations would occur at the high-power run-up area under this alternative. Of the 168 run-ups, approximately 67 percent, or 114 run-ups, would be conducted by

F/A-18 aircraft, with the remaining 33 percent, or 54 run-ups, completed by EA-6B aircraft. The day/evening/night utilization rates would remain unchanged. (Wyle, November 2001)

2.2.4 Aircraft Flight Profiles, Noise Data, and Climatological Data

All flight profiles, noise data, and climatological data utilized in modeling the baseline conditions at the NAWS airfield in Section 1.5 would remain unchanged for this alternative. NOISEFILE contains reference data for all four modeled aircraft types. (Wyle, November 2001)

2.2.5 Airfield Noise Exposure for the Moderate Expansion Alternative

Using the data described in Sections 2.2.1 through 2.2.4, NOISEMAP Version 6.5 was used to calculate and plot the 65-dB through 85-dB CNEL contours for the average busy day operations for this alternative. These contours are presented in Figure 2.1-1. Compared to the previous contours, the CNEL contours for the Moderate Expansion Alternative have increased in size, but follow the overall shape of the baseline and the Limited Expansion Alternative contours. This increase in contour area is caused solely by the increased operations by 25 percent when compared to baseline and by approximately 9 percent when compared to the Limited Expansion Alternative. (Wyle, November 2001)

Table 2.2-4
Single-Engine Maintenance Run-Up Operations at High-Power Turn-Up Area for the Moderate Expansion Alternative at NAWS China Lake

Aircraft Type	Magnetic Heading (Degrees)	Power Setting	Duration (Minutes)	Annual Ops	Percent Utilization			Modeled Average Busy-Day Operations			
					Day	Evening	Night	Day	Evening	Night	Total
F/A-18C/D	230	idle	15	18	49%	49%	2%	0.02	0.02	0	0.04
		mil	2.5	18	49%	49%	2%	0.02	0.02	0	0.04
		AB	2.5	18	49%	49%	2%	0.02	0.02	0	0.04
F/A-18E/F	230	idle	15	19	49%	49%	2%	0.03	0.03	0	0.06
		mil	2.5	19	49%	49%	2%	0.03	0.03	0	0.06
		AB	2.5	19	49%	49%	2%	0.03	0.03	0	0.06
EA-6B	230	idle	15	19	45%	45%	10%	0.03	0.03	0	0.06
		mil	2	19	45%	45%	10%	0.03	0.03	0	0.06

AB = Afterburner Power mil = Military Power Source: NAWS China Lake

In the northern and eastern portions of the CNEL contours, the noise levels are increased significantly from increases operations. East of the city of Ridgecrest extends a small portion of the 65-dB CNEL contour, which is generally caused by F/A-18 arrival operations. (Wyle, November 2001)

Table 2.2-5 compares the impacts in terms of acreage and estimated population within contour bands at 5-dB increments of the baseline conditions, the Limited Expansion Alternative and the Moderate Expansion Alternative at NAWS. The computed contour areas, dwelling units, and population estimates exclude NAWS station boundary. (Wyle 2001)

The total area within the 65-dB to 70-dB CNEL contours would be approximately 1,502 acres, excluding the Station boundaries. This is a 70 percent increase in off-Station area when compared to the baseline conditions. The estimated off-Station population and dwelling units within the 65-dB to 70-dB CNEL, using the methodology described in Section 1.5, would be 1,528 people and 673 units. The population within the 70- to 75-dB CNEL contour band would be approximately 59, while the area and dwelling units impacted within the same contour band would be approximately 44 acres and 25 units, respectively. There would be no off-Station impacts within the 75+-dB CNEL contour area. (Wyle, November 2001)

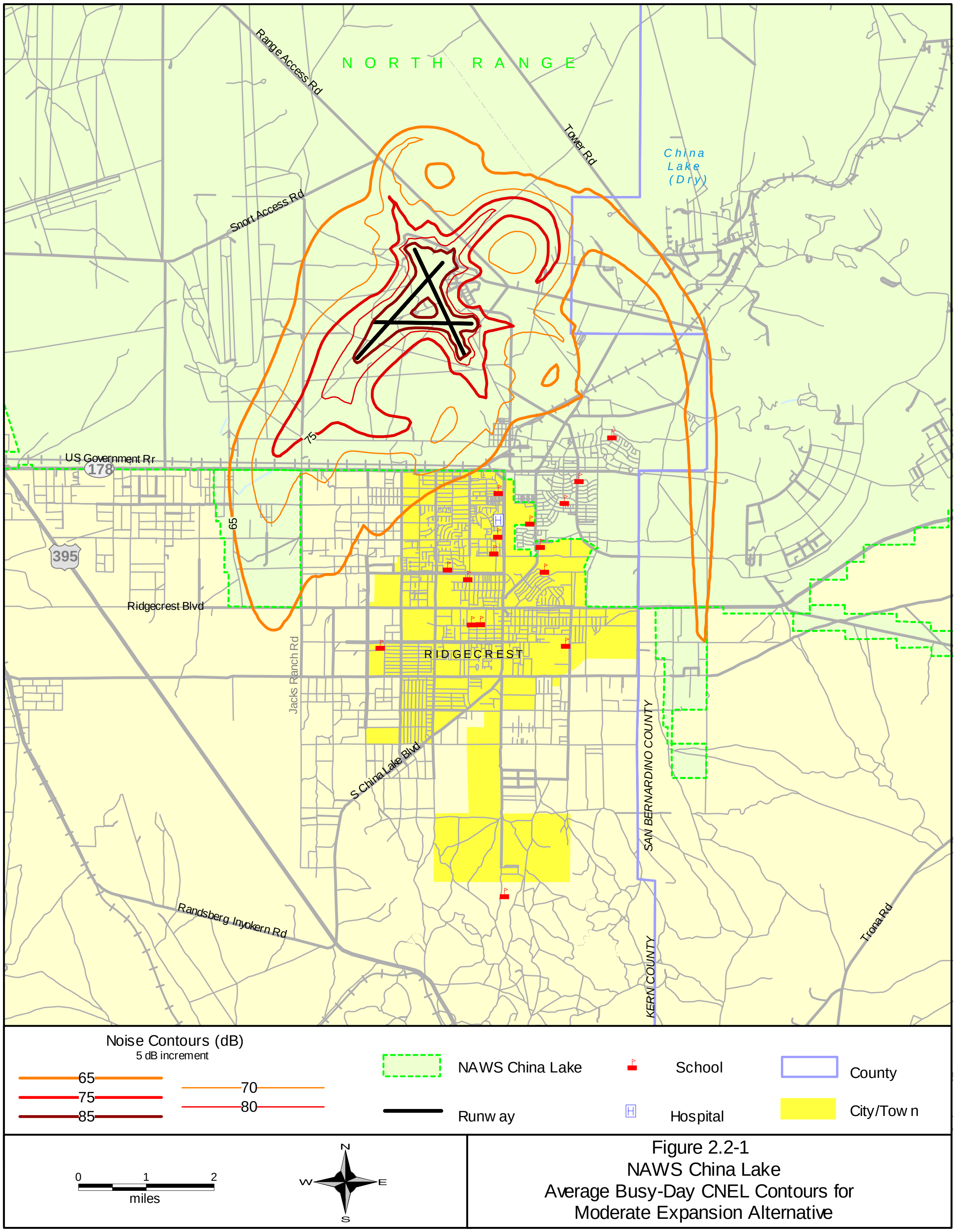

Figure 2.2-1
NAWS China Lake
Average Busy-Day CNEL Contours for
Moderate Expansion Alternative

Table 2.2-5
Estimated Off-Base Land Areas, Dwellings, and Populations Within Average Busy-Day CNEL Noise Exposure Contours for Baseline Airfield Conditions, the Limited Expansion Alternative and the Moderate Expansion Alternative at NAWS China Lake*

DNL Contour	Item	Baseline	LEA[1]	MEA[2]	LEA-Baseline	MEA-Baseline	MEA-LEA
65-70 dB	Acres	889	1235	1458	346	569	223
	Dwelling Units	489	616	673	127	184	57
	Population	1075	1374	1528	299	453	154
70-75 dB	Acres	57	18	44	-39	-13	26
	Dwelling Units	29	4	25	-25	-4	21
	Population	69	9	59	-60	-10	50
75-80 dB	Acres						
	Dwelling Units						
	Population						

*NAWS China Lake and bodies of water excluded.
**Estimates based on 1990 U.S. Census using population density methods

Table 2.2-5 shows the impacts in terms of acreage and estimated population within contour bands at 5-dB increments for the projected conditions at NAWS. The computed contour areas, dwelling units, and population estimates exclude NAWS. As mentioned in Section 1.5, the population and dwelling data reported herein, based on the population density methodology, is most useful for determining <u>relative change in impact</u> between noise contours of different operational conditions and/or scenarios. (Wyle 2001)

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3.0 Supersonic Flight Events in the Range Airspace of NAWS China Lake

This section contains a discussion of the results for the analysis of the supersonic flight events conducted on the North and South Ranges of NAWS China Lake. Sections 3.1 and 3.2 discuss the existing condition and projected condition supersonic flight events and noise exposure, respectively, on the North Range. Sections 3.3 and 3.4 discuss the existing condition and projected condition supersonic events and resultant noise exposure on the South Range. Section 3.5 presents the cumulative contours for the combined North and South range operations. (Wyle 1999)

3.1 Existing Supersonic Flight Events on the North Range of NAWS China Lake

All supersonic flight events modeled on the North Range were done so over the George Range and Coso Range airspace. NAWS China Lake personnel provided supersonic flight events within the boundaries of these range airspace components for the existing condition.[22] The event information provided consisted of aircraft type, maximum Mach number, and altitude (Table 3.1-1). All events were modeled between 0700 and 1900 local time on a single, south to north flight track, shown in Figure 3.1-1. This data was entered into a spreadsheet for analysis, and a total of 24 events, representing the existing conditions, were analyzed. The majority of the supersonic flights (approximately 92 percent) are conducted using F/A-18C/D aircraft with the remaining 8 percent flown by F/A-18E/F aircraft. Table 3.1-1 shows the supersonic flight distribution by aircraft, altitude, and Mach. For example, most F/A-18C/D supersonic events occurred between Mach 1.1 and Mach 1.5 in an altitude block from 25,000 feet to 33,000 feet MSL. (Wyle 1999)

A supersonic maneuvering acoustical direct simulation computer program, BOOMAP3[23], was used for the analysis. BOOMAP3 calculates and plots L_{Cdn} contours representing the cumulative impact of sonic booms due to supersonic activity. Input data for China Lake were created based on the following assumptions:

- A U.S. Standard 1976 Sea Level atmosphere is applicable for converting Mach number to velocity.
- All analysis was performed using an AGL aircraft altitude perspective. Each track uses a nominal ground height for calculation of AGL. Table 3.1-2 documents these nominal ground altitudes.
- Aircraft undergo constant acceleration from Mach 1.0 at the track starting point until the maximum Mach is reached at the mid-point, at which time they undergo a constant deceleration to Mach 1.0 at the track end point.

L_{Cdn} contours were plotted for all existing condition supersonic events, and they are shown in Figure 3.1-2. This figure shows L_{Cdn} 35-, 30- and 25-dB contours. In addition, the overall existing condition noise contours shown in Figure 1.9-1 include the noise exposure resulting from existing condition supersonic flight events over the North Range. (Wyle 1999)

Impacts at ground level can also be expressed in pounds per square foot (psf) of overpressure of a single event. Considering the Mach number and altitude matrix listed in Table 3.1-1, the largest overpressure for constant velocity and altitude flight would be created by the F/A-18C/D flying at 12,000 ft MSL over a nominal ground altitude of 5000 ft. at Mach 1.1, with an overpressure of 9.0 psf. (Wyle 1999)

Table 3.1-1. Distribution of Supersonic Flight Events for Given Mach and Altitude Over North Range for Existing Conditions

Aircraft	Mach	Altitude in Thousands of Feet (MSL)																											
	Number	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
F/A-18C/D	1.0	1																											
(22 events)	1.1			1													2		2		2		2						
	1.2					1														1		1							
	1.3																						2						
	1.4						1																	2					
	1.5						1																		2				
	1.6																									1			
	1.7																												
	1.8																												
	1.9																												
F/A-18E/F	1.0																												
(2 events)	1.1											1																	
	1.2																												
	1.3																												
	1.4																1												
	1.5																												
	1.6																												
	1.7																												
	1.8																												
	1.9																												

Table 3.1-2. Nominal Ground Altitudes

Range	Track	Nominal Ground Altitude MSL
North		5000 ft.
South	1	4000 ft.
South	2	2500 ft.
South	3	5000 ft.

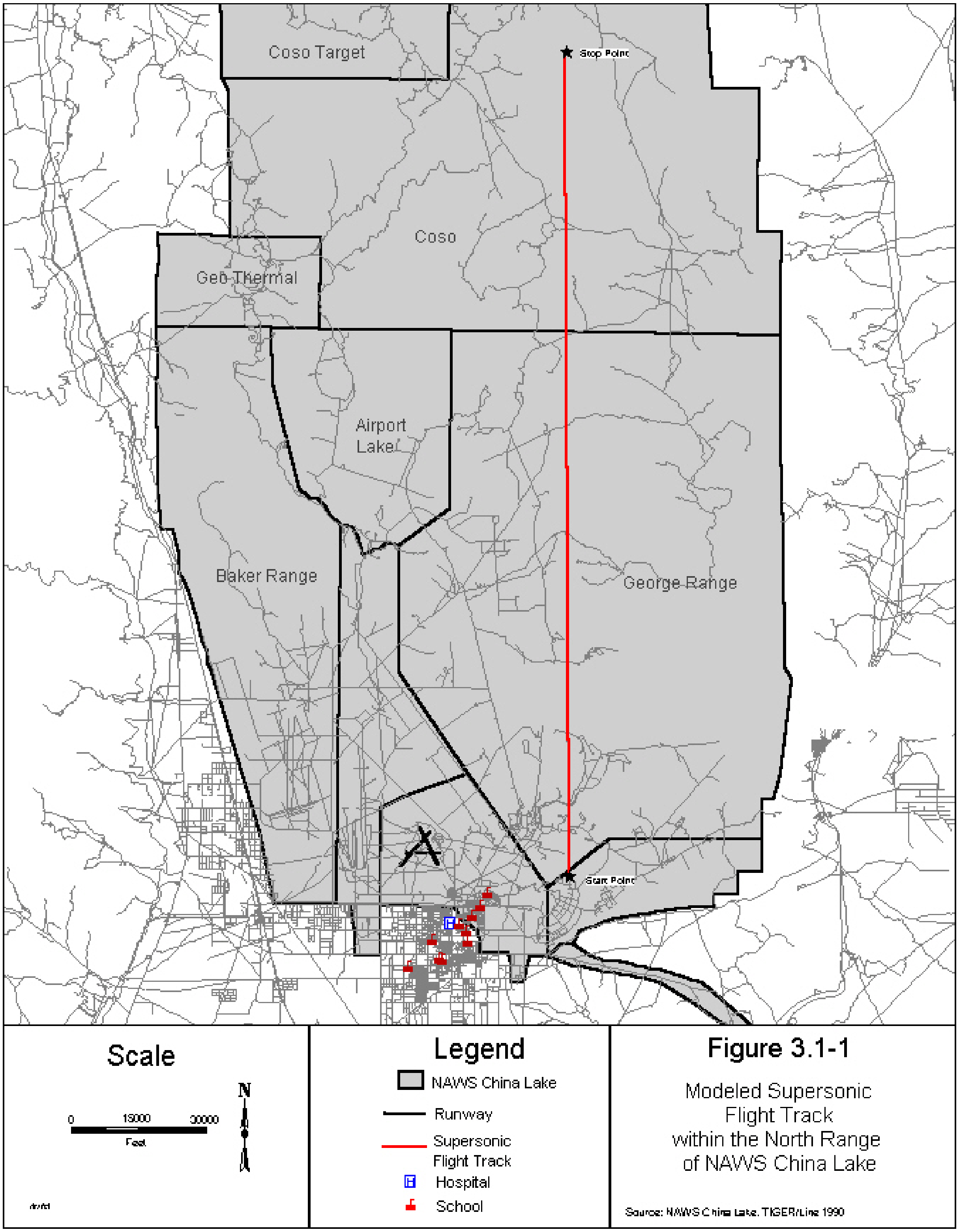


Figure 3.1-1
Modeled Supersonic Flight Track within the North Range of NAWS China Lake

Source: NAWS China Lake, TIGER/Line 1990

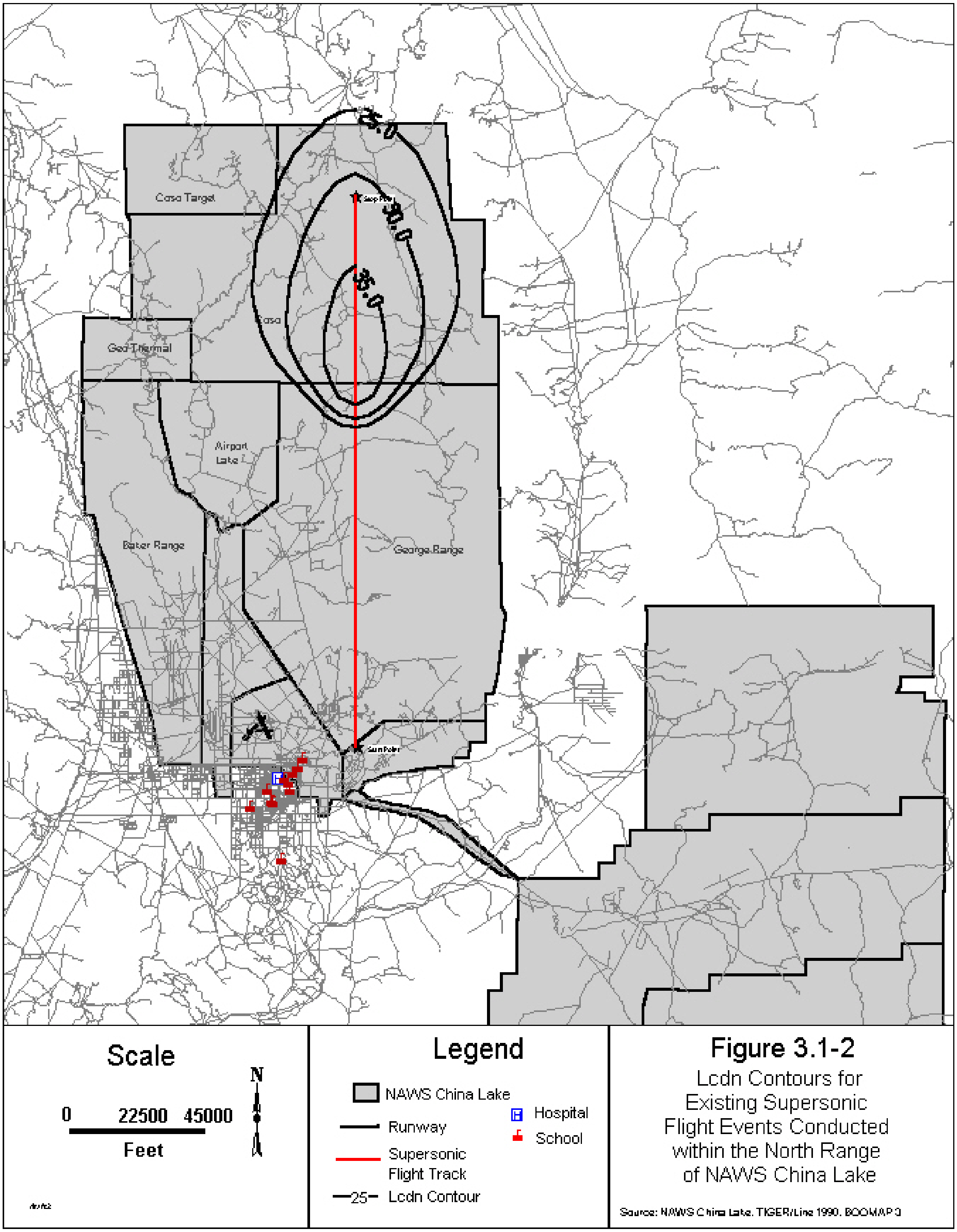


Figure 3.1-2
Ldn Contours for Existing Supersonic Flight Events Conducted within the North Range of NAWS China Lake

3.2 Projected Supersonic Flight Events on the North Range of NAWS China Lake

NAWS personnel provided annual supersonic flight events on the North Range for the projected year condition. The data obtained is shown in Table 3.2-1 by aircraft, altitude and Mach. Under the projected conditions, 52 supersonic flight events were modeled, with the majority (90 percent) flown by the F/A-18E/F aircraft. F/A-18C/D aircraft account for the remaining five events, or 10 percent of the operations. All events were modeled using the same flight track (shown in Figure 3.1-1) and model assumptions set forth in the existing condition supersonic analysis. (Wyle 1999)

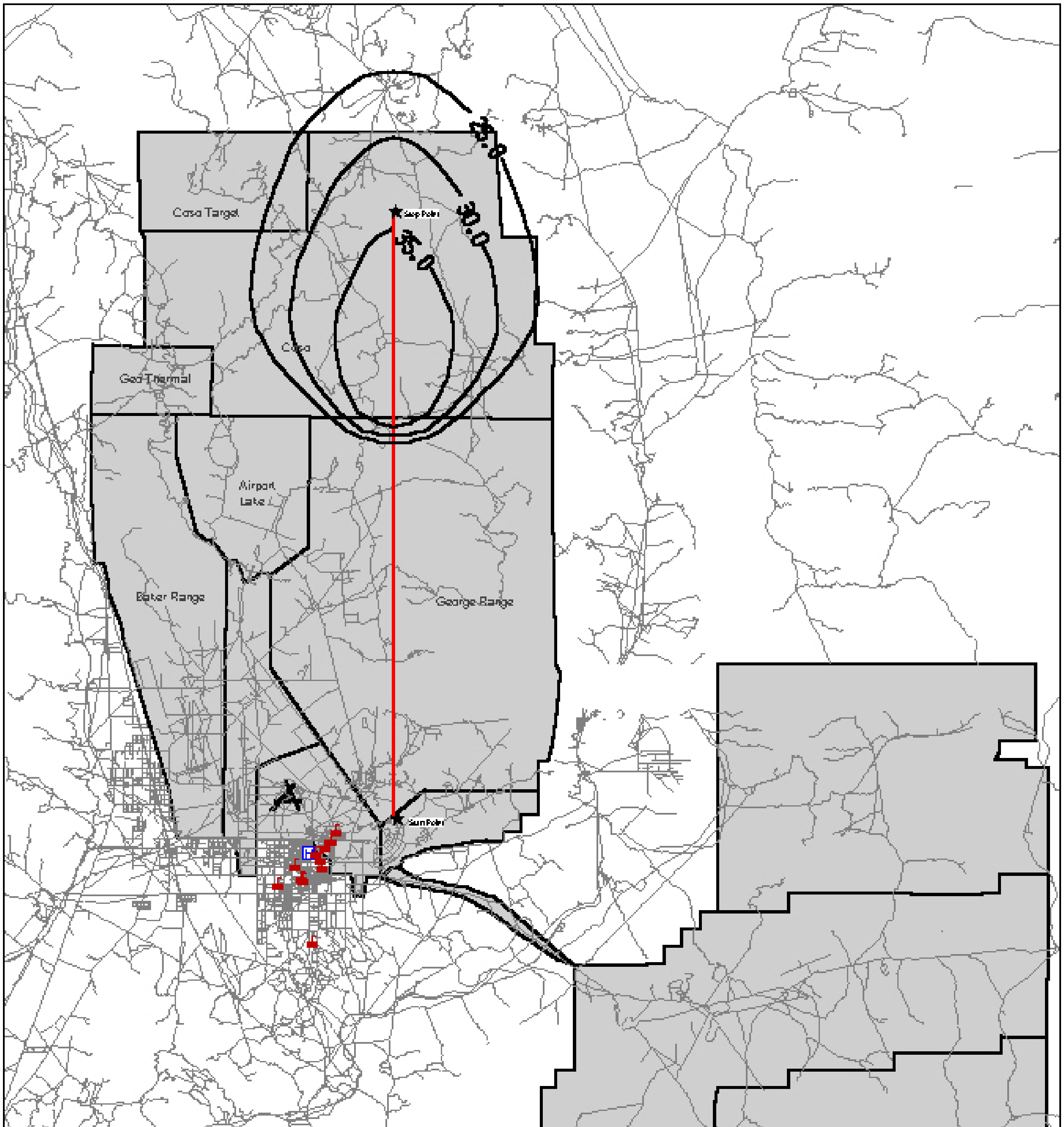
BOOMAP3 was used to model the increase in supersonic operations for the projected annual conditions. L_{Cdn} contours were plotted for all projected supersonic operations, and they are shown in Figure 3.2-1. This figure depicts an L_{Cdn} 35-, 30- and 25-dB contour due to the extremely low number of supersonic operations that would occur under the projected conditions. In addition, the overall projected condition noise contours shown in Figure 2.5-1 include the noise exposure resulting from these projected supersonic flight events over the North Range. (Wyle 1999)

Impacts at ground level can also be expressed in psf of overpressure of a single event. Considering the Mach number and altitude matrix listed in Table 3.2-1, the largest overpressure for straight and level flight would be created by the F/A-18C/D flying at 12,000 feet MSL at Mach 1.1, over a nominal ground altitude with an overpressure of 9.0 psf. This most critical Mach number and altitude combination is the same as the existing conditions (Section 3.1). (Wyle 1999)

Table 3.2-1. Distribution of Supersonic Flight Events for Given Mach and Altitude Over North Range for Projected Conditions

Aircraft	Mach Number	Altitude in Thousands of Feet (MSL)																													
		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
F/A-18C/D (5 events)	1.0	1																														
	1.1			1																												
	1.2					1																										
	1.3												1																			
	1.4																1															
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9																															
F/A-18E/F (47 events)	1.0	1															1				1						1					
	1.1						2				1						3								2			2		2		
	1.2						2					1								2		3					2					
	1.3												2				2												2			
	1.4														2				1		1		1		1		2		1	1		2
	1.5																															
	1.6																2															
	1.7																					1										
	1.8																															
	1.9																															

Source: NAWS China Lake



Scale

0 22500 45000

Feet

N

Legend

NAWS China Lake

Runway

Supersonic Flight Track

25 Ldn Contour

Hospital

School

Figure 3.2-1

Ldn Contours for Projected Supersonic Flight Events Conducted within the North Range of NAWS China Lake

Source: NAWS China Lake, TIGER/Line 1990, BOOMAP3

3.3 Existing Supersonic Flight Events from the South Range of NAWS China Lake

All existing supersonic flight events modeled from the South Range were done so based on supersonic flight segments and event data provided by NAWS China Lake personnel.[25] Operations on the three flight tracks, shown in Figure 3.3-1, were modeled using the directional path of south to north for Tracks 1 and 3, and west to east for Track 2, for each individual track as shown in the figure. The event data provided consisted of aircraft type, maximum Mach number, altitude and specific track. All events were modeled between 0700 and 1900 local time. This data was entered into a spreadsheet for analysis, and a total of 12 events, representing the existing conditions from the South Range, were analyzed. All supersonic events, modeled from the South Range for the existing condition, were flown by F/A-18E/F aircraft. (Wyle 1999)

Table 3.3-1 shows the supersonic flight distribution by aircraft, altitude, Mach and track. For example, the majority of the F/A-18E/F supersonic events occurred at 15,000 feet MSL, at speeds ranging from Mach 1.1 to Mach 1.9. Table 3.3-1 also shows that approximately 58 percent of the events were conducted on Track 1, with the remaining 17 percent and 25 percent on Track 2 and Track 3, respectively. All modeling assumptions used in conjunction with the BOOMAP3 program, and set forth in Section 3.1 of this report, were also used to model the supersonic events on the South Range. The analysis was based on an AGL aircraft height calculated using a nominal ground altitude for each track as itemized in Table 3.1-2. (Wyle 1999)

L_{Cdn} contours were plotted for all existing condition supersonic events from the South Range and are shown in Figure 3.3-2. This figure depicts L_{Cdn} 35-, 30- and 25-dB contours. (Wyle 1999)

The overall existing noise exposure on the South Range, including that generated by the supersonic operations discussed above, is estimated to remain below 60-dB CNEL. Therefore, overall existing noise contours on the South Range are not shown here. (Wyle 1999)

As discussed in previous Sections 3.1 and 3.2, impacts at ground level can also be expressed in psf of overpressure of a single event. Considering the Mach number and altitude matrix listed in Table 3.3-1, for straight and level flight by the F/A-18E/F flying at 15,000 feet MSL over a nominal ground altitude of 4000 ft. at Mach 1.9 on Track 1, will create an overpressure of 7.5 psf. Track 2 would experience an overpressure of 5.5 psf from straight and level flight at 15,000 feet MSL and 2500 ft. nominal ground altitude at 1.4 Mach. Track 3 would experience an overpressure of 5.9 psf from flight at 15,000 feet MSL over a nominal ground altitude of 5000 ft. at 1.1 Mach. Maneuvering aircraft will likely cause higher levels in a very small area due to focusing, and that effect is included in the contours. The maneuvering assumptions made for the contour analysis, namely linear acceleration and deceleration, are itemized in Section 3.1. (Wyle 1999)

Table 3.3-1. Distribution of Supersonic Flight Events for Given Mach and Altitude Over South Range for Existing Conditions

Aircraft	Mach	Altitude in Thousands of Feet (MSL)																														
	Number	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
F/A-18E/F	1.0																															
on Track 1	1.1						2															1										
	1.2																															
	1.3																															
	1.4						1															1										
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9						1															1										
F/A-18E/F	1.0																															
on Track 2	1.1						1																									
	1.2																															
	1.3																															
	1.4						1																									
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9																															
F/A-18E/F	1.0																															
on Track 3	1.1						2															1										
	1.2																															
	1.3																															
	1.4																															
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9																															

NOTE: All operations modeled between 0700-1900.

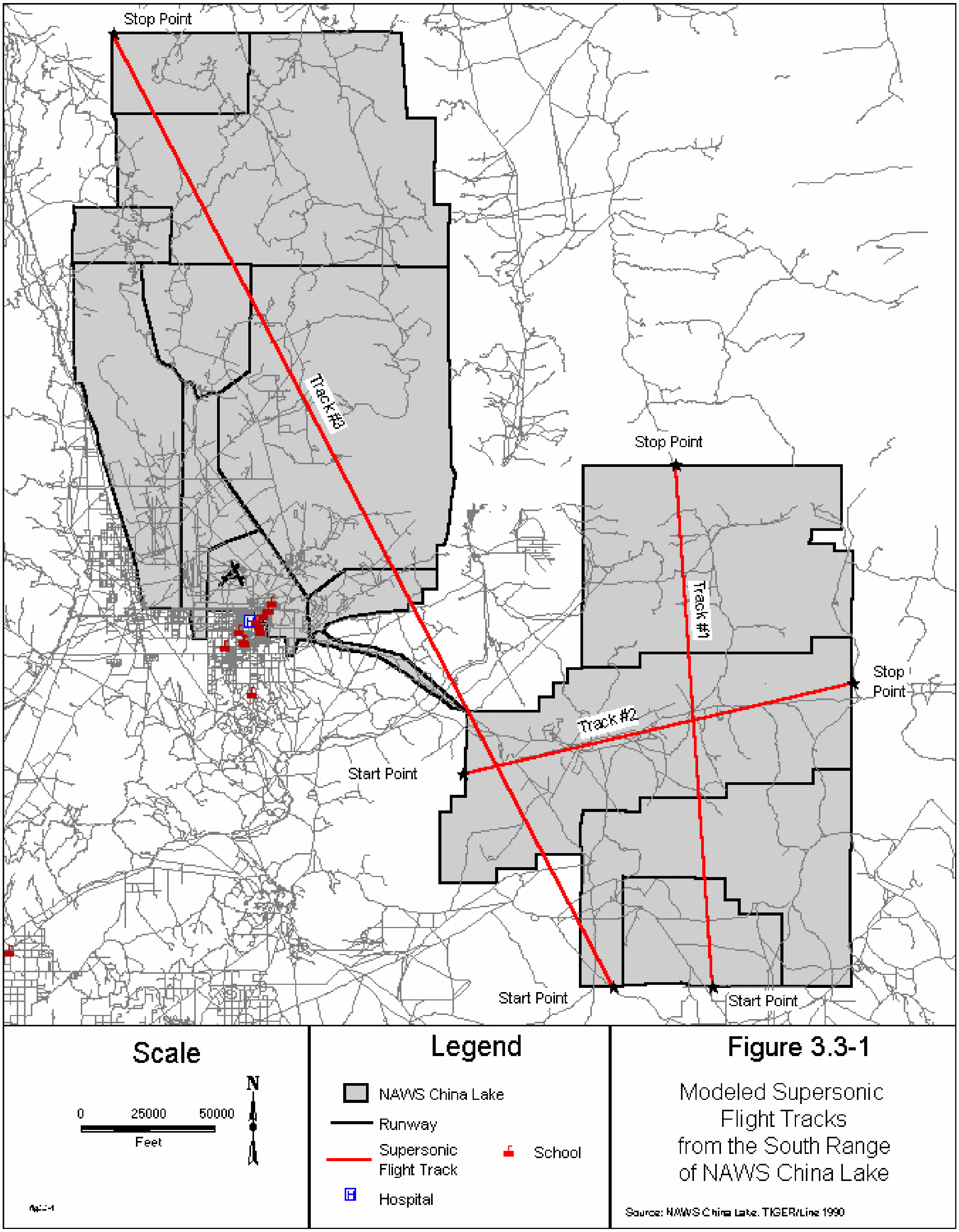


Figure 3.3-1

Modeled Supersonic Flight Tracks from the South Range of NAWS China Lake

Source: NAWS China Lake, TIGER/Line 1990

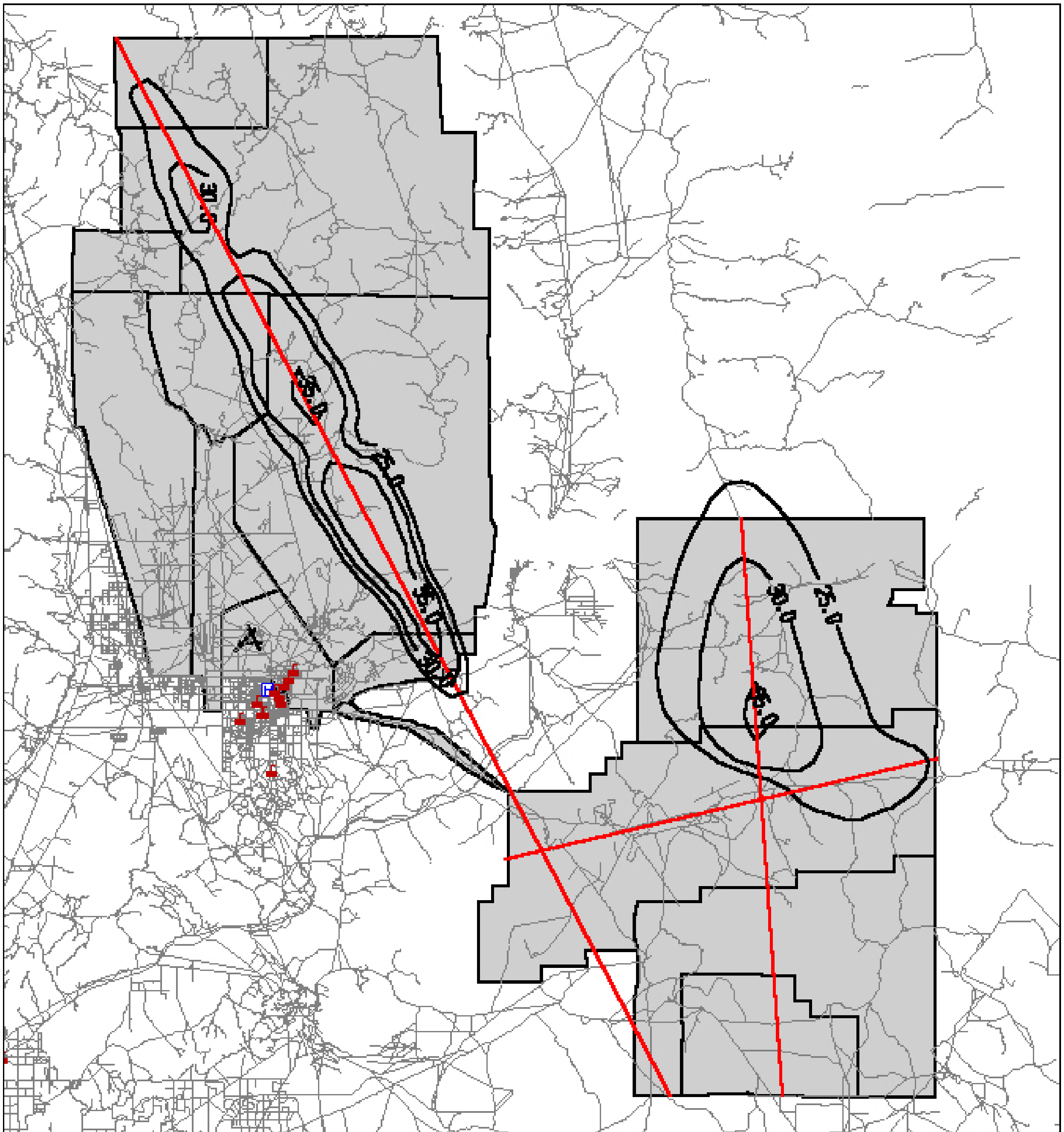


Figure 3.3-2
Lcdn Contours for Existing Supersonic Flight Events Conducted from the South Range of NAWS China Lake

Source: NAWS China Lake. TIGER/Line 1990

3.4 Projected Supersonic Flight Events on the South Range of NAWS China Lake

NAWS China Lake personnel provided annual supersonic flight events on the South Range for the projected year condition and as a worst case scenario consistent with the fact that they currently only test F/A-18E/F aircraft. The data obtained is shown in Table 3.4-1 by aircraft, altitude, Mach and flight track. Under the projected conditions on the South Range, 48 F/A-18E/F supersonic flight events were modeled. Of the 48 events, 52 percent were modeled on Track 1, with events conducted on Track 2 and Track 3 comprising approximately 13 percent and 35 percent of the total events, respectively. Approximately 79 percent of the events were modeled at speeds of Mach 1.1 and 1.4; the remaining 21 percent were modeled at speeds of Mach 1.9. All events were modeled using the same flight tracks (shown in Figure 3.3-1) and model assumptions set forth in Section 3.1 of this analysis. (Wyle 1999)

BOOMAP3 was used to model the increase in supersonic operations for the projected year conditions on the South Range. L_{Cdn} contours were plotted for all projected supersonic operations and are shown in Figure 3.4-1. This figure depicts only L_{Cdn} 40-, 35-, 30- and 25-dB contours due to the extremely low number of supersonic operations that would occur under the projected conditions. The overall projected condition noise exposure on the South Range, including that generated by the supersonic operations discussed in this section, would be expected to be below 60-dB CNEL and would be expected to remain so even if the number of modeled supersonic operations were doubled. Therefore, overall projected condition noise contours for the South Range are not shown here. (Wyle 1999)

Considering the Mach number and altitude matrix listed in Table 3.4-1 for straight and level flight for Track 1, the largest overpressure would be created by the F/A-18E/F flying at 15,000 feet MSL with a nominal ground altitude of 4000 ft. at Mach 1.9, with an overpressure of 7.5 psf. Track 2 would experience an overpressure of 5.5 psf from flight at 15,000 feet MSL, with a nominal ground altitude of 2500 ft., at 1.4 Mach. Track 3 would experience an overpressure of 5.9 psf from flight at 15,000 feet MSL with a nominal ground altitude of 5000 ft., and 1.1 Mach. (Wyle 1999)

Table 3.4-1. Distribution of Supersonic Flight Events for Given Mach and Altitude Over South Range for Projected Conditions

Aircraft	Mach	Altitude in Thousands of Feet (MSL)																													
	Number	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
F/A-18E/F	1.0																															
on Track 1	1.1						6															4										
	1.2																															
	1.3																															
	1.4						5															4										
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9						3															3										
F/A-18E/F	1.0																															
on Track 2	1.1						3																									
	1.2																															
	1.3																															
	1.4						3																									
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9																															
F/A-18E/F	1.0																															
on Track 3	1.1						2															6										
	1.2																															
	1.3																															
	1.4																					5										
	1.5																															
	1.6																															
	1.7																															
	1.8																															
	1.9																					4										

NOTE: All operations modeled between 0700-1900.

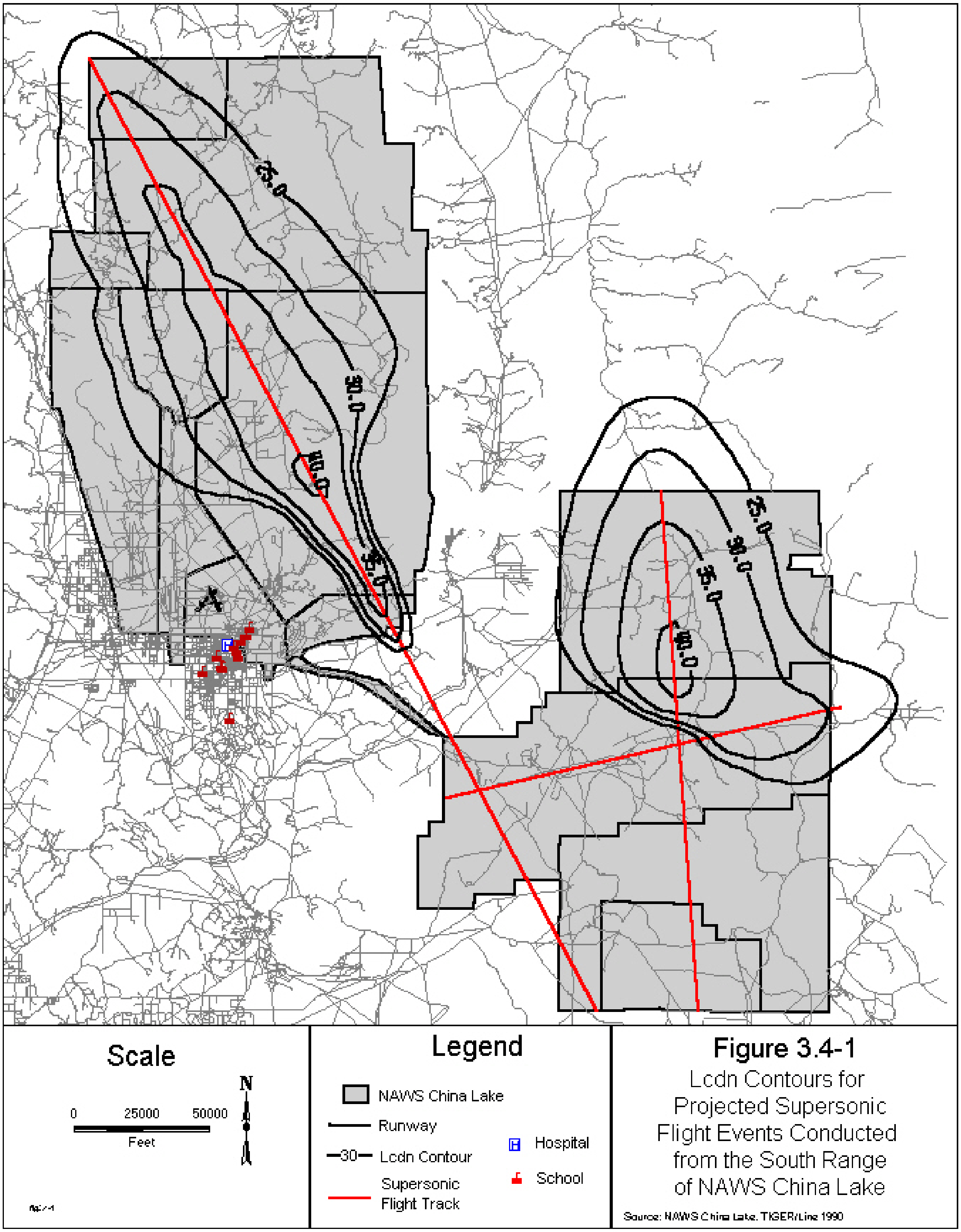


Figure 3.4-1
Lcdn Contours for Projected Supersonic Flight Events Conducted from the South Range of NAWS China Lake

3.5. Location of Cumulative Contours for North and South Ranges

For each track shown in all of the figures in this chapter, the general location of the contour relative to the length of the track varies. For example, North Range track contours intersect the ground past the middle of the track, and in each case reach beyond the end point. Contours for South Range Track 1 are generated past the middle to beyond the end of the track, whereas Track 2 contours do not reach the end for existing conditions, but extend beyond the end for projected operations. For South Range Track 3, contours that result from supersonic flight operations are located from before the middle almost to end of the track for existing conditions, but beyond the end for proposed operations. (Wyle 1999)

Even though the relative location of the supersonic start, maximum Mach, and supersonic end points for all four tracks were similar, the contours generated are located differently relative to the track. Reasons for this include changes in the source strengths of the booms, variations in the ground altitude and vertical propagation distance under each flight track, and the resultant varying boom propagation distances. During supersonic flight operations as modeled, the source of the loudest boom occurs during focusing right after reaching maximum Mach and initial deceleration. This location was modeled at the midpoint for all tracks. South Range Track 3 is physically longer than the other tracks; therefore there is more track distance beyond where the maximum boom intersects the ground. The North Range has a higher MSL ground elevation resulting in a shorter vertical propagation distance. South Range Tracks 1 and 2 are shorter, resulting in less track distance after the maximum boom has intersected the ground. The terrain beneath South Range Track 2 is lowest in MSL; therefore, the maximum boom intersects the ground furthest from the midpoint of the track. (Wyle 1999)

All South Range supersonic operations occur at 15,000 MSL or higher. Sonic boom source strength is a function of the second derivative of the Mach number; the bigger the second derivative, the stronger the boom at the source. The shorter the track, the greater the acceleration, jerk, and boom associated with the supersonic flight for a given Mach number. However, the longer the vertical propagation altitude, the more the source overpressure will decay and the further forward of the aircraft ground track it will travel propagate before intersecting the ground. (Wyle 1999)

Supersonic operations on the South Range are conducted at Mach numbers as high as 1.9 for both existing and proposed conditions. The North Range existing operations are conducted at a maximum Mach number of 1.6, with proposed operations to be conducted at a maximum Mach number of 1.7. The increased carpet boom resulting from significant increase in number of operations at the Mach 1.9 condition on the South Range Track 3 is identified as the most drastic change between existing and projected future operations. (Wyle 1999)

Decision making, particularly for land management purposes, requires an understanding of the total or cumulative impulse noise environment resulting from all supersonic operations. For this reason resulting sonic boom contours from combined North and South range operations have been calculated. (Wyle 1999)

Figure 3.5-1 shows the L_{cdn} contours and flight tracks for existing supersonic operations occurring on both the North and South Ranges. For both ranges, the total area within the 35-, 30-, and 25-dB contours would be approximately 150, 360, and 620 square miles, respectively. (Wyle 1999)

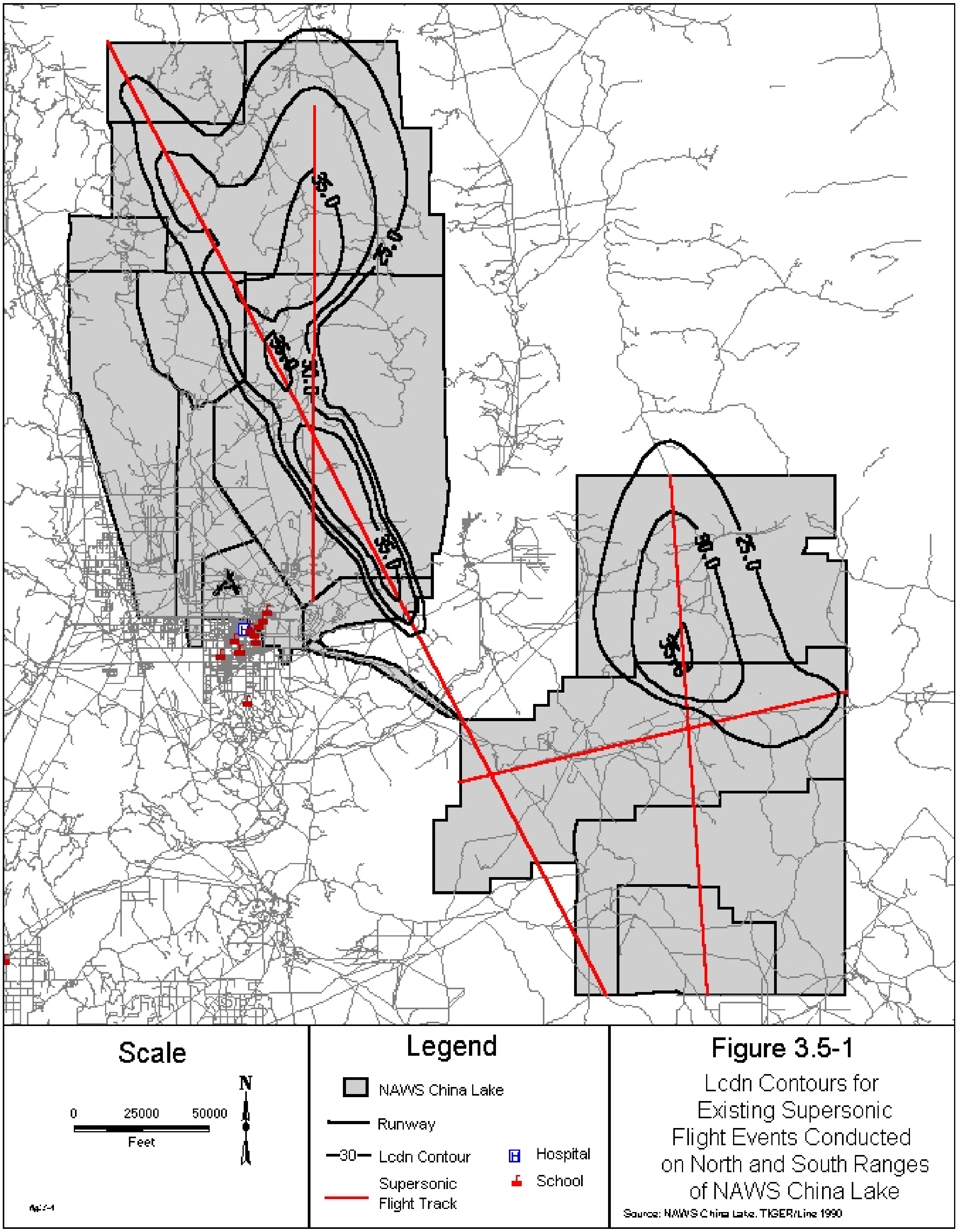


Figure 3.5-1
Lcdn Contours for Existing Supersonic Flight Events Conducted on North and South Ranges of NAWS China Lake

Source: NAWS China Lake, TIGER/Line 1990

Figure 3.5-2 shows the L_{cdn} contours and flight tracks for proposed conditions supersonic operations occurring on both the North and South Ranges. For both ranges, the total area within the 40-, 35-, 30- and 25-dB contours would be approximately 60, 330, 680, and 1090 square miles, respectively. (Wyle 1999)

3.6 Sonic Boom Analysis

This section contains a discussion of the analysis of the single event supersonic operations of the F/A-18E/F conducted in the North and South Ranges of NAWS China Lake. The analysis supplements the previous sonic boom analysis described in WR 99-11 (Long, Sypek, and Page, 1999), which considered the long-term average sonic boom levels from year round operations. (Wyle 2001)

Sonic boom is an impulsive noise caused by an object moving faster than the speed of sound. An aircraft traveling through the atmosphere continuously produces pressures waves similar to water waves caused by a ship. When the aircraft exceeds the speed of sound, these pressure waves coalesce and form shock waves and may propagate to the ground depending on the speed of the aircraft and atmospheric conditions. The sonic boom heard on the ground is the sudden onset and release of pressure buildup in the shock waves. The change, or peak, in pressure caused by sonic boom is historically measured in terms of pounds per square foot (psf). This magnitude of the sonic boom is referred to as the peak overpressure and is the basic descriptor of sonic boom. The actual magnitude of most sonic booms generated by military aircraft are only a few psf. (Wyle 2001)

The area exposed to a single sonic boom is restricted in its lateral extent because of atmospheric effects. The atmosphere refracts (bends) sonic boom waves away from the ground so that a point is reached where the sonic boom wave will be curved upward before it reaches the ground. This point is referred to as the lateral cutoff of the sonic boom carpet. This cutoff region provides a sharp change in the received noise levels on the ground. Inside the cutoff a sonic boom will be heard; outside the cutoff only a low level rumble will be heard since no sonic boom intersects the ground. (Wyle 2001)

Current models predict the cutoff point of the sonic boom footprint but do not estimate the rumbles occurring beyond the cutoff. This fact means sonic boom estimates will have a sharp discontinuity at the lateral edges of the boom carpet. (Wyle 2001)

There are two types of sonic booms: N-wave and U-waves. N-waves are generated from steady flight condition, and its pressure wave is shaped like the letter “N”. U-waves, or focused booms, are generated from maneuvering flights (e.g., accelerations, dives, and turns), and its pressure wave is shaped like the letter “U”. U-waves have increased peak overpressures compared to N-waves because of the focusing effect of maneuvers on the pressure wave. For level acceleration, the focus boom region is generated at the start of the sonic boom footprint and has levels that are increased by a factor of 2 to 5 times, compared to the steady flight conditions. The focus region covers only a very small portion of the overall sonic boom footprint. The actual thickness of the focus region is approximately 1,000 ft. with the highest levels occurring within <100 ft. (Downing, et al.). (Wyle 2001)

The previous study (Long, Sypek, and Page, 1999) estimated the long-term average sonic boom levels to be well below any criteria for community annoyance. The highest estimate level was 45 dB CDNL. However, this finding does not mean there will be no annoyance from individual sonic booms. Thus, to address the potential effects from single event sonic booms the following analysis was performed on four supersonic flight profiles of the F/A-18E/F. These profiles provide a more detailed picture of where the community would be exposed to sonic boom. (Wyle 2001)

This report concentrates on the potential for damage to window panes and plaster items. However, it should be stated that these levels can also generate structural vibrations and can rattle bric-a-brac. These secondary effects can lead to annoyance (Sutherland and Czech, 1992); however, no direct relationship between sonic boom exposure, secondary vibrations and rattle, and short-term annoyance exists. (Wyle 2001)

Section 3.1 describes the four supersonic flight profiles used in this analysis. Section 3.2 provides the modeled sonic boom footprints from these operations. Section 3.3 discusses the potential impacts of these sonic booms. (Wyle 2001)

3.7 Single Event Supersonic Flight Profiles

Four supersonic profiles are modeled for this analysis. All four profiles are for the F/A-18 E/F flying straight and level at an altitude of 23,000 ft MSL. The difference in the profiles is the start/stop points, which are listed in Table 3.1-1. These points refer to the Mach 1.0 points in the aircraft's trajectory; beyond these points the aircraft is at subsonic speeds. The aircraft was assumed to be at a constant acceleration at the start point until the aircraft obtains an airspeed of 1.3 Mach. Once this speed was reached, the aircraft remained steady until deceleration is required to be at 1.0 Mach at the stop point. During the entire profile, the aircraft remains level. The acceleration and deceleration rates used in the model are based on previous flight data (Downing et al., 1997, JASA).

It should be noted that PCBoom3 uses only one ground height (flat earth). Thus, an average ground height was used for each flight track because of the varying terrain around NAWS China Lake. The ground height used are the same as in WR 99-11 and are listed in Table 3.1-1. (Wyle 2001)

Table 3.1-1. Supersonic Flight Profile Descriptions for F/A-18 E/F Single Event Sonic Boom Analysis

Flight Profile	Start 1.0 Mach		Stop 1.0 Mach		Ground Height	Mach Number	Flight Altitude
	Latitude	Longitude	Latitude	Longitude			
Track #1	35:16:21	-117:05:45	35:47:43	-117:08:38	4,000 ft	1.3	23,000 ft
Track #2	35:29:38	-117:24:05	35:35:11	-116:55:33	2,500 ft	1.3	23,000 ft
Track #3	35:16:23	-117:12:49	36:13:17	-117:50:25	5,000 ft	1.3	23,000 ft
Track #4	35:40:51	-117:35:03	36:10:33	-117:35:13	5,000 ft	1.3	23,000 ft

For the atmospheric profile description, an annual profile for the southwestern US was used (supplied with the PCBoom3 program). For the modeling, the effects of wind were not included due to the wide variation of winds. (Wyle 2001)

3.8 Sonic Boom Footprints

The sonic boom footprints from these four flight tracks are provided in Figures 3.1 to 3.4. These figures show the contours of peak overpressure for each individual flight. Contour levels of 1.0, 2.0, 4.0, 6.0, and 8.0 psf are provided. Figure 3.5 provides the sonic boom footprints from all of the flights for comparison between the flights. (The peak overpressure levels in psf correspond to the following C-weighted SEL values: 101.6 dBC, 107.6 dBC, 113.6 dBC, 120.6 dBC, and 126.6 dBC). A minimum of 1.0 psf was chosen since this level corresponds to a low noise level boom and has been suggested as an acceptable level for N-wave sonic booms from the operation of a fleet of civilian supersonic transports (Shepherd, 1999). The threshold for the potential of structural damage starts around 2.5 psf. Bric-a-brac is also susceptible to damage from the resulting boom induced structural vibrations. The primary mode for damage to bric-a-brac is tipping or falling (Haber and Nakaki, 1989). (Wyle 2001)

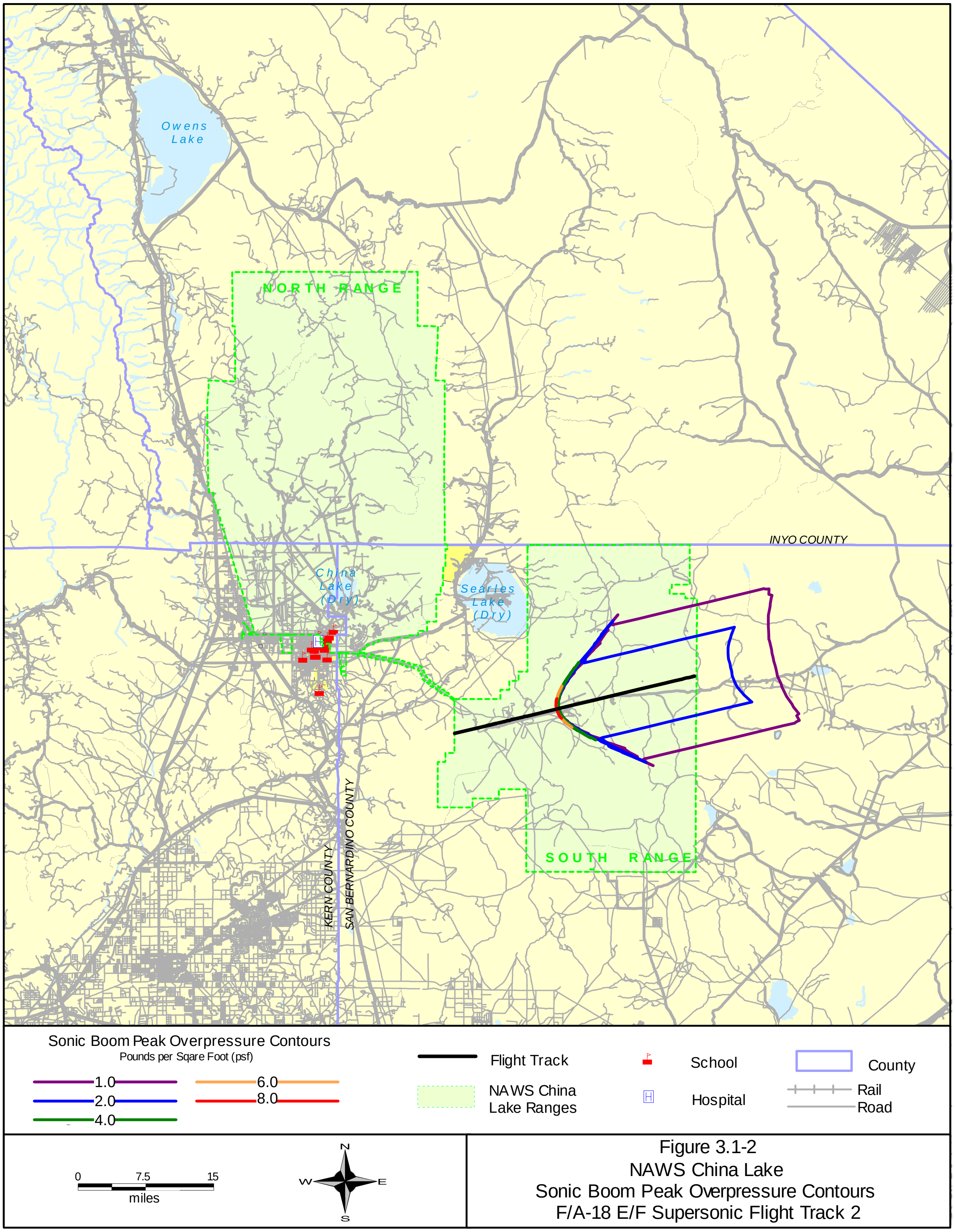


Figure 3.1-2
NAWS China Lake
Sonic Boom Peak Overpressure Contours
F/A-18 E/F Supersonic Flight Track 2

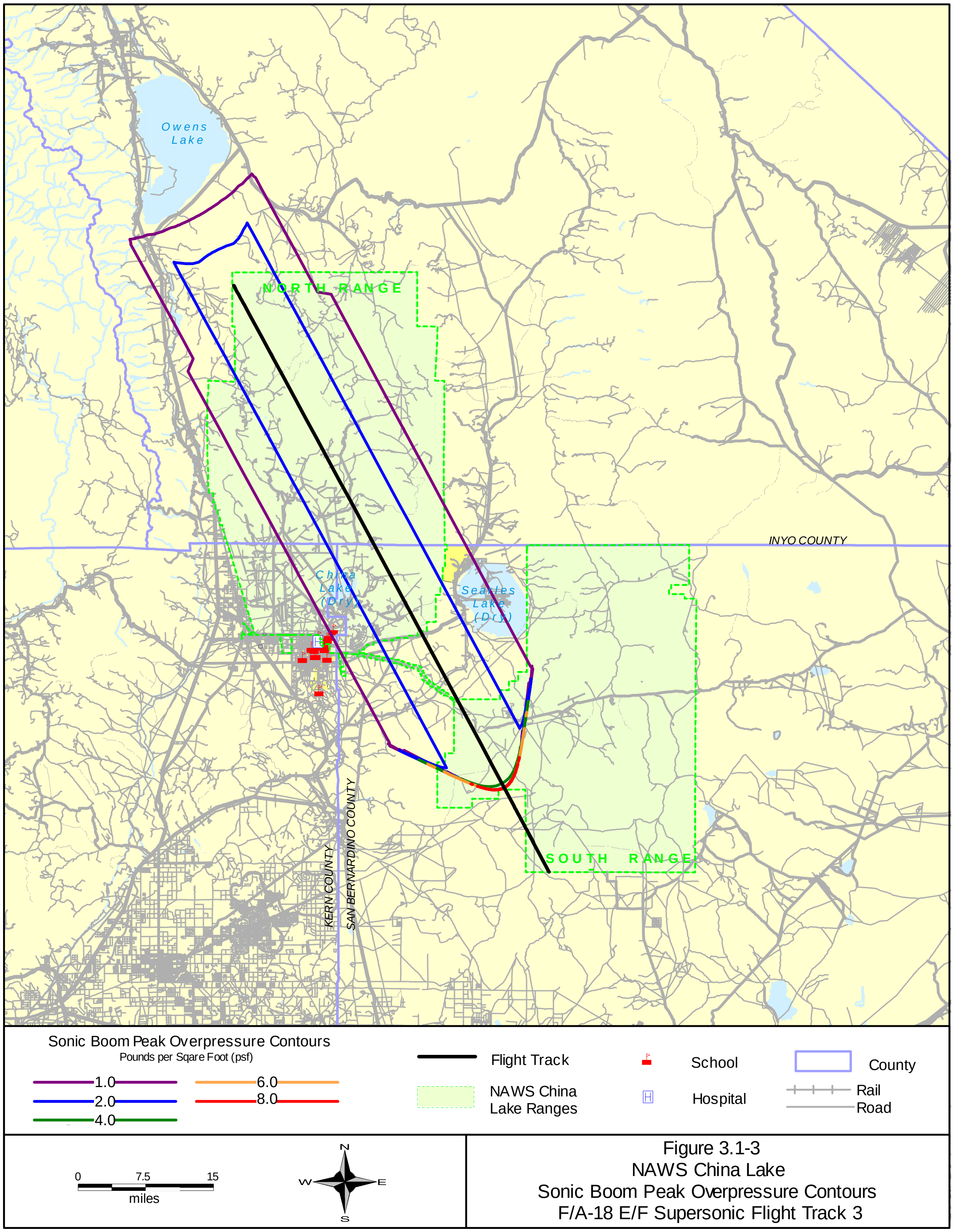


Figure 3.1-3
NAWS China Lake
Sonic Boom Peak Overpressure Contours
F/A-18 E/F Supersonic Flight Track 3

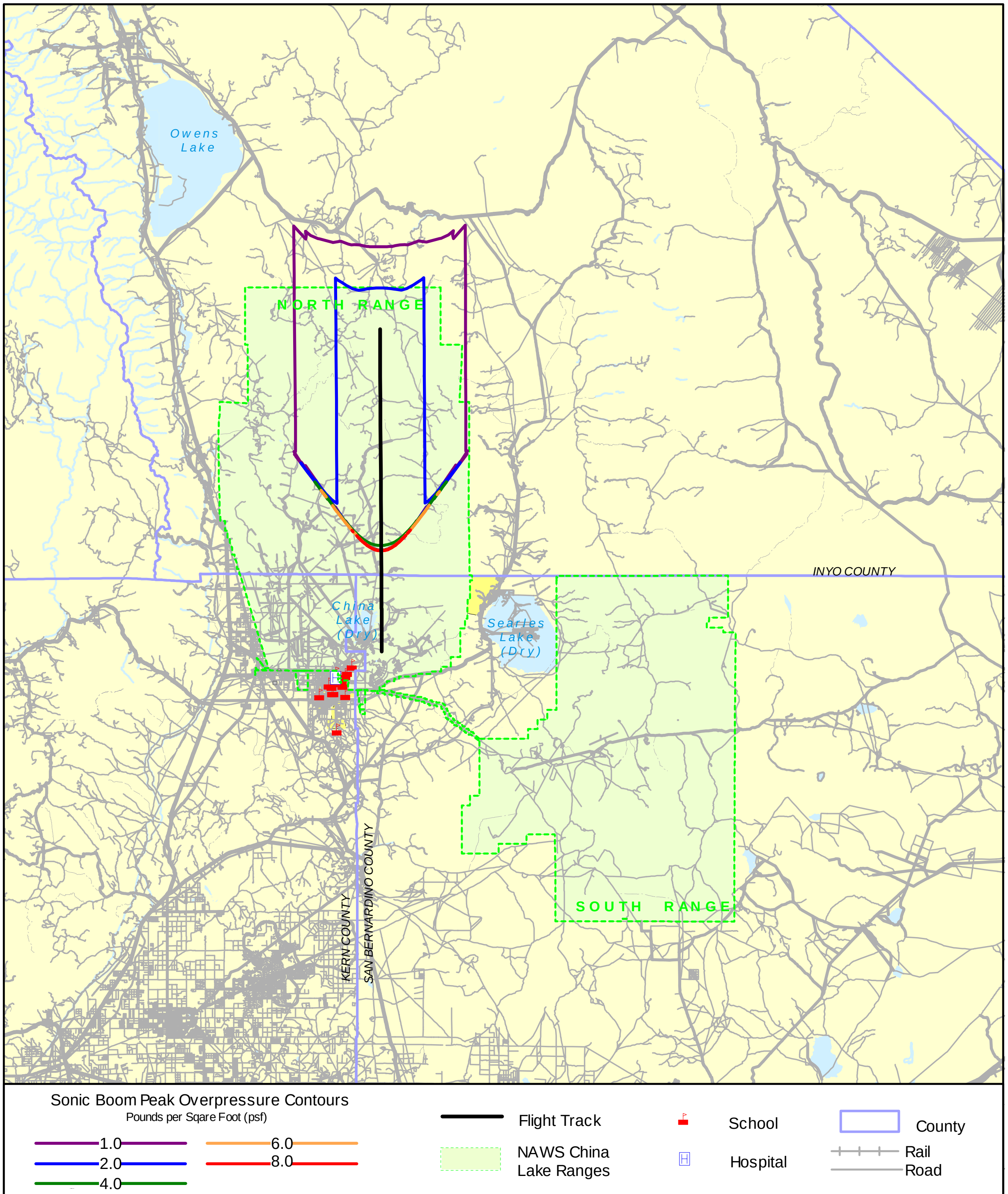


Figure 3.1-4
NAWS China Lake
Sonic Boom Peak Overpressure Contours
F/A-18 E/F Supersonic Flight Track 4

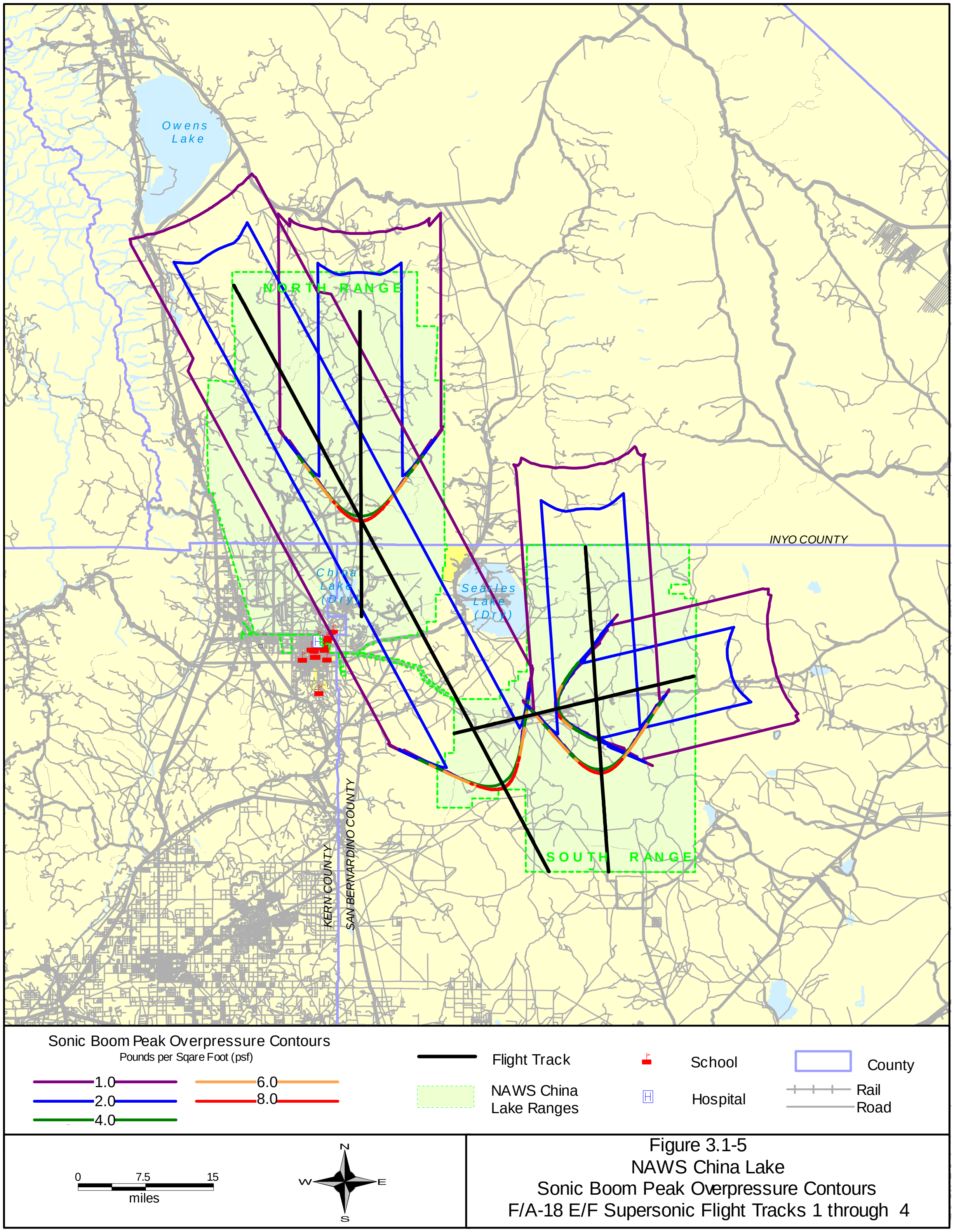


Figure 3.1-5
NAWS China Lake
Sonic Boom Peak Overpressure Contours
F/A-18 E/F Supersonic Flight Tracks 1 through 4

All four sonic boom footprints have similar features, which include a very narrow focus region at the up track portion of the footprint (red and orange lines) and a carpet boom area down track of the focus boom (outlined by the purple line). In the focus region, the peak overpressures are elevated, but these overpressures occur over a very small region (<1000 $ft.^2$), and it should be noted that the physical area of the focus boom is smaller than the line width. The maximum peak overpressure in the focus region is less than 12 psf and occurs on the flight track centerline. The lateral portion of the focus area (denoted primarily by orange) has peak overpressures that vary from 6 to 10 psf. For all of the flight tracks this maximum focus boom will occur within the boundaries of NAWS China Lake. For the stated flight conditions, the expected variation in the location of the focus boom should occur within 2 miles. This variation arises from actual flight and atmospheric conditions. However, the size of the focus region generally remains the same or smaller for these varying conditions. (Wyle 2001)

Down track of the focus region, the overpressure will decrease to their steady values in the carpet boom portion of the footprint. In this region, the peak overpressures will be largest directly underneath the flight track and decrease toward the lateral edges of the footprint. Along the flight track centerline, the peak overpressures are 3 psf. The 1.0 psf contour on the lateral edge of the footprint marks the cutoff. Beyond this cutoff, one would hear a low rumble. For these profiles, the cutoff distance is approximately 8 to 9 miles from the flight track centerline. (Wyle 2001)

In between these two regions, there is a transition region as the focus boom overpressures decrease to the overpressures of the carpet boom. In this region two separate booms may be heard. The first boom would be a N-wave sonic boom and the second would be a post focus boom with a much-reduced overpressure. The post focus boom diminishes very quickly with distance down track (Downing et al., 1997, JASA). (Wyle 2001)

The focus region for tracks 1, 2, and 4 remain on base property, as noted in their respective figures. For track 3, portions of the focus region goes off base. The potential exists for the maximum focus boom to occur off base with this flight track. With this estimate, the centerline portion of the focus boom occurs at the base boundary. In this area, the focus boom is estimated to be 11 psf, although the area in which this occurs is very small (<1000 $ft.^2$). Also, some of the lateral portion of the focus boom goes off base. The maximum peak overpressure levels in this area have a maximum value of 6 psf and occur over a very small area. (Wyle 2001)

For all of the flights, portions of the carpet boom go off base property. These levels vary from 3 psf to the minimum at cutoff, which is calculated to vary from 0.5 to 1.5 psf. (Wyle 2001)

3.9 Effects of Sonic Boom

For structural damage estimates, probability of damage (POD) is used to assess the potential effects from a single supersonic overflight. These damage effects refer to cracking or breaking of glass windowpanes and the initiation of fine cracks or extension of preexisting cracks in plaster elements of buildings. These potentially damaging effects are primarily cosmetic in nature and do not degrade the structural integrity of a building. (Wyle 2001)

Potential structural damage from sonic booms are expected to occur primarily within the focus region where the peak overpressures are elevated. For the four modeled flight tracks, only track #3 has a portion of the focus region expected to occur off base. In the off base portions of the focus boom, the POD levels are estimated for 6 and 12 psf boom levels. In this very small region, some minor window damage may occur and plaster walls may have fine cracks created or extended. For this focused sonic boom level, the following POD can be expected for the following structural items (Haber and Nakaki, 1989). (Wyle 2001)

Table 3.1 Probability of Damage from 6 psf and 12 psf Focused Sonic Boom

Windows in Good repair			
Area	**Thickness**	**POD (6 psf)**	**POD (12 psf)**
<2 ft^2	3/32	.72E-11	.72E-11
2 – 10 ft^2	3/16	.52E-09	.55e-06
10 – 50 ft^2	¼	.12E-05	.24e-03
50 – 100 ft^2	5/16	.15E-04	.11e-02
>100 ft^2	5/16	.44E-04	.25e-02
Plaster Elements in good repair			
Type	**Span**	**POD (6psf)**	**POD (12 psf)**
Ceiling	12 ft	.74e-02	.10e+00
Wood Frame wall	8 ft	.43e-03	.16e-01
Brick Wall	8 ft	.25e-03	.12e-01
Partition Wall	10 ft	.57e-02	.93e-01
Windows with predamage			
Area	**Thickness**	**POD (6psf)**	**POD (12 psf)**
<2 ft^2	3/32”	.61e-03	.22e-01
2 – 10 ft^2	3/16”	.50e-01	.90e-01
10 – 50 ft^2	¼”	.11e+00	.50e+00
50 – 100 ft^2	5/16”	.16e+00	.55e+00
>100 ft^2	5/16”	.23e+00	.64e+00
Plaster Elements with predamage			
Type	**Span**	**POD (6 psf)**	**POD (12 psf)**
Ceiling	12 ft	.25e+00	.70e+00
Wood Frame wall	8 ft	.58e-01	.35e+00
Brick Wall	8 ft	.48e-01	.32e+00
Partition Wall	10 ft	.24e+00	.69e+00

From these probability of damage values, the largest potential damage is for pre-damaged elements. For elements in good repair, most of the potential damage would be the initiation of fine cracks or the extension of preexisting cracks in plaster ceilings and partition walls at a rate of 1 out of 135 (POD = 0.0074) for the lateral portion of the focus region and at a rate of 1 out of 10 (POD = 0.10) for the centerline of the focus boom. (Wyle 2001)

For the portions of the carpet boom that go outside of NAWS China Lake boundaries, minimal probability of damage exists since the maximum levels are only 3 psf and lower. For these normal sonic boom levels, the following probability of damage can be expected for the following structural items (Haber and Nakaki, 1989):

Table 3.2 Probability of Damage from an N-wave Sonic Boom

Windows in Good repair		
Area	**Thickness**	**POD (3 psf)**
<2 ft^2	3/32	0
2 – 10 ft^2	3/16	0
10 – 50 ft^2	¼	.11E-13
50 – 100 ft^2	5/16	.33E-07
>100 ft^2	5/16	.13E-05
Plaster Elements in good repair		
Type	**Span**	**POD (3 psf)**
Ceiling	12 ft	.32e-04

Wood Frame wall	8 ft	.25e-08
Brick Wall	8 ft	.26e-08
Partition Wall	10 ft	.49e-05
Windows with predamage		
Area	**Thickness**	**POD (3 psf)**
<2 ft^2	3/32"	.90e-10
2 – 10 ft^2	3/16"	.60e-07
10 – 50 ft^2	¼"	.54e-02
50 – 100 ft^2	5/16"	.27
>100 ft^2	5/16"	.35
Plaster Elements with predamage		
Type	**Span**	**POD (3 psf)**
Ceiling	12 ft	.69e-01
Wood Frame wall	8 ft	.70e-03
Brick Wall	8 ft	.66e-03
Partition Wall	10 ft	.35e-01

From these POD values, there is a minimal expectation of any damage to occur except for pre-damaged large windows (>50 ft2 area), pre-damaged plaster ceilings, and pre-damaged plaster wall partitions. For elements in good repair, no damage is expected since the highest probability of damage is 1 out of about 30,000. (Wyle 2001)

Thus, the expected effects from these four flight tracks are minimal with the greatest impact potentially occurring to structural elements that already have preexisting damage. (Wyle 2001)

Table 2.1-3. Modeled Average Busy-Day Flight Operations for the Limited Expansion Alternative at NAWS China Lake.

Operation Type	Runw	Track	F/A-18C/D Day	F/A-18C/D Eve.	F/A-18C/D Night	F/A-18C/D Total	F/A-18E/F Day	F/A-18E/F Eve.	F/A-18E/F Night	F/A-18E/F Total	EA-6B Day	EA-6B Eve.	EA-6B Night	EA-6B Total	AV-8B Day	AV-8B Eve.	AV-8B Night	AV-8B Total	All Modeled Aircraft Day	All Modeled Aircraft Eve.	All Modeled Aircraft Night	All Modeled Aircraft Total
Departures	**14**	**14D1**	1.299	0.07	0.035	1.404	1.407	0.076	0.038	1.521	0.380	0.025	0.003	0.408	0.135	0.008	0.004	0.147	3.221	0.179	0.080	3.480
	21	**21D1**	1.053	0.057	0.028	1.138	1.140	0.062	0.031	1.233	0.308	0.020	0.003	0.331	0.053	0.003	0.002	0.058	2.554	0.142	0.064	2.760
	21	**21D2**	5.964	0.324	0.16	6.448	6.461	0.349	0.176	6.986	1.744	0.113	0.016	1.873	0.301	0.018	0.009	0.328	14.470	0.804	0.361	15.635
	26	**26D1**	0.756	0.041	0.02	0.817	0.819	0.044	0.022	0.885	0.221	0.014	0.002	0.237	2.063	0.121	0.065	2.249	3.859	0.220	0.109	4.188
	32	**32D1**	0.62	0.034	0.017	0.671	0.672	0.036	0.018	0.726	0.181	0.012	0.002	0.195	0.052	0.003	0.002	0.057	1.525	0.085	0.039	1.649
Straight-In Arrivals	**14**	**14A1**	0.269	0.037	0.004	0.31	0.292	0.041	0.004	0.337	0.033	0.015	0.001	0.049	0.022	0.000	0.002	0.024	0.616	0.093	0.011	0.720
	21	**21A1**	1.252	0.174	0.02	1.446	1.360	0.190	0.020	1.570	0.154	0.069	0.003	0.226	0.020	0.000	0.002	0.022	2.786	0.433	0.045	3.264
	26	**26A1**	0.109	0.015	0.002	0.126	0.119	0.017	0.002	0.138	0.013	0.006	0.000	0.019	0.092	0.000	0.010	0.102	0.333	0.038	0.014	0.385
	32	**32A1**	0.32	0.044	0.005	0.369	0.348	0.049	0.005	0.402	0.039	0.018	0.001	0.058	0.004	0.000	0.000	0.004	0.711	0.111	0.011	0.833
Overhead Arrivals	**14**	**14O3**	1.036	0.051	0.009	1.096	1.121	0.056	0.009	1.186	0.387	0.033	0.001	0.421	0.193	0.011	0.005	0.209	2.737	0.151	0.024	2.912
	21	**21O3**	3.156	0.156	0.027	3.339	3.416	0.170	0.027	3.613	1.179	0.100	0.003	1.282	0.354	0.019	0.010	0.383	8.105	0.445	0.067	8.617
	26	**26O3**	0.261	0.013	0.002	0.276	0.283	0.014	0.002	0.299	0.098	0.008	0.000	0.106	0.930	0.051	0.026	1.007	1.572	0.086	0.030	1.688
	32	**32O3**	0.387	0.019	0.003	0.409	0.419	0.021	0.003	0.443	0.145	0.012	0.000	0.157	0.009	0.000	0.000	0.009	0.960	0.052	0.006	1.018
Carrier Break Arrivals	**14**	**14O3**	0.039	0.002	0	0.041	0.042	0.002	0.000	0.044	0.015	0.001	0.000	0.016	0.002	0.000	0.000	0.002	0.098	0.005	0.000	0.103
	21	**21O3**	2.954	0.153	0.019	3.126	3.204	0.162	0.028	3.394	1.108	0.097	0.005	1.210	0.130	0.006	0.004	0.140	7.396	0.418	0.056	7.870
	26	**26O3**	0.208	0.011	0.001	0.22	0.226	0.011	0.002	0.239	0.078	0.007	0.000	0.085	0.375	0.018	0.011	0.404	0.887	0.047	0.014	0.948
	32	**32O3**	0.052	0.003	0	0.055	0.056	0.003	0.000	0.059	0.020	0.002	0.000	0.022	0.024	0.001	0.001	0.026	0.152	0.009	0.001	0.162
Touch & Go*	**14**	**14T1**	0.443	0.051	0.01	0.504	0.480	0.055	0.011	0.546	0.300	0.029	0.000	0.329	0.140	0.007	0.003	0.150	1.363	0.142	0.024	1.529
	21	**21T1**	4.781	0.546	0.107	5.434	5.181	0.593	0.116	5.890	3.238	0.314	0.004	3.556	0.189	0.010	0.004	0.203	13.389	1.463	0.231	15.083
	26	**26T1**	0.386	0.044	0.009	0.439	0.418	0.048	0.009	0.475	0.261	0.025	0.000	0.286	1.112	0.059	0.023	1.194	2.177	0.176	0.041	2.394
	32	**32T1**	0.068	0.008	0.002	0.078	0.074	0.008	0.002	0.084	0.046	0.004	0.000	0.050	0.015	0.001	0.000	0.016	0.203	0.021	0.004	0.228
FCLP*	**14**	**14F1**	0.045	0.011	0	0.056	0.048	0.012	0.000	0.060	0.059	0.033	0.000	0.092	0.000	0.000	0.000	0.000	0.152	0.056	0.000	0.208
	21	**21F1**	0.486	0.116	0	0.602	0.520	0.133	0.000	0.653	0.636	0.353	0.004	0.993	0.000	0.000	0.000	0.000	1.642	0.602	0.004	2.248
	26	**26F1**	0.039	0.009	0	0.048	0.042	0.011	0.000	0.053	0.051	0.028	0.000	0.079	0.000	0.000	0.000	0.000	0.132	0.048	0.000	0.180
	32	**32F1**	0.007	0.002	0	0.009	0.007	0.002	0.000	0.009	0.009	0.005	0.000	0.014	0.000	0.000	0.000	0.000	0.023	0.009	0.000	0.032
Operations Summary																						
Departures			9.692	0.526	0.260	10.478	10.499	0.567	0.285	11.351	2.834	0.184	0.026	3.044	2.604	0.153	0.082	2.839	25.629	1.430	0.653	27.712
Arrivals			10.043	0.678	0.092	10.813	10.886	0.736	0.102	11.724	3.269	0.368	0.014	3.651	2.155	0.106	0.071	2.332	26.353	1.888	0.279	28.520
Closed Patterns*			6.255	0.787	0.128	7.170	6.770	0.862	0.138	7.770	4.600	0.791	0.008	5.399	1.456	0.077	0.030	1.563	19.081	2.517	0.304	21.902
TOTAL			25.990	1.991	0.480	28.461	28.155	2.165	0.525	30.845	10.703	1.343	0.048	12.094	6.215	0.336	0.183	6.734	71.063	5.835	1.236	78.134

* Patterns counted as one operation for noise modeling purposes.

Table 2.2-3. Modeled Average Busy-Day Flight Operations for the Moderate Expansion Alternative at NAWS China Lake

Operation Type	Runway	Track	F/A-18C/D				F/A-18E/F				EA-6B				AV-8B				All Modeled Aircraft			
			Day	Eve	Night	Total	Day	Eve	Night	Total	Day	Eve	Night	Total	Day	Eve	Night	Total	Day	Eve	Night	Total
Departures	**14**	**14D1**	1.412	0.077	0.038	1.527	1.529	0.083	0.041	1.653	0.413	0.027	0.004	0.444	0.147	0.008	0.005	0.160	3.501	0.195	0.088	3.784
	21	**21D1**	1.144	0.062	0.031	1.237	1.239	0.067	0.033	1.339	0.334	0.022	0.003	0.359	0.058	0.003	0.002	0.063	2.775	0.154	0.069	2.998
	21	**21D2**	6.483	0.352	0.176	7.011	7.023	0.380	0.189	7.592	1.895	0.123	0.019	2.037	0.327	0.019	0.011	0.357	15.728	0.874	0.395	16.997
	26	**26D1**	0.822	0.045	0.022	0.889	0.890	0.048	0.024	0.962	0.240	0.016	0.002	0.258	2.241	0.129	0.073	2.443	4.193	0.238	0.121	4.552
	32	**32D1**	0.674	0.037	0.018	0.729	0.730	0.040	0.020	0.790	0.197	0.013	0.002	0.212	0.057	0.003	0.002	0.062	1.658	0.093	0.042	1.793
Straight-In Arrivals	**14**	**14A1**	0.293	0.041	0.005	0.339	0.318	0.044	0.005	0.367	0.036	0.016	0.001	0.053	0.023	0.000	0.002	0.025	0.670	0.101	0.013	0.784
	21	**21A1**	1.364	0.19	0.023	1.577	1.479	0.207	0.023	1.709	0.167	0.072	0.003	0.242	0.021	0.000	0.002	0.023	3.031	0.469	0.051	3.551
	26	**26A1**	0.119	0.017	0.002	0.138	0.129	0.018	0.002	0.149	0.015	0.006	0.000	0.021	0.099	0.000	0.010	0.109	0.362	0.041	0.014	0.417
	32	**32A1**	0.348	0.049	0.006	0.403	0.378	0.053	0.006	0.437	0.043	0.018	0.001	0.062	0.005	0.000	0.000	0.005	0.774	0.120	0.013	0.907
Overhead Arrivals	**14**	**14O3**	1.126	0.056	0.01	1.192	1.218	0.061	0.010	1.289	0.420	0.035	0.001	0.456	0.210	0.012	0.006	0.228	2.974	0.164	0.027	3.165
	21	**21O3**	3.429	0.17	0.03	3.629	3.712	0.186	0.030	3.928	1.278	0.107	0.003	1.388	0.384	0.022	0.011	0.417	8.803	0.485	0.074	9.362
	26	**26O3**	0.284	0.014	0.002	0.3	0.307	0.015	0.002	0.324	0.106	0.009	0.000	0.115	1.010	0.058	0.029	1.097	1.707	0.096	0.033	1.836
	32	**32O3**	0.421	0.021	0.004	0.446	0.455	0.023	0.004	0.482	0.157	0.013	0.000	0.170	0.010	0.001	0.000	0.011	1.043	0.058	0.008	1.109
Carrier Break Arrivals	**14**	**14O3**	0.042	0.002	0	0.044	0.046	0.002	0.000	0.048	0.016	0.001	0.000	0.017	0.002	0.000	0.000	0.002	0.106	0.005	0.000	0.111
	21	**21O3**	3.213	0.167	0.019	3.399	3.482	0.176	0.032	3.690	1.206	0.102	0.005	1.313	0.141	0.007	0.004	0.152	8.042	0.452	0.060	8.554
	26	**26O3**	0.226	0.012	0.001	0.239	0.245	0.012	0.002	0.259	0.085	0.007	0.000	0.092	0.407	0.022	0.011	0.440	0.963	0.053	0.014	1.030
	32	**32O3**	0.057	0.003	0	0.06	0.061	0.003	0.001	0.065	0.021	0.002	0.000	0.023	0.027	0.001	0.001	0.029	0.166	0.009	0.002	0.177
Touch & Go*	**14**	**14T1**	0.482	0.055	0.011	0.548	0.522	0.060	0.012	0.594	0.326	0.031	0.000	0.357	0.152	0.008	0.003	0.163	1.482	0.154	0.026	1.662
	21	**21T1**	5.198	0.598	0.116	5.912	5.632	0.645	0.125	6.402	3.517	0.340	0.004	3.861	0.206	0.011	0.005	0.222	14.553	1.594	0.250	16.397
	26	**26T1**	0.42	0.048	0.009	0.477	0.455	0.052	0.010	0.517	0.284	0.027	0.000	0.311	1.209	0.066	0.027	1.302	2.368	0.193	0.046	2.607
	32	**32T1**	0.074	0.009	0.002	0.085	0.080	0.009	0.002	0.091	0.050	0.005	0.000	0.055	0.016	0.001	0.000	0.017	0.220	0.024	0.004	0.248
FCLP*	**14**	**14F1**	0.049	0.012	0	0.061	0.053	0.014	0.000	0.067	0.064	0.035	0.000	0.099	0.000	0.000	0.000	0.000	0.166	0.061	0.000	0.227
	21	**21F1**	0.529	0.125	0	0.654	0.568	0.146	0.000	0.714	0.688	0.383	0.004	1.075	0.000	0.000	0.000	0.000	1.785	0.654	0.004	2.443
	26	**26F1**	0.043	0.01	0	0.053	0.046	0.012	0.000	0.058	0.056	0.031	0.000	0.087	0.000	0.000	0.000	0.000	0.145	0.053	0.000	0.198
	32	**32F1**	0.008	0.002	0	0.01	0.008	0.002	0.000	0.010	0.010	0.005	0.000	0.015	0.000	0.000	0.000	0.000	0.026	0.009	0.000	0.035
Operations Summary																						
Departures			10.535	0.573	0.285	11.393	11.411	0.618	0.307	12.336	3.079	0.201	0.030	3.310	2.830	0.162	0.093	3.085	27.855	1.554	0.715	30.124
Arrivals			10.922	0.742	0.102	11.766	11.830	0.800	0.117	12.747	3.550	0.388	0.014	3.952	2.339	0.123	0.076	2.538	28.641	2.053	0.309	31.003
Closed Patterns*			6.803	0.859	0.138	7.800	7.364	0.940	0.149	8.453	4.995	0.857	0.008	5.860	1.583	0.086	0.035	1.704	20.745	2.742	0.330	23.817
TOTAL			28.260	2.174	0.525	30.959	30.605	2.358	0.573	33.536	11.624	1.446	0.052	13.122	6.752	0.371	0.204	7.327	77.241	6.349	1.354	84.944

* Patterns counted as one operation for noise modeling purposes.

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Appendix D

Air Quality

APPENDIX D1 - EMISSIONS ASSOCIATED WITH AIRFIELD OPERATIONS

D1.1 INTRODUCTION

This appendix contains documentation for the analysis of emissions associated with Armitage Airfield at NAWS. Documentation for analyses of other CLUMP-related emission sources at NAWS are presented in Appendix D2 (range-related flight operations and generators supporting range operations); Appendix D3 (sources associated with ground troop training exercises); and Appendix D4 (emissions associated with ordnance use and testing). In addition, Appendix D5 contains a discussion of Clean Air Act conformity requirements promulgated by the US Environmental Protection Agency (EPA), a record of nonapplicability (RONA) for the Limited Expansion Alternative, and a RONA for the Moderate Expansion Alternative.

Emission sources covered in this airfield operations appendix include: flight operations at Armitage Airfield; in-frame engine run-ups following routine engine maintenance; use of ground support equipment at Armitage Airfield; and fuel transfer activities (which are primarily associated with aircraft fueling and defueling). Aircraft emission estimates have been prepared in a manner consistent with, but more detailed than, procedures outlined in US Environmental Protection Agency (1992). Most emission rate data has been taken from various documents prepared by the Navy's Aircraft Environmental Support Office (AESO). To be consistent with normal emission inventory procedures, only emission released within 3,000 feet of ground level are included in the emissions analyses.

Extensive tabular summaries of data and emissions analyses are presented in this appendix. For convenience, these tables are grouped by emission source category and are presented following the appendix narrative. Most tables include footnotes and data source references that further explain the details of the emission estimates.

Emission summaries for major airfield activity components are provided in the following tables:

- Table D1-27 through D1-29: Flight operations at Armitage Airfield
- Table D1-35, D1-37, and D1-39: Engine maintenance run-ups
- Table D1-44 through D1-46: Ground support equipment

Baseline emissions from fuel transfer operations are summarized in Table D1-52. The baseline emissions are extrapolated to future conditions by assuming a 15% increase for the Limited Expansion Alternative and a 25% increase for the Moderate Expansion Alternative.

D1.2 ARMITAGE AIRFIELD FLIGHT OPERATIONS

Aircraft emission estimates require categorizing flight operations by aircraft type. In addition, flight operations for each aircraft type must be separated into various components that have different durations, fuel consumption rates, and engine power settings. The major flight activity categories used for aircraft emissions analyses include takeoffs, landings, and various practice patterns cycles. Figures 1.5-1 through 1.5-4 of the noise study report by Wyle Research (see Appendix C) illustrate the primary departure, arrival, and practice pattern flight tracks for the various runways at Armitage Airfield.

Each of the major takeoff, landing, and practice pattern types can be broken down further into components that have relatively uniform engine power setting characteristics. For each aircraft type, each flight activity component is analyzed in terms of the number times it will occur during a year, the average duration (time-in-mode) of the component, the engine power setting and fuel flow rate associated with the flight component, and associated engine emission rates as a function of fuel flow.

Flight Activity Estimates

NAWS staff determined that 1993 was the year having the best data records from which to estimate baseline flight activity at NAWS. To provide more consistency with other analyses in this EIS, the 1993 data were extrapolated to estimate 1996 conditions.

Because flight activity data are recorded in different ways for different purposes, it is difficult to obtain an internally consistent set of data organized in a manner most appropriate for aircraft emissions analyses. Data provided by NAWS staff have been combined with data from airfield noise modeling studies (Wyle Research 1995, 1997, 1998) to develop the flight activity estimates used for air quality analysis purposes.

Tables D1-1 through D1-5 present the analysis of flight operations at Armitage Airfield. Armitage Airfield had a total of 26,984 flight operations in 1993 (Wyle Research 1995). NAWS staff provided an estimate of 1993 flight operations for each of 33 aircraft types. Table D1-1 summarizes the extrapolations required to characterize 1993 flight activity in a format appropriate for air quality analyses. One of the aircraft types present in 1993 (A-4 jets) was retired from US military service prior to 1996. A 1996 baseline condition was estimated by assuming that 1993 A-4 flight missions are now being conducted by F/A-18 aircraft (Table D1-2).

Future flight activity conditions for the No Action Alternative required additional consideration of on-going changes in aircraft models used by the Navy. A-6E aircraft were recently retired from US military service. As was the case with 1993 A-4 operations, all future projections of aircraft flight activity assume that 1996 A-6E missions are will be conducted by F/A-18 aircraft. In addition, a new F/A-18 aircraft model is being introduced into Navy service. In the future, many F/A-18 squadrons will replace their F/A-18A/B and F/A-18C/D models with the new F/A-18E/F models.

For analysis purposes, future No Action Alternative flight operations at Armitage Airfield assume that 48% of future F/A-18 flight operations will be conducted by F/A-18A/B/C/D models and that 52% of F/A-18 operations will be conducted by F/A-18E/F models (Table D1-3). The mix of F/A-18A/B/C/D and F/A-18E/F models is based on assumptions used for recent noise studies at NAWS (Wyle 1998).

Flight activity estimates for the Limited Expansion Alternative were developed by assuming a 15% increase in No Action scenario operations (Table D1-4). Flight activity estimates for the Moderate Expansion Alternative were developed by assuming a 25% increase in No Action scenario operations (Table D1-5).

Time-In-Mode Estimates

Time-in-mode estimates for flight activity components by different aircraft types have been estimated by combining data from a variety of sources. Noise modeling studies for various Navy airfields provided flight profiles (distance, altitude, power setting, and air speed) for takeoffs, landings, and practice pattern cycles by various aircraft types at different airfields, including Armitage Airfield.

Tables D1-6 through D1-18 present flight-profile analyses for various aircraft at NAWS, NAF El Centro, NAS Lemoore, and NAS North Island. Some of the aircraft covered by those flight profiles do not operate at Armitage Airfield; those aircraft were evaluated to obtain comparative data that might be useful for other aircraft types that do operate from Armitage Airfield. Tables D1-19 through D1-21 summarize the flight track distance, air speed, and time-in-mode data developed from the various noise-study flight profiles.

A synthesized flight track profile approach was adopted for this EIS as the most appropriate method to develop time-in-mode estimates for the major flight components of the 32 aircraft types being evaluated for the emissions analysis at Armitage Airfield. This approach characterizes major flight components by an average flight track length and an average air speed. Estimates of flight track length and average air speed allow a consistent calculation procedure to be used for deriving time-in- mode values for major flight components. Table D1-22 summarizes the resulting time-in-mode estimates used for takeoff, climbout, straight-in landings, overhead break landings, and pattern cycles at Armitage Airfield. The basic time-in-mode estimates in Table D1-22 have been supplemented as necessary by additional estimates for other flight components applicable to particular aircraft or helicopter models. Most of the supplemental time-in-mode estimates are based on AESO evaluations for various aircraft and helicopter models.

Aircraft Emissions Analyses

Only a relatively small number of aircraft and helicopter engine models have been tested for emission factor purposes. Most emission tests on aircraft and helicopter engines are limited to organic compounds, nitrogen oxides, and carbon monoxide. Few engines have been tested to develop emission factors for particulate matter. Sulfur oxide emission rates are normally based on the typical sulfur content of the fuel. Because emissions data are not available for the engine models present in many aircraft models, aircraft emissions analyses must substitute data for engine models that have been tested. Table D1-23 summarizes the engine model substitutions that have been used for this EIS.

Most of the fuel flow and emission rate data for various power settings of different aircraft engines come from numerous memo reports prepared by AESO. For a few engine types, data published by EPA (1992) have been used. AESO data for PM_{10} emissions from two engine types have been converted by regression analysis into equations relating PM_{10} emission rates to engine-fuel flow-rates. Figures D1-1 and D1-2 illustrate the resulting emission rate curves.

Aircraft emissions analyses for the No Action Alternative are presented in Tables D1-24 and D1-25. Analyses for the Limited Expansion Alternative are presented in Tables D1-26 and D1-27. Analyses for the Moderate Expansion Alternative are presented in Tables D1-28 and D1-29. Table D1-30 provides a summary of the emissions analyses for aircraft flight operations at Armitage Airfield.

As indicated in these tables, the basic takeoff, climbout, landing, and practice pattern flight modes have been expanded to include consideration of engine warm-up, taxi, and engine shutdown conditions. In addition to the primary flight engines, some aircraft models include an auxiliary power unit (APU) that is used to start the main engines and to provide power for various aircraft systems.

At many military airfields, jet aircraft taxi to a fuel pit facility to refuel after landing; during this "hot refueling" procedure, the main engines remain in an idle setting. NAWS does not have facilities to accommodate hot refueling. The hot refueling entries are retained in the aircraft emissions tables to avoid any ambiguity about whether or not hot refueling was considered in the analysis.

D1.3 IN-FRAME ENGINE RUN-UP EMISSIONS

In addition to direct flight operations, there will be emissions associated with engine tests performed after engine maintenance. In-frame engine run-ups are performed when maintenance activities do not require removing the engine from the aircraft. In-frame run-ups are also performed after engines are re-installed in aircraft. Depending on the number of engines and the nature of maintenance activities, a variety of run-up test procedures may be performed.

Only those aircraft based at NAWS or aircraft that make frequent use of Armitage Airfield are likely to require routine maintenance and subsequent engine run-up tests. Aircraft and helicopter types currently based at NAWS include F/A-18, EA-6B, AV-8B, T-39D, AH-1W, and HH-1N. Visiting aircraft types that average fewer than four total flight operations per week (combined takeoffs, landings, and pattern cycles) are not included in the analysis of in-frame engine run-ups. F-86, UC-12B, MU-2, C-130, UN-1L, and Cessna general aviation aircraft make relatively frequent flights in and out of Armitage Airfield. Until recently, A-6E aircraft also made relatively frequent flights in and out of Armitage Airfield.

NAWS does not have readily available records on the number of different types of in-frame engine run-ups conducted each year. Consequently, run-up test types and their frequency have been estimated using data collected by AESO from a various other Navy installations. The AESO data on the frequency of engine run-up tests are typically presented as the annual number of tests of a given type per individual aircraft based at an installation.

Because many flight operations at NAWS are conducted by aircraft not based at Armitage Airfield, the number of aircraft assigned to NAWS does not provide a reliable index of the frequency of routine engine maintenance activities and subsequent engine run-up tests. Estimated flight operations by aircraft type have been converted into a surrogate number of "equivalent aircraft" for purposes of estimating emissions from in-frame engine run-ups. For jet aircraft, every 145 sorties per year is assumed to represent one equivalent aircraft. Every 100 sorties per year is assumed to represent one equivalent aircraft for turboprop aircraft, general aviation aircraft, and helicopters. Tables D1-31 through D1-33 present the estimates of equivalent aircraft numbers for the No Action Alternative, the Limited Expansion Alternative, and the Moderate Expansion Alternative.

Tables D1-34 and D1-35 present the engine run-up emission estimates for the No Action Alternative. Tables D1-36 and D1-37 present engine run-up emission estimates for the Limited Expansion Alternative. Tables D1-38 and D1-39 present engine run-up emission estimates for the Moderate Expansion Alternative. The type and frequency of engine run-up tests shown in these tables are based on recent evaluations conducted by AESO.

D1.4 GROUND SUPPORT EQUIPMENT

Aircraft operations generally require the use of some specialized ground support equipment (GSE). The most common equipment includes tow tractors, bomb hoists, and hydraulic test stands. Portable air start units, portable generators, and portable air conditioning units are used for large aircraft that do not have built-in auxiliary power units. Small aircraft normally start their engines from built-in battery-powered starters.

Most GSE items are classified as "tactical support equipment" and are registered under the California Portable Equipment Registration Program. Therefore, they are exempt from APCD permit requirements and stationary source control regulations. Stationary sources operated under air pollution control district permits are exempt from the general conformity rule. Items registered with the state as portable equipment are not subject to stationary source permit requirements, and must be accounted for in Clean Air Act conformity analyses. All GSE items at NAWS have been accounted for in the conformity analyses.

NAWS does not have records for use of individual GSE items, but does have records for the amount of fuel used by the overall GSE pool. NAWS staff provided data on the number and type of GSE items, engine horsepower ratings, and average fuel consumption rates. GSE use rates were developed by iteration, using total 1996 GSE fuel use as a control total.

Table D1-40 summarizes estimated GSE use rates for 1996. The resulting use rates are indexed to various types of aircraft sorties, in-frame engine tests, or generalized monthly use rates. Future GSE use and emissions have been estimated by applying the 1996 use rates to projected sortie and engine test numbers.

Because A-6E missions have been taken over by F/A-18 aircraft, estimates of use and resulting emissions for some types of GSE equipment are lower than the 1996 condition. Many older jet aircraft, including the A-6E, do not have a built-in auxiliary power unit. Jet aircraft such as the A-6E require a ground-based air start unit to start the aircraft engines. In contrast, F/A-18 aircraft have a built-in auxiliary power unit that starts itself from battery power. Aircraft with built-in auxiliary power units do not need to use ground-based air start units.

Table D1-41 summarizes estimated GSE use for the No Action Alternative. Table D1-42 summarizes estimated GSE use for the Limited Expansion Alternative. Table D1-43 summarizes estimated GSE use for the Moderate Expansion Alternative.

GSE emission estimates for the No Action Alternative are summarized in Table D1-44. GSE emission estimates for the Limited Expansion Alternative are summarized in Table D1-45. GSE emission estimates for the Moderate Expansion Alternative are summarized in Table D1-46.

Emission rates used in Tables D1-44 through D1-46 are based on US Environmental Protection Agency (1991, 1995) data. EPA has not published emission factors for equipment fueled by JP fuel. Emission rate adjustment factors for diesel engine GSE items operating on JP-5 fuel were provided to Tetra Tech by NAS Lemoore staff (Castro 1997a) during prior EIS studies. Those emission rate adjustment factors have been used in Tables D1-44 through D1-46.

D1.5 FUEL DELIVERIES AND TRANSFERS

Military aircraft and most diesel engine equipment at military facilities are operated on JP fuel (typically either JP-5 or JP-8). NAWS uses JP-8 fuel for aircraft and ground support equipment. JP-8 fuel has a low volatility. Fuel handling and transfers will result in small quantities of evaporative emissions as liquid fuel displaces air and fuel vapors when fuel tanks are filled (US Environmental Protection Agency 1995). Fuel transfer emissions vary with temperature. Table D1-47 summarizes monthly temperature patterns for NAWS, and indicates the temperature assumed for computing fuel volatility.

Table D1-48 summarizes the parameters required to compute fuel vapor displacement during fuel transfer operations. The EPA calculation procedure does not provide parameters for JP-8 fuel, but does provide parameters for JP-5 fuel. The JP-5 parameter values have been used to estimate JP-8 fuel emissions at NAWS. Table D1-49 summarizes emission rates for splash loading transfers of JP fuel at different average temperatures.

Tables D1-50 and D1-51 show baseline fuel use at NAWS. Aircraft refueling accounts for about 99% of JP-8 fuel use at NAWS. Aircraft refueling requires two fuel transfers: from fuel farm storage tanks to tanker trucks, and from tanker trucks to aircraft. Table D1-52 summarizes baseline emissions from fuel transfers and fuel deliveries at NAWS.

Baseline fuel use estimates are assumed to apply to the No Action Alternative. Fuel use for the Limited Expansion Alternative is to increase by 15% over baseline values, while fuel use for the Moderate Expansion Alternative is estimated to increase by 25% over baseline values.

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TABLE D1-1. PARTITIONING OF 1993 BASELINE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	LISTED OPERATIONS	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F/A-18A-D	TAKEOFFS			37.4%		4,868	
	LANDINGS			37.4%			
	STRAIGHT IN				20.8%	1,014	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK				79.2%	3,854	Wyle 1998 Table 3.5-2
	PATTERN CYCLES			25.2%			Wyle 1998 Table 3.5-2
	T&G PATTERNS				90.1%	2,950	Wyle 1998 Table 3.5-2
	FCLP PATTERNS				9.9%	326	Wyle 1998 Table 3.5-2
	TOTAL	12,845	13,012				
A-6	TAKEOFFS			27.7%		583	
	LANDINGS			27.7%			
	STRAIGHT IN				9.7%	56	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK				90.3%	527	Wyle 1998 Table 3.5-2
	PATTERN CYCLES			44.7%			Wyle 1998 Table 3.5-2
	T&G PATTERNS				78.2%	734	Wyle 1998 Table 3.5-2
	FCLP PATTERNS				21.8%	206	Wyle 1998 Table 3.5-2
	TOTAL	2,078	2,106				
EA-6B	TAKEOFFS			27.7%		291	
	LANDINGS			27.7%			
	STRAIGHT IN				9.7%	28	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK				90.3%	263	Wyle 1998 Table 3.5-2
	PATTERN CYCLES			44.7%			Wyle 1998 Table 3.5-2
	T&G PATTERNS				78.2%	368	Wyle 1998 Table 3.5-2
	FCLP PATTERNS				21.8%	102	Wyle 1998 Table 3.5-2
	TOTAL	1,039	1,052				
AV-8B	TAKEOFFS			38.4%		575	
	LANDINGS			38.4%			
	STRAIGHT IN				6.5%	37	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK				93.5%	538	Wyle 1998 Table 3.5-2
	PATTERN CYCLES			23.2%			Wyle 1998 Table 3.5-2
	T&G PATTERNS				100.0%	348	Wyle 1998 Table 3.5-2
	FCLP PATTERNS				0.0%	0	Wyle 1998 Table 3.5-2
	TOTAL	1,478	1,498				
TA-4F,J	TAKEOFFS			33.5%		213	
	OVERHEAD BREAK LANDINGS			33.5%		213	
	T&G PATTERN CYCLES			32.9%		208	Wyle 1995 Table 3-3
	TOTAL	626	634				
F-3	TAKEOFFS			24.1%		34	
(Panavia	STRAIGHT IN LANDINGS			24.1%		34	
Tornado)	T&G PATTERN CYCLES			51.9%		74	AESO 1994 (F-5)
	TOTAL	140	142				
F-15	TAKEOFFS			24.1%		39	
	STRAIGHT IN LANDINGS			24.1%		39	
	T&G PATTERN CYCLES			51.7%		84	AESO 1994 (F-16N)
	TOTAL	160	162				
F-16	TAKEOFFS			24.1%		39	
	STRAIGHT IN LANDINGS			24.1%		39	
	T&G PATTERN CYCLES			51.7%		84	AESO 1994 (F-16N)
	TOTAL	160	162				
F-86	TAKEOFFS			23.9%		243	
	STRAIGHT IN LANDINGS			23.9%		243	
	T&G PATTERN CYCLES			52.1%		530	AESO 1994 (F-86F)
	TOTAL	1,002	1,016				
C-9B	TAKEOFFS			25.0%		25	
(DC-9)	STRAIGHT IN LANDINGS			25.0%		25	
	T&G PATTERN CYCLES			50.0%		50	Wyle 1995 (Navy Heavy)
	TOTAL	100	100				
UC-8A	TAKEOFFS			43.2%		12	
(DHC-5)	STRAIGHT IN LANDINGS			43.2%		12	
	T&G PATTERN CYCLES			13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	28	28				

TABLE D1-1. PARTITIONING OF 1993 BASELINE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	LISTED OPERATIONS	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
UC-12B	TAKEOFFS			43.2%		210	
(Super King	STRAIGHT IN LANDINGS			43.2%		210	
Air 200)	T&G PATTERN CYCLES			13.7%		66	Wyle 1995 (Navy Prop)
	TOTAL	481	486				
U-21	TAKEOFFS			43.2%		9	
(King Air	STRAIGHT IN LANDINGS			43.2%		9	
A100)	T&G PATTERN CYCLES			13.7%		2	Wyle 1995 (Navy Prop)
	TOTAL	21	20				
MU-2	TAKEOFFS			43.2%		1,166	
	STRAIGHT IN LANDINGS			43.2%		1,166	
	T&G PATTERN CYCLES			13.7%		368	Wyle 1995 (Navy Prop)
	TOTAL	2,665	2,700				
OV-10	TAKEOFFS			43.2%		24	
	STRAIGHT IN LANDINGS			43.2%		24	
	T&G PATTERN CYCLES			13.7%		8	Wyle 1995 (Navy Prop)
	TOTAL	55	56				
OV-1	TAKEOFFS			43.2%		35	
	STRAIGHT IN LANDINGS			43.2%		35	
	T&G PATTERN CYCLES			13.7%		12	Wyle 1995 (Navy Prop)
	TOTAL	82	82				
P-3	TAKEOFFS			43.2%		12	
	STRAIGHT IN LANDINGS			43.2%		12	
	T&G PATTERN CYCLES			13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	28	28				
C-130	TAKEOFFS			47.8%		67	
	STRAIGHT IN LANDINGS			47.8%		67	
	T&G PATTERN CYCLES			4.4%		6	Wyle 1995 (Other Prop)
	TOTAL	137	140				
T-34	TAKEOFFS			43.2%		17	
(Beechcraft	STRAIGHT IN LANDINGS			43.2%		17	
Model 45)	T&G PATTERN CYCLES			13.7%		6	Wyle 1995 (Navy Prop)
	TOTAL	40	40				
T-38	TAKEOFFS			24.1%		25	
	STRAIGHT IN LANDINGS			24.1%		25	
	T&G PATTERN CYCLES			51.9%		52	AESO 1994 (F-5)
	TOTAL	100	102				
T-39D	TAKEOFFS			16.7%		44	
	STRAIGHT IN LANDINGS			16.7%		44	
	T&G PATTERN CYCLES			66.7%		176	AESO 1994 (T-39D)
	TOTAL	261	264				
AH-1W	TAKEOFFS			20.2%		57	
	STRAIGHT IN LANDINGS			20.2%		57	
	T&G PATTERN CYCLES			59.5%		166	Wyle 1995 (Navy Helo)
	TOTAL	275	280				
AH-64	TAKEOFFS			20.2%		11	
	STRAIGHT IN LANDINGS			20.2%		11	
	T&G PATTERN CYCLES			59.5%		34	Wyle 1995 (Navy Helo)
	TOTAL	55	56				
CH-46E	TAKEOFFS			20.2%		7	
	STRAIGHT IN LANDINGS			20.2%		7	
	T&G PATTERN CYCLES			59.5%		20	Wyle 1995 (Navy Helo)
	TOTAL	34	34				
CH-53E	TAKEOFFS			20.2%		3	
	STRAIGHT IN LANDINGS			20.2%		3	
	T&G PATTERN CYCLES			59.5%		8	Wyle 1995 (Navy Helo)
	TOTAL	14	14				

TABLE D1-1. PARTITIONING OF 1993 BASELINE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	LISTED OPERATIONS	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
UH-1L	TAKEOFFS			20.2%		43	
	STRAIGHT IN LANDINGS			20.2%		43	
	T&G PATTERN CYCLES			59.5%		126	Wyle 1995 (Navy Helo)
	TOTAL	210	212				
HH-1N	TAKEOFFS			20.2%		129	
	STRAIGHT IN LANDINGS			20.2%		129	
	T&G PATTERN CYCLES			59.5%		378	Wyle 1995 (Navy Helo)
	TOTAL	628	636				
OH-58	TAKEOFFS			20.2%		18	
	STRAIGHT IN LANDINGS			20.2%		18	
	T&G PATTERN CYCLES			59.5%		54	Wyle 1995 (Navy Helo)
	TOTAL	89	90				
UH-60	TAKEOFFS			20.2%		14	
	STRAIGHT IN LANDINGS			20.2%		14	
	T&G PATTERN CYCLES			59.5%		42	Wyle 1995 (Navy Helo)
	TOTAL	69	70				
BEECHCRAF	TAKEOFFS			30.0%		19	
	STRAIGHT IN LANDINGS			30.0%		19	
	T&G PATTERN CYCLES			39.9%		26	Wyle 1995 (Gen Aviation)
	TOTAL	62	64				
CESSNA	TAKEOFFS			30.0%		501	
	STRAIGHT IN LANDINGS			30.0%		501	
	T&G PATTERN CYCLES			39.9%		668	Wyle 1995 (Gen Aviation)
	TOTAL	1,648	1,670				
MOONEY	TAKEOFFS			30.0%		4	
	STRAIGHT IN LANDINGS			30.0%		4	
	T&G PATTERN CYCLES			39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	14	14				
GULFSTREAI	TAKEOFFS			30.0%		4	
AA-5	STRAIGHT IN LANDINGS			30.0%		4	
	T&G PATTERN CYCLES			39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	14	14				
TOTALS	TAKEOFFS					9,341	
	LANDINGS					9,341	
	PATTERN CYCLES					8,302	
	---------------------------------	--------	--------			--------	
	TOTALS	26,638	26,984			26,984	

Notes:

The control total for annual operations (26,984) is from Table 3-1 in Wyle (1995) and Table 3.5-1 in Wyle (1997).
Listed Operations are from NAWS China Lake (1998).
Adjusted Operations reflect a proportional scaling of listed operations to reach the control total value for total annual opertions.
Total operations and pattern cycle operations for each aircraft type adjusted as necessary to obtain even numbers since takeoffs must equal landings and pattern cycles are counted as two operations.
Primary split factors for pattern cycles derived from data in Wyle (1995), Wyle (1998), and AESO (1994); primary split factors for landings and takeoffs calculated by difference, with takeoffs equal to landings for each aircraft type.
Secondary split factors for landing patterns derived from data in Wyle (1998).
Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), landings are assumed to use a straight-in approach.
Secondary split factors for pattern cycles derived from data in Wyle (1998).
Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), pattern cycles are assumed to be touch-and-go patterns.

Data Sources:

NAWS China Lake. 1998. Estimated CY93 Flight Operations by Aircraft Type. July 17, 1998 Fax from Tina Evans.
U.S. Navy, Aircraft Environmental Support Office. 1994. NAWS China Lake Aircraft Emissions for Fiscal Year 1993. Draft. AESO Memorandum Report No. 9501.
Wyle Laboratories. 1995. Aircraft Noise Study for Naval Air Weapons Station China Lake, California. Wyle Research Report WR 95-9. August 1995.
Wyle Laboratories. 1997. Draft Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. May 1997.
Wyle Laboratories. 1998. Final Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. November 1998.

TABLE D1-2. EXTRAPOLATED 1996 FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F/A-18A-D	TAKEOFFS		37.4%		5,105	
	LANDINGS		37.4%			
	STRAIGHT IN			20.8%	1,064	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			79.2%	4,041	Wyle 1998 Table 3.5-2
	PATTERN CYCLES		25.2%			Wyle 1998 Table 3.5-2
	T&G PATTERNS			90.1%	3,094	Wyle 1998 Table 3.5-2
	FCLP PATTERNS			9.9%	342	Wyle 1998 Table 3.5-2
	TOTAL	13,646				
A-6	TAKEOFFS		27.7%		583	
	LANDINGS		27.7%			
	STRAIGHT IN			9.7%	56	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			90.3%	527	Wyle 1998 Table 3.5-2
	PATTERN CYCLES		44.7%			Wyle 1998 Table 3.5-2
	T&G PATTERNS			78.2%	734	Wyle 1998 Table 3.5-2
	FCLP PATTERNS			21.8%	206	Wyle 1998 Table 3.5-2
	TOTAL	2,106				
EA-6B	TAKEOFFS		27.7%		291	
	LANDINGS		27.7%			
	STRAIGHT IN			9.7%	28	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			90.3%	263	Wyle 1998 Table 3.5-2
	PATTERN CYCLES		44.7%			Wyle 1998 Table 3.5-2
	T&G PATTERNS			78.2%	368	Wyle 1998 Table 3.5-2
	FCLP PATTERNS			21.8%	102	Wyle 1998 Table 3.5-2
	TOTAL	1,052				
AV-8B	TAKEOFFS		38.4%		575	
	LANDINGS		38.4%			
	STRAIGHT IN			6.5%	37	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			93.5%	538	Wyle 1998 Table 3.5-2
	PATTERN CYCLES		23.2%			Wyle 1998 Table 3.5-2
	T&G PATTERNS			100.0%	348	Wyle 1998 Table 3.5-2
	FCLP PATTERNS			0.0%	0	Wyle 1998 Table 3.5-2
	TOTAL	1,498				
F-3	TAKEOFFS		24.1%		34	
(Panavia	STRAIGHT IN LANDINGS		24.1%		34	
Tornado)	T&G PATTERN CYCLES		51.9%		74	AESO 1994 (F-5)
	TOTAL	142				
F-15	TAKEOFFS		24.1%		39	
	STRAIGHT IN LANDINGS		24.1%		39	
	T&G PATTERN CYCLES		51.7%		84	AESO 1994 (F-16N)
	TOTAL	162				
F-16	TAKEOFFS		24.1%		39	
	STRAIGHT IN LANDINGS		24.1%		39	
	T&G PATTERN CYCLES		51.7%		84	AESO 1994 (F-16N)
	TOTAL	162				
F-86	TAKEOFFS		23.9%		243	
	STRAIGHT IN LANDINGS		23.9%		243	
	T&G PATTERN CYCLES		52.1%		530	AESO 1994 (F-86F)
	TOTAL	1,016				

TABLE D1-2. EXTRAPOLATED 1996 FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
C-9B	TAKEOFFS		25.0%		25	
(DC-9)	STRAIGHT IN LANDINGS		25.0%		25	
	T&G PATTERN CYCLES		50.0%		50	Wyle 1995 (Navy Heavy)
	TOTAL	100				
UC-8A	TAKEOFFS		43.2%		12	
(DHC-5)	STRAIGHT IN LANDINGS		43.2%		12	
	T&G PATTERN CYCLES		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	28				
UC-12B	TAKEOFFS		43.2%		210	
(Super King	STRAIGHT IN LANDINGS		43.2%		210	
Air 200)	T&G PATTERN CYCLES		13.7%		66	Wyle 1995 (Navy Prop)
	TOTAL	486				
U-21	TAKEOFFS		43.2%		9	
(King Air	STRAIGHT IN LANDINGS		43.2%		9	
A100)	T&G PATTERN CYCLES		13.7%		2	Wyle 1995 (Navy Prop)
	TOTAL	20				
MU-2	TAKEOFFS		43.2%		1,166	
	STRAIGHT IN LANDINGS		43.2%		1,166	
	T&G PATTERN CYCLES		13.7%		368	Wyle 1995 (Navy Prop)
	TOTAL	2,700				
OV-10	TAKEOFFS		43.2%		24	
	STRAIGHT IN LANDINGS		43.2%		24	
	T&G PATTERN CYCLES		13.7%		8	Wyle 1995 (Navy Prop)
	TOTAL	56				
OV-1	TAKEOFFS		43.2%		35	
	STRAIGHT IN LANDINGS		43.2%		35	
	T&G PATTERN CYCLES		13.7%		12	Wyle 1995 (Navy Prop)
	TOTAL	82				
P-3	TAKEOFFS		43.2%		12	
	STRAIGHT IN LANDINGS		43.2%		12	
	T&G PATTERN CYCLES		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	28				
C-130	TAKEOFFS		47.8%		67	
	STRAIGHT IN LANDINGS		47.8%		67	
	T&G PATTERN CYCLES		4.4%		6	Wyle 1995 (Other Prop)
	TOTAL	140				
T-34	TAKEOFFS		43.2%		17	
(Beechcraft	STRAIGHT IN LANDINGS		43.2%		17	
Model 45)	T&G PATTERN CYCLES		13.7%		6	Wyle 1995 (Navy Prop)
	TOTAL	40				
T-38	TAKEOFFS		24.1%		25	
	STRAIGHT IN LANDINGS		24.1%		25	
	T&G PATTERN CYCLES		51.9%		52	AESO 1993 (F-5)
	TOTAL	102				

TABLE D1-2. EXTRAPOLATED 1996 FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
T-39D	TAKEOFFS		16.7%		44	
	STRAIGHT IN LANDINGS		16.7%		44	
	T&G PATTERN CYCLES		66.7%		176	AESO 1994 (T-39D)
	TOTAL	264				
AH-1W	TAKEOFFS		20.2%		57	
	STRAIGHT IN LANDINGS		20.2%		57	
	T&G PATTERN CYCLES		59.5%		166	Wyle 1995 (Navy Helo)
	TOTAL	280				
AH-64	TAKEOFFS		20.2%		11	
	STRAIGHT IN LANDINGS		20.2%		11	
	T&G PATTERN CYCLES		59.5%		34	Wyle 1995 (Navy Helo)
	TOTAL	56				
CH-46E	TAKEOFFS		20.2%		7	
	STRAIGHT IN LANDINGS		20.2%		7	
	T&G PATTERN CYCLES		59.5%		20	Wyle 1995 (Navy Helo)
	TOTAL	34				
CH-53E	TAKEOFFS		20.2%		3	
	STRAIGHT IN LANDINGS		20.2%		3	
	T&G PATTERN CYCLES		59.5%		8	Wyle 1995 (Navy Helo)
	TOTAL	14				
UH-1L	TAKEOFFS		20.2%		43	
	STRAIGHT IN LANDINGS		20.2%		43	
	T&G PATTERN CYCLES		59.5%		126	Wyle 1995 (Navy Helo)
	TOTAL	212				
HH-1N	TAKEOFFS		20.2%		129	
	STRAIGHT IN LANDINGS		20.2%		129	
	T&G PATTERN CYCLES		59.5%		378	Wyle 1995 (Navy Helo)
	TOTAL	636				
OH-58	TAKEOFFS		20.2%		18	
	STRAIGHT IN LANDINGS		20.2%		18	
	T&G PATTERN CYCLES		59.5%		54	Wyle 1995 (Navy Helo)
	TOTAL	90				
UH-60	TAKEOFFS		20.2%		14	
	STRAIGHT IN LANDINGS		20.2%		14	
	T&G PATTERN CYCLES		59.5%		42	Wyle 1995 (Navy Helo)
	TOTAL	70				
BEECHCRAFT	TAKEOFFS		30.0%		19	
	STRAIGHT IN LANDINGS		30.0%		19	
	T&G PATTERN CYCLES		39.9%		26	Wyle 1995 (Gen Aviation)
	TOTAL	64				
CESSNA	TAKEOFFS		30.0%		501	
	STRAIGHT IN LANDINGS		30.0%		501	
	T&G PATTERN CYCLES		39.9%		668	Wyle 1995 (Gen Aviation)
	TOTAL	1,670				

TABLE D1-2. EXTRAPOLATED 1996 FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
MOONEY	TAKEOFFS		30.0%		4	
	STRAIGHT IN LANDINGS		30.0%		4	
	T&G PATTERN CYCLES		39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	14				
GULFSTREAM AA-5	TAKEOFFS		30.0%		4	
	STRAIGHT IN LANDINGS		30.0%		4	
	T&G PATTERN CYCLES		39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	14				
TOTALS	TAKEOFFS				9,365	
	LANDINGS				9,365	
	PATTERN CYCLES				8,254	
	TOTALS	26,984			26,984	

Notes:

The control total for annual operations (26,984) is from Table 3-1 in Wyle (1995) and Table 3.5-1 in Wyle (1997).

1993 operations used as 1996 operations for most aircraft types.

1993 total TA-4 operations added to 1993 total F/A-18 operations to create 1996 F/A-18 total operations; TA-4 aircraft deleted from the 1996 condition.

Total operations and pattern cycle operations for each aircraft type adjusted as necessary to obtain even numbers, since takeoffs must equal landings and pattern cycles are counted as two operations.

Primary split factors for pattern cycles derived from data in Wyle (1995), Wyle (1998), and AESO (1994); primary split factors for landings and takeoffs calculated by difference, with takeoffs equal to landings for each aircraft type.

Secondary split factors for landing patterns derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), landings are assumed to use a straight-in approach.

Secondary split factors for pattern cycles derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), pattern cycles are assumed to be touch-and-go patterns.

Data Sources:

NAWS China Lake. 1998. Estimated CY93 Flight Operations by Aircraft Type. July 17, 1998 Fax from Tina Evans.

U.S. Navy, Aircraft Environmental Support Office. 1994. NAWS China Lake Aircraft Emissions for Fiscal Year 1993. Draft. AESO Memorandum Report No. 9501.

Wyle Laboratories. 1995. Aircraft Noise Study for Naval Air Weapons Station China Lake, California.

Wyle Research Report WR 95-9. August 1995.

Wyle Laboratories. 1997. Draft Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. May 1997.

Wyle Laboratories. 1998. Final Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. November 1998.

TABLE D1-3. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F/A-18A-D	TAKEOFFS		37.4%		2,829	
	LANDINGS		37.4%			
	STRAIGHT IN			20.8%	590	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			79.2%	2,239	Wyle 1998 Table 3.5-2
	PATTERN CYCLE OPS		25.2%			Wyle 1998 Table 3.5-2
	T&G PATTERN OPS			90.1%	1,714	Wyle 1998 Table 3.5-2
	FCLP PATTERN OPS			9.9%	190	Wyle 1998 Table 3.5-2
	TOTAL	7,562				
F/A-18E/F	TAKEOFFS		37.4%		3,064	
	LANDINGS		37.4%			
	STRAIGHT IN			20.8%	639	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			79.2%	2,425	Wyle 1998 Table 3.5-2
	PATTERN CYCLE OPS		25.2%			Wyle 1998 Table 3.5-2
	T&G PATTERN OPS			90.1%	1,858	Wyle 1998 Table 3.5-2
	FCLP PATTERN OPS			9.9%	204	Wyle 1998 Table 3.5-2
	TOTAL	8,190				
EA-6B	TAKEOFFS		27.7%		291	
	LANDINGS		27.7%			
	STRAIGHT IN			9.7%	28	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			90.3%	263	Wyle 1998 Table 3.5-2
	PATTERN CYCLE OPS		44.7%			Wyle 1998 Table 3.5-2
	T&G PATTERN OPS			78.2%	368	Wyle 1998 Table 3.5-2
	FCLP PATTERN OPS			21.8%	102	Wyle 1998 Table 3.5-2
	TOTAL	1,052				
AV-8B	TAKEOFFS		38.4%		575	
	LANDINGS		38.4%			
	STRAIGHT IN			6.5%	37	Wyle 1998 Table 3.5-2
	OVERHEAD BREAK			93.5%	538	Wyle 1998 Table 3.5-2
	PATTERN CYCLE OPS		23.2%			Wyle 1998 Table 3.5-2
	T&G PATTERN OPS			100.0%	348	Wyle 1998 Table 3.5-2
	FCLP PATTERN OPS			0.0%	0	Wyle 1998 Table 3.5-2
	TOTAL	1,498				
F-3	TAKEOFFS		24.1%		34	
(Panavia	STRAIGHT IN LANDINGS		24.1%		34	
Tornado)	T&G PATTERN OPS		51.9%		74	AESO 1994 (F-5)
	TOTAL	142				
F-15	TAKEOFFS		24.1%		39	
	STRAIGHT IN LANDINGS		24.1%		39	
	T&G PATTERN OPS		51.7%		84	AESO 1994 (F-16N)
	TOTAL	162				
F-16	TAKEOFFS		24.1%		39	
	STRAIGHT IN LANDINGS		24.1%		39	
	T&G PATTERN OPS		51.7%		84	AESO 1994 (F-16N)
	TOTAL	162				

TABLE D1-3. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F-86	TAKEOFFS		23.9%		243	
	STRAIGHT IN LANDINGS		23.9%		243	
	T&G PATTERN OPS		52.1%		530	AESO 1994 (F-86F)
	TOTAL	1,016				
C-9B (DC-9)	TAKEOFFS		25.0%		25	
	STRAIGHT IN LANDINGS		25.0%		25	
	T&G PATTERN OPS		50.0%		50	Wyle 1995 (Navy Heavy)
	TOTAL	100				
UC-8A (DASH 8)	TAKEOFFS		43.2%		12	
	STRAIGHT IN LANDINGS		43.2%		12	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	28				
UC-12B (Super King Air 200)	TAKEOFFS		43.2%		210	
	STRAIGHT IN LANDINGS		43.2%		210	
	T&G PATTERN OPS		13.7%		66	Wyle 1995 (Navy Prop)
	TOTAL	486				
U-21 (King Air A100)	TAKEOFFS		43.2%		9	
	STRAIGHT IN LANDINGS		43.2%		9	
	T&G PATTERN OPS		13.7%		2	Wyle 1995 (Navy Prop)
	TOTAL	20				
MU-2	TAKEOFFS		43.2%		1,166	
	STRAIGHT IN LANDINGS		43.2%		1,166	
	T&G PATTERN OPS		13.7%		368	Wyle 1995 (Navy Prop)
	TOTAL	2,700				
OV-10	TAKEOFFS		43.2%		24	
	STRAIGHT IN LANDINGS		43.2%		24	
	T&G PATTERN OPS		13.7%		8	Wyle 1995 (Navy Prop)
	TOTAL	56				
OV-1	TAKEOFFS		43.2%		35	
	STRAIGHT IN LANDINGS		43.2%		35	
	T&G PATTERN OPS		13.7%		12	Wyle 1995 (Navy Prop)
	TOTAL	82				
P-3	TAKEOFFS		43.2%		12	
	STRAIGHT IN LANDINGS		43.2%		12	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	28				
C-130	TAKEOFFS		47.8%		67	
	STRAIGHT IN LANDINGS		47.8%		67	
	T&G PATTERN OPS		4.4%		6	Wyle 1995 (Other Prop)
	TOTAL	140				
T-34 (Beechcraft Model 45)	TAKEOFFS		43.2%		17	
	STRAIGHT IN LANDINGS		43.2%		17	
	T&G PATTERN OPS		13.7%		6	Wyle 1995 (Navy Prop)
	TOTAL	40				

TABLE D1-3. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
T-38	TAKEOFFS		24.1%		25	
	STRAIGHT IN LANDINGS		24.1%		25	
	T&G PATTERN OPS		51.9%		52	AESO 1994 (F-5)
	TOTAL	102				
T-39D	TAKEOFFS		16.7%		44	
	STRAIGHT IN LANDINGS		16.7%		44	
	T&G PATTERN OPS		66.7%		176	AESO 1994 (T-39D)
	TOTAL	264				
AH-1W	TAKEOFFS		20.2%		57	
	STRAIGHT IN LANDINGS		20.2%		57	
	T&G PATTERN OPS		59.5%		166	Wyle 1995 (Navy Helo)
	TOTAL	280				
AH-64	TAKEOFFS		20.2%		11	
	STRAIGHT IN LANDINGS		20.2%		11	
	T&G PATTERN OPS		59.5%		34	Wyle 1995 (Navy Helo)
	TOTAL	56				
CH-46E	TAKEOFFS		20.2%		7	
	STRAIGHT IN LANDINGS		20.2%		7	
	T&G PATTERN OPS		59.5%		20	Wyle 1995 (Navy Helo)
	TOTAL	34				
CH-53E	TAKEOFFS		20.2%		3	
	STRAIGHT IN LANDINGS		20.2%		3	
	T&G PATTERN OPS		59.5%		8	Wyle 1995 (Navy Helo)
	TOTAL	14				
UH-1L	TAKEOFFS		20.2%		43	
	STRAIGHT IN LANDINGS		20.2%		43	
	T&G PATTERN OPS		59.5%		126	Wyle 1995 (Navy Helo)
	TOTAL	212				
HH-1N	TAKEOFFS		20.2%		129	
	STRAIGHT IN LANDINGS		20.2%		129	
	T&G PATTERN OPS		59.5%		378	Wyle 1995 (Navy Helo)
	TOTAL	636				
OH-58	TAKEOFFS		20.2%		18	
	STRAIGHT IN LANDINGS		20.2%		18	
	T&G PATTERN OPS		59.5%		54	Wyle 1995 (Navy Helo)
	TOTAL	90				
UH-60	TAKEOFFS		20.2%		14	
	STRAIGHT IN LANDINGS		20.2%		14	
	T&G PATTERN OPS		59.5%		42	Wyle 1995 (Navy Helo)
	TOTAL	70				
Beechcraft	TAKEOFFS		30.0%		19	
	STRAIGHT IN LANDINGS		30.0%		19	
	T&G PATTERN OPS		39.9%		26	Wyle 1995 (Gen Aviation)
	TOTAL	64				

TABLE D1-3. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
Cessna	TAKEOFFS		30.0%		501	
	STRAIGHT IN LANDINGS		30.0%		501	
	T&G PATTERN OPS		39.9%		668	Wyle 1995 (Gen Aviation)
	TOTAL	1,670				
Mooneys	TAKEOFFS		30.0%		4	
	STRAIGHT IN LANDINGS		30.0%		4	
	T&G PATTERN OPS		39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	14				
Gulfstream	TAKEOFFS		30.0%		4	
AA-5	STRAIGHT IN LANDINGS		30.0%		4	
	T&G PATTERN OPS		39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	14				
TOTALS	TAKEOFFS				9,570	
	LANDINGS				9,570	
	PATTERN CYCLE OPS				7,844	
	TOTALS	26,984			26,984	

Notes:

The control total for annual operations (26,984) is the same as for 1996 operations.

1996 A-6 operations converted to F/A-18 operations for the No Action Alternative; A-6 aircraft deleted from No Action Alternative conditions.

Total F/A-18 operations for the No Action Alternative (15,752) partitioned into flight components using F/A-18 split factors from Wyle (1998).

Total F/A-18 operations for the No Action Alternative split into F/A-18A/B/C/D models and F/A-18E/F models using data from Table 4.1-1 of Wyle (1998).

Total operations and pattern cycle operations for each aircraft type adjusted as necessary to obtain even numbers, since takeoffs must equal landings and pattern cycles are counted as two operations.

Primary split factors for pattern cycles derived from data in Wyle (1995), Wyle (1998), and AESO (1994); primary split factors for landings and takeoffs calculated by difference, with takeoffs equal to landings for each aircraft type.

Secondary split factors for landing patterns derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), landings are assumed to use a straight-in approach.

Secondary split factors for pattern cycle operations derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), pattern cycles are assumed to be touch-and-go patterns.

Data Sources:

NAWS China Lake. 1998. Estimated CY93 Flight Operations by Aircraft Type. July 17, 1998 Fax from Tina Evans.

U.S. Navy, Aircraft Environmental Support Office. 1994. NAWS China Lake Aircraft Emissions for Fiscal Year 1993. Draft. AESO Memorandum Report No. 9501.

Wyle Laboratories. 1995. Aircraft Noise Study for Naval Air Weapons Station China Lake, California. Wyle Research Report WR 95-9. August 1995.

Wyle Laboratories. 1997. Draft Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. May 1997.

Wyle Laboratories. 1998. Final Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. November 1998.

TABLE D1-4. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F/A-18A-D	TAKEOFFS		37.4%		3,254	
	LANDINGS		37.4%			
	STRAIGHT IN			20.9%	678	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			79.1%	2,576	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		25.2%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			90.1%	1,972	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			9.9%	216	Wyle 1998 Table 4.1-1
	TOTAL	8,696				
F/A-18E/F	TAKEOFFS		37.4%		3,524	
	LANDINGS		37.4%			
	STRAIGHT IN			20.8%	735	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			79.2%	2,789	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		25.2%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			90.0%	2,136	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			10.0%	236	Wyle 1998 Table 4.1-1
	TOTAL	9,420				
EA-6B	TAKEOFFS		27.7%		335	
	LANDINGS		27.7%			
	STRAIGHT IN			9.6%	32	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			90.4%	303	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		44.7%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			78.2%	424	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			21.8%	116	Wyle 1998 Table 4.1-1
	TOTAL	1,210				
AV-8B	TAKEOFFS		38.4%		661	
	LANDINGS		38.4%			
	STRAIGHT IN			6.5%	43	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			93.5%	618	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		23.2%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			100.0%	400	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			0.0%	0	Wyle 1998 Table 4.1-1
	TOTAL	1,722				
F-3	TAKEOFFS		24.1%		39	
(Panavia	STRAIGHT IN LANDINGS		24.1%		39	
Tornado)	T&G PATTERN OPS		51.9%		86	AESO 1994 (F-5)
	TOTAL	164				
F-15	TAKEOFFS		24.1%		45	
	STRAIGHT IN LANDINGS		24.1%		45	
	T&G PATTERN OPS		51.7%		96	AESO 1994 (F-16N)
	TOTAL	186				
F-16	TAKEOFFS		24.1%		45	
	STRAIGHT IN LANDINGS		24.1%		45	
	T&G PATTERN OPS		51.7%		96	AESO 1994 (F-16N)
	TOTAL	186				

TABLE D1-4. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F-86	TAKEOFFS		23.9%		279	
	STRAIGHT IN LANDINGS		23.9%		279	
	T&G PATTERN OPS		52.1%		610	AESO 1994 (F-86F)
	TOTAL	1,168				
C-9B (DC-9)	TAKEOFFS		25.0%		29	
	STRAIGHT IN LANDINGS		25.0%		29	
	T&G PATTERN OPS		50.0%		58	Wyle 1995 (Navy Heavy)
	TOTAL	116				
UC-8A (DHC-5)	TAKEOFFS		43.2%		14	
	STRAIGHT IN LANDINGS		43.2%		14	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	32				
UC-12B (Super King Air 200)	TAKEOFFS		43.2%		242	
	STRAIGHT IN LANDINGS		43.2%		242	
	T&G PATTERN OPS		13.7%		76	Wyle 1995 (Navy Prop)
	TOTAL	560				
U-21 (King Air A100)	TAKEOFFS		43.2%		10	
	STRAIGHT IN LANDINGS		43.2%		10	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	24				
MU-2	TAKEOFFS		43.2%		1,341	
	STRAIGHT IN LANDINGS		43.2%		1,341	
	T&G PATTERN OPS		13.7%		424	Wyle 1995 (Navy Prop)
	TOTAL	3,106				
OV-10	TAKEOFFS		43.2%		28	
	STRAIGHT IN LANDINGS		43.2%		28	
	T&G PATTERN OPS		13.7%		8	Wyle 1995 (Navy Prop)
	TOTAL	64				
OV-1	TAKEOFFS		43.2%		41	
	STRAIGHT IN LANDINGS		43.2%		41	
	T&G PATTERN OPS		13.7%		12	Wyle 1995 (Navy Prop)
	TOTAL	94				
P-3	TAKEOFFS		43.2%		14	
	STRAIGHT IN LANDINGS		43.2%		14	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	32				
C-130	TAKEOFFS		47.8%		76	
	STRAIGHT IN LANDINGS		47.8%		76	
	T&G PATTERN OPS		4.4%		8	Wyle 1995 (Other Prop)
	TOTAL	160				
T-34 (Beechcraft Model 45)	TAKEOFFS		43.2%		20	
	STRAIGHT IN LANDINGS		43.2%		20	
	T&G PATTERN OPS		13.7%		6	Wyle 1995 (Navy Prop)
	TOTAL	46				

TABLE D1-4. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
T-38	TAKEOFFS		24.1%		28	
	STRAIGHT IN LANDINGS		24.1%		28	
	T&G PATTERN OPS		51.9%		62	AESO 1994 (F-5)
	TOTAL	118				
T-39D	TAKEOFFS		16.7%		51	
	STRAIGHT IN LANDINGS		16.7%		51	
	T&G PATTERN OPS		66.7%		202	AESO 1994 (T-39D)
	TOTAL	304				
AH-1W	TAKEOFFS		20.2%		65	
	STRAIGHT IN LANDINGS		20.2%		65	
	T&G PATTERN OPS		59.5%		192	Wyle 1995 (Navy Helo)
	TOTAL	322				
AH-64	TAKEOFFS		20.2%		13	
	STRAIGHT IN LANDINGS		20.2%		13	
	T&G PATTERN OPS		59.5%		38	Wyle 1995 (Navy Helo)
	TOTAL	64				
CH-46E	TAKEOFFS		20.2%		8	
	STRAIGHT IN LANDINGS		20.2%		8	
	T&G PATTERN OPS		59.5%		22	Wyle 1995 (Navy Helo)
	TOTAL	38				
CH-53E	TAKEOFFS		20.2%		3	
	STRAIGHT IN LANDINGS		20.2%		3	
	T&G PATTERN OPS		59.5%		10	Wyle 1995 (Navy Helo)
	TOTAL	16				
UH-1L	TAKEOFFS		20.2%		49	
	STRAIGHT IN LANDINGS		20.2%		49	
	T&G PATTERN OPS		59.5%		146	Wyle 1995 (Navy Helo)
	TOTAL	244				
HH-1N	TAKEOFFS		20.2%		148	
	STRAIGHT IN LANDINGS		20.2%		148	
	T&G PATTERN OPS		59.5%		434	Wyle 1995 (Navy Helo)
	TOTAL	730				
OH-58	TAKEOFFS		20.2%		21	
	STRAIGHT IN LANDINGS		20.2%		21	
	T&G PATTERN OPS		59.5%		60	Wyle 1995 (Navy Helo)
	TOTAL	102				
UH-60	TAKEOFFS		20.2%		17	
	STRAIGHT IN LANDINGS		20.2%		17	
	T&G PATTERN OPS		59.5%		48	Wyle 1995 (Navy Helo)
	TOTAL	82				
Beechcraft	TAKEOFFS		30.0%		22	
	STRAIGHT IN LANDINGS		30.0%		22	
	T&G PATTERN OPS		39.9%		30	Wyle 1995 (Gen Aviation)
	TOTAL	74				

TABLE D1-4. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
Cessna	TAKEOFFS		30.0%		577	
	STRAIGHT IN LANDINGS		30.0%		577	
	T&G PATTERN OPS		39.9%		766	Wyle 1995 (Gen Aviation)
	TOTAL	1,920				
Mooney	TAKEOFFS		30.0%		5	
	STRAIGHT IN LANDINGS		30.0%		5	
	T&G PATTERN OPS		39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	16				
Gulfstream	TAKEOFFS		30.0%		5	
AA-5	STRAIGHT IN LANDINGS		30.0%		5	
	T&G PATTERN OPS		39.9%		6	Wyle 1995 (Gen Aviation)
	TOTAL	16				
TOTALS	TAKEOFFS				11,009	
	LANDINGS				11,009	
	PATTERN CYCLE OPS				9,014	
	-----------------------------------	--------			--------	
	TOTALS	31,032			31,032	

Notes:

The control total for annual operations (31,032) is based on a 15% increase over baseline operations identified in Table 3-1 of Wyle (1995) and Table 3.5-1 of Wyle (1997).

1996 A-6 operations converted to F/A-18 operations for the Limited Expansion Alternative; A-6 aircraft deleted from Limited Expansion Alternative conditions.

1996 total operations for each aircraft type increased by 15% to obtain Limited Expansion Alternative operations by aircraft type.

Total F/A-18 operations for the Limited Expansion Alternative (18,116) split into F/A-18A/B/C/D models and F/A-18E/F models using data from Table 4.1-1 of Wyle (1998).

Total operations and pattern cycle operations for each aircraft type adjusted as necessary to obtain even numbers, since takeoffs must equal landings and pattern cycles are counted as two operations.

Primary split factors for pattern cycles derived from data in Wyle (1995), Wyle (1998), and AESO (1994); primary split factors for landings and takeoffs calculated by difference, with takeoffs equal to landings for each aircraft type.

Secondary split factors for landing patterns derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), landings are assumed to use a straight-in approach.

Secondary split factors for pattern cycles derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), pattern cycles are assumed to be touch-and-go patterns.

Data Sources:

NAWS China Lake. 1998. Estimated CY93 Flight Operations by Aircraft Type. July 17, 1998 Fax from Tina Evans.

U.S. Navy, Aircraft Environmental Support Office. 1994. NAWS China Lake Aircraft Emissions for Fiscal Year 1993. Draft. AESO Memorandum Report No. 9501.

Wyle Laboratories. 1995. Aircraft Noise Study for Naval Air Weapons Station China Lake, California.
Wyle Research Report WR 95-9. August 1995.

Wyle Laboratories. 1997. Draft Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. May 1997.

Wyle Laboratories. 1998. Final Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. November 1998.

TABLE D1-5. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F/A-18A-D	TAKEOFFS		37.4%		3,537	
	LANDINGS		37.4%			
	STRAIGHT IN			20.9%	737	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			79.1%	2,800	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		25.2%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			90.1%	2,142	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			9.9%	236	Wyle 1998 Table 4.1-1
	TOTAL	9,452				
F/A-18E/F	TAKEOFFS		37.4%		3,830	
	LANDINGS		37.4%			
	STRAIGHT IN			20.8%	798	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			79.2%	3,032	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		25.2%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			90.0%	2,322	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			10.0%	256	Wyle 1998 Table 4.1-1
	TOTAL	10,238				
EA-6B	TAKEOFFS		27.7%		364	
	LANDINGS		27.7%			
	STRAIGHT IN			9.6%	35	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			90.4%	329	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		44.7%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			78.2%	460	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			21.8%	128	Wyle 1998 Table 4.1-1
	TOTAL	1,316				
AV-8B	TAKEOFFS		38.4%		719	
	LANDINGS		38.4%			
	STRAIGHT IN			6.5%	47	Wyle 1998 Table 4.1-1
	OVERHEAD BREAK			93.5%	672	Wyle 1998 Table 4.1-1
	PATTERN CYCLE OPS		23.2%			Wyle 1998 Table 4.1-1
	T&G PATTERN OPS			100.0%	436	Wyle 1998 Table 4.1-1
	FCLP PATTERN OPS			0.0%	0	Wyle 1998 Table 4.1-1
	TOTAL	1,874				
F-3	TAKEOFFS		24.1%		43	
(Panavia	STRAIGHT IN LANDINGS		24.1%		43	
Tornado)	T&G PATTERN OPS		51.9%		92	AESO 1994 (F-5)
	TOTAL	178				
F-15	TAKEOFFS		24.1%		49	
	STRAIGHT IN LANDINGS		24.1%		49	
	T&G PATTERN OPS		51.7%		104	AESO 1994 (F-16N)
	TOTAL	202				
F-16	TAKEOFFS		24.1%		49	
	STRAIGHT IN LANDINGS		24.1%		49	
	T&G PATTERN OPS		51.7%		104	AESO 1994 (F-16N)
	TOTAL	202				

TABLE D1-5. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
F-86	TAKEOFFS		23.9%		304	
	STRAIGHT IN LANDINGS		23.9%		304	
	T&G PATTERN OPS		52.1%		662	AESO 1994 (F-86F)
	TOTAL	1,270				
C-9B	TAKEOFFS		25.0%		32	
(DC-9)	STRAIGHT IN LANDINGS		25.0%		32	
	T&G PATTERN OPS		50.0%		62	Wyle 1995 (Navy Heavy)
	TOTAL	126				
UC-8A	TAKEOFFS		43.2%		16	
(DHC-5)	STRAIGHT IN LANDINGS		43.2%		16	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	36				
UC-12B	TAKEOFFS		43.2%		262	
(Super King	STRAIGHT IN LANDINGS		43.2%		262	
Air 200)	T&G PATTERN OPS		13.7%		84	Wyle 1995 (Navy Prop)
	TOTAL	608				
U-21	TAKEOFFS		43.2%		10	
(King Air	STRAIGHT IN LANDINGS		43.2%		10	
A100)	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	24				
MU-2	TAKEOFFS		43.2%		1,457	
	STRAIGHT IN LANDINGS		43.2%		1,457	
	T&G PATTERN OPS		13.7%		460	Wyle 1995 (Navy Prop)
	TOTAL	3,374				
OV-10	TAKEOFFS		43.2%		30	
	STRAIGHT IN LANDINGS		43.2%		30	
	T&G PATTERN OPS		13.7%		10	Wyle 1995 (Navy Prop)
	TOTAL	70				
OV-1	TAKEOFFS		43.2%		44	
	STRAIGHT IN LANDINGS		43.2%		44	
	T&G PATTERN OPS		13.7%		14	Wyle 1995 (Navy Prop)
	TOTAL	102				
P-3	TAKEOFFS		43.2%		15	
	STRAIGHT IN LANDINGS		43.2%		15	
	T&G PATTERN OPS		13.7%		4	Wyle 1995 (Navy Prop)
	TOTAL	34				
C-130	TAKEOFFS		47.8%		83	
	STRAIGHT IN LANDINGS		47.8%		83	
	T&G PATTERN OPS		4.4%		8	Wyle 1995 (Other Prop)
	TOTAL	174				
T-34	TAKEOFFS		43.2%		22	
(Beechcraft	STRAIGHT IN LANDINGS		43.2%		22	
Model 45)	T&G PATTERN OPS		13.7%		6	Wyle 1995 (Navy Prop)
	TOTAL	50				

TABLE D1-5. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
T-38	TAKEOFFS		24.1%		31	
	STRAIGHT IN LANDINGS		24.1%		31	
	T&G PATTERN OPS		51.9%		66	AESO 1994 (F-5)
	TOTAL	128				
T-39D	TAKEOFFS		16.7%		55	
	STRAIGHT IN LANDINGS		16.7%		55	
	T&G PATTERN OPS		66.7%		220	AESO 1994 (T-39D)
	TOTAL	330				
AH-1W	TAKEOFFS		20.2%		71	
	STRAIGHT IN LANDINGS		20.2%		71	
	T&G PATTERN OPS		59.5%		208	Wyle 1995 (Navy Helo)
	TOTAL	350				
AH-64	TAKEOFFS		20.2%		14	
	STRAIGHT IN LANDINGS		20.2%		14	
	T&G PATTERN OPS		59.5%		42	Wyle 1995 (Navy Helo)
	TOTAL	70				
CH-46E	TAKEOFFS		20.2%		8	
	STRAIGHT IN LANDINGS		20.2%		8	
	T&G PATTERN OPS		59.5%		26	Wyle 1995 (Navy Helo)
	TOTAL	42				
CH-53E	TAKEOFFS		20.2%		4	
	STRAIGHT IN LANDINGS		20.2%		4	
	T&G PATTERN OPS		59.5%		10	Wyle 1995 (Navy Helo)
	TOTAL	18				
UH-1L	TAKEOFFS		20.2%		53	
	STRAIGHT IN LANDINGS		20.2%		53	
	T&G PATTERN OPS		59.5%		158	Wyle 1995 (Navy Helo)
	TOTAL	264				
HH-1N	TAKEOFFS		20.2%		161	
	STRAIGHT IN LANDINGS		20.2%		161	
	T&G PATTERN OPS		59.5%		472	Wyle 1995 (Navy Helo)
	TOTAL	794				
OH-58	TAKEOFFS		20.2%		23	
	STRAIGHT IN LANDINGS		20.2%		23	
	T&G PATTERN OPS		59.5%		66	Wyle 1995 (Navy Helo)
	TOTAL	112				
UH-60	TAKEOFFS		20.2%		18	
	STRAIGHT IN LANDINGS		20.2%		18	
	T&G PATTERN OPS		59.5%		52	Wyle 1995 (Navy Helo)
	TOTAL	88				
Beechcraft	TAKEOFFS		30.0%		24	
	STRAIGHT IN LANDINGS		30.0%		24	
	T&G PATTERN OPS		39.9%		32	Wyle 1995 (Gen Aviation)
	TOTAL	80				

TABLE D1-5. FUTURE FLIGHT OPERATIONS FOR ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

AIRCRAFT TYPE	FLIGHT COMPONENT	ADJUSTED OPERATIONS	PRIMARY SPLIT	SECONDARY SPLIT	PARTITIONED OPERATIONS	DATA SOURCE FOR SPLIT FACTORS
Cessna	TAKEOFFS		30.0%		627	
	STRAIGHT IN LANDINGS		30.0%		627	
	T&G PATTERN OPS		39.9%		834	Wyle 1995 (Gen Aviation)
	TOTAL	2,088				
Mooney	TAKEOFFS		30.0%		5	
	STRAIGHT IN LANDINGS		30.0%		5	
	T&G PATTERN OPS		39.9%		8	Wyle 1995 (Gen Aviation)
	TOTAL	18				
Gulfstream AA-5	TAKEOFFS		30.0%		5	
	STRAIGHT IN LANDINGS		30.0%		5	
	T&G PATTERN OPS		39.9%		8	Wyle 1995 (Gen Aviation)
	TOTAL	18				
TOTALS	TAKEOFFS				11,965	
	LANDINGS				11,965	
	PATTERN CYCLE OPS				9,800	
	TOTALS	33,730			33,730	

Notes:

The control total for annual operations (33,730) is based on a 25% increase over baseline operations identified in Table 3-1 of Wyle (1995) and Table 3.5-1 of Wyle (1997).

1996 baseline A-6 operations converted to F/A-18 operations for the Moderate Expansion Alternative; A-6 aircraft deleted from Moderate Expansion Alternative conditions.

1996 total operations for each aircraft type increased by 25% to obtain Moderate Expansion Alternative operations by aircraft type.

Total F/A-18 operations for the Moderate Expansion Alternative (19,690) split into F/A-18A/B/C/D models and F/A-18E/F models using data from Table 4.1-1 of Wyle (1998).

Total operations and pattern cycle operations for each aircraft type adjusted as necessary to obtain even numbers, since takeoffs must equal landings and pattern cycles are counted as two operations.

Primary split factors for PATTERN CYCLE OPS derived from data in Wyle (1995), Wyle (1998), and AESO (1994); primary split factors for landings and takeoffs calculated by difference, with takeoffs equal to landings for each aircraft type.

Secondary split factors for landing patterns derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), landings are assumed to use a straight-in approach.

Secondary split factors for pattern cycles derived from data in Wyle (1998).

Except for aircraft types covered directly by Wyle (1995) and Wyle (1998), pattern cycles are assumed to be touch-and-go patterns.

Data Sources:

NAWS China Lake. 1998. Estimated CY93 Flight Operations by Aircraft Type. July 17, 1998 Fax from Tina Evans.

U.S. Navy, Aircraft Environmental Support Office. 1994. NAWS China Lake Aircraft Emissions for Fiscal Year 1993. Draft. AESO Memorandum Report No. 9501.

Wyle Laboratories. 1995. Aircraft Noise Study for Naval Air Weapons Station China Lake, California. Wyle Research Report WR 95-9. August 1995.

Wyle Laboratories. 1997. Draft Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. May 1997.

Wyle Laboratories. 1998. Final Noise Chapter, Environmental Impact Statement - Naval Air Weapons Station China Lake. November 1998.

TABLE D1-6. NAWS CHINA LAKE F/A-18 PROFILES (WYLE 1995)

F/A-18 DEPARTURES (ALL RUNWAYS), NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	MAX AB	0							
B	4,750	4,750	0.8	150	MAX AB	0	A-B	4,750	75.0	0	37.5		
C	7,000	7,038	1.2	249	MAX AB	415	B-C	2,288	199.5	208	6.8		
D	8,000	8,055	1.3	248	97.0%	600	C-D	1,017	248.5	508	2.4		
E	20,000	20,062	3.3	306	97.0%	1,000	D-E	12,007	277.0	800	25.7		
F	80,000	80,922	13.3	367	97.0%	11,200	E-F	60,861	336.5	6,100	107.2		
G	200,000	200,922	33.1	367	97.0%	11,200	F-G	120,000	367.0	11,200	193.7		
500 FT	7,459	7,505	1.2	249	97.0%	500	C-500	467	248.8	458	1.1		
3k AGL	31,765	31,995	5.3	318	97.0%	3,000	E-3k	11,933	312.0	2,000	22.7		
TOTAL							0-500	7,505	97.9			0.76	
							500-3k	24,490	292.2				0.83

F/A-18 STRAIGHT IN APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,108	32.9	191	86.0%	4,000	F-G	110,000	191.0	4,000	341.2		
F	90,000	90,108	14.8	191	86.0%	4,000	E-F	41,076	191.0	2,750	127.4		
E	49,000	49,032	8.1	191	86.0%	1,500	D-E	10,018	163.0	1,200	36.4		
D	39,000	39,014	6.4	135	86.0%	900	C-D	12,000	135.0	900	52.7		
C	27,000	27,014	4.4	135	86.0%	900	B-C	13,003	135.0	750	57.1		
B	14,000	14,011	2.3	135	86.0%	600	A-B	14,011	135.0	325	61.5		
A	0	0	0.0	135	86.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	73,600	73,678	12.1	191	86.0%	3,000	3k-E	24,646	191.0	2,250	76.5		
TOTAL							3k-Taxi	78,678	142.1			328.0	5.5

F/A-18 STRAIGHT IN APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,100	32.9	191	86.0%	4,000	F-G	110,000	191.0	4,000	341.2		
F	90,000	90,100	14.8	191	86.0%	4,000	E-F	47,066	191.0	2,750	146.0		
E	43,000	43,034	7.1	191	86.0%	1,500	D-E	10,018	163.0	1,200	36.4		
D	33,000	33,016	5.4	135	86.0%	900	C-D	10,000	135.0	900	43.9		
C	23,000	23,016	3.8	135	86.0%	900	B-C	9,005	135.0	750	39.5		
B	14,000	14,011	2.3	135	86.0%	600	A-B	14,011	135.0	325	61.5		
A	0	0	0.0	135	86.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	71,200	71,274	11.7	191	86.0%	3,000	3k-E	28,240	191.0	2,250	87.6		
TOTAL							3k-Taxi	76,274	144.5			312.8	5.2

F/A-18 STRAIGHT IN APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,104	32.9	191	86.0%	4,000	E-F	110,000	191.0	4,000	341.2		
E	90,000	90,104	14.8	191	86.0%	4,000	D-E	59,053	191.0	2,750	183.2		
D	31,000	31,051	5.1	191	86.0%	1,500	C-D	10,040	163.0	1,050	36.5		
C	21,000	21,011	3.5	135	86.0%	600	B-C	7,000	135.0	600	30.7		
B	14,000	14,011	2.3	135	86.0%	600	A-B	14,011	135.0	325	61.5		
A	0	0	0.0	135	86.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	66,400	66,483	10.9	191	86.0%	3,000	3k-D	35,432	191.0	2,250	109.9		
TOTAL							3k-Taxi	71,483	149.9			282.5	4.7

F/A-18 STRAIGHT IN APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,100	32.9	191	86.0%	4,000	E-F	110,000	191.0	4,000	341.2		
E	90,000	90,100	14.8	191	86.0%	4,000	D-E	64,548	191.0	2,750	200.2		
D	25,500	25,551	4.2	191	86.0%	1,500	C-D	10,040	163.0	1,050	36.5		
C	15,500	15,511	2.6	135	86.0%	600	B-C	1,500	135.0	600	6.6		
B	14,000	14,011	2.3	135	86.0%	600	A-B	14,011	135.0	325	61.5		
A	0	0	0.0	135	86.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	64,200	64,280	10.6	191	86.0%	3,000	3k-D	38,729	191.0	2,250	120.1		
TOTAL							3k-Taxi	69,280	152.8			268.6	4.5

MEAN OF F/A-18 STRAIGHT IN APPROACHES, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
14		13.9%					3k-50	73,678			284.1		5.5
21		63.9%					3k-50	71,274			268.9		5.2
26		6.0%					3k-50	66,483			238.6		4.7
32		16.3%					3k-50	64,280			224.7		4.5
							50-TAXI	5,000			43.9		
MEAN							3k-Taxi	75,180	145.6			305.9	5.1

F/A-18 OVERHEAD BREAK APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,090	32.9	350	85.0%	5,000	H-I	121,153	350.0	3,200	205.1		
H	78,900	78,937	13.0	350	85.0%	1,400	G-H	23,400	350.0	1,400	39.6		
G	55,500	55,537	9.1	350	85.0%	1,400	F-G	26,050	350.0	1,400	44.1		
F	29,450	29,487	4.9	350	85.0%	1,400	E-F	10,312	250.0	1,150	24.4		
E	19,150	19,175	3.2	150	85.0%	900	D-E	4,450	150.0	900	17.6		
D	14,700	14,725	2.4	150	85.0%	900	C-D	10,162	142.5	590	42.3		
C	4,557	4,563	0.8	135	85.0%	280	B-C	327	135.0	272	1.4		
B	4,230	4,235	0.7	135	85.0%	263	A-B	4,235	135.0	157	18.6		
A	0	0	0.0	135	85.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	132,722	132,783	21.9	350	85.0%	3,000	3k-H	53,846	350.0	2,200	91.2		
TOTAL							3k-Taxi	137,783	252.7			323.0	5.4

F/A-18 OVERHEAD BREAK APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,086	32.9	350	85.0%	5,000	H-I	132,649	350.0	3,200	224.5		
H	67,400	67,437	11.1	350	85.0%	1,400	G-H	11,900	350.0	1,400	20.1		
G	55,500	55,537	9.1	350	85.0%	1,400	F-G	26,050	350.0	1,400	44.1		
F	29,450	29,487	4.9	350	85.0%	1,400	E-F	10,312	250.0	1,150	24.4		
E	19,150	19,175	3.2	150	85.0%	900	D-E	4,450	150.0	900	17.6		
D	14,700	14,725	2.4	150	85.0%	900	C-D	10,162	142.5	590	42.3		
C	4,557	4,563	0.8	135	85.0%	280	B-C	327	135.0	272	1.4		
B	4,230	4,235	0.7	135	85.0%	263	A-B	4,235	135.0	157	18.6		
A	0	0	0.0	135	85.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	126,333	126,392	20.8	350	85.0%	3,000	3k-H	58,955	350.0	2,200	99.8		
TOTAL							3k-Taxi	131,392	249.3			312.2	5.2

F/A-18 OVERHEAD BREAK APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,082	32.9	350	85.0%	5,000	G-H	144,545	350.0	3,200	244.7		
G	55,500	55,537	9.1	350	85.0%	1,400	F-G	26,050	350.0	1,400	44.1		
F	29,450	29,487	4.9	350	85.0%	1,400	E-F	10,312	250.0	1,150	24.4		
E	19,150	19,175	3.2	150	85.0%	900	D-E	4,450	150.0	900	17.6		
D	14,700	14,725	2.4	150	85.0%	900	C-D	10,162	142.5	590	42.3		
C	4,557	4,563	0.8	135	85.0%	280	B-C	327	135.0	272	1.4		
B	4,230	4,235	0.7	135	85.0%	263	A-B	4,235	135.0	157	18.6		
A	0	0	0.0	135	85.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	119,722	119,779	19.7	350	85.0%	3,000	3k-G	64,242	350.0	2,200	108.7		
TOTAL							3k-Taxi	124,779	245.6			301.0	5.0

F/A-18 OVERHEAD BREAK APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,082	32.9	350	85.0%	5,000	G-H	145,145	350.0	3,200	245.7		
G	54,900	54,937	9.0	350	85.0%	1,400	F-G	25,450	350.0	1,400	43.1		
F	29,450	29,487	4.9	350	85.0%	1,400	E-F	10,312	250.0	1,150	24.4		
E	19,150	19,175	3.2	150	85.0%	900	D-E	4,450	150.0	900	17.6		
D	14,700	14,725	2.4	150	85.0%	900	C-D	10,162	142.5	590	42.3		
C	4,557	4,563	0.8	135	85.0%	280	B-C	327	135.0	272	1.4		
B	4,230	4,235	0.7	135	85.0%	263	A-B	4,235	135.0	157	18.6		
A	0	0	0.0	135	85.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	119,389	119,446	19.7	350	85.0%	3,000	3k-G	64,509	350.0	2,200	109.2		
TOTAL							3k-Taxi	124,446	245.4			300.5	5.0

MEAN OF F/A-18 OVERHEAD BREAK APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	13.4%	3k-50	132,783			279.2		5.4
21	75.3%	3k-50	126,392			268.3		5.2
26	5.9%	3k-50	119,779			257.1		5.0
32	5.5%	3k-50	119,446			256.6		5.0
		50-TAXI	5,000			43.9		
MEAN		3k-Taxi	131,476	249.4			312.4	5.2

F/A-18 TOUCH AND GO PATTERN ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,079	0.7	150	97.0%	817	B-C	3,779	200.0	434	11.2		
D	4,400	4,487	0.7	135	85.0%	900	C-D	409	142.5	859	1.7		
E	14,700	14,787	2.4	135	85.0%	900	D-E	10,300	135.0	900	45.2		
F	23,777	23,864	3.9	135	85.0%	900	E-F	9,077	135.0	900	39.8		
G	33,350	33,455	5.5	135	85.0%	310	F-G	9,591	135.0	605	42.1		
H	38,544	38,656	6.4	135	85.0%	50	G-H	5,201	135.0	180	22.8		
TOTAL	38,544	38,656	6.4					38,656	140.0			163.6	2.7

F/A-18 TOUCH AND GO PATTERN ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,079	0.7	150	97.0%	817	B-C	3,779	200.0	434	11.2		
D	4,400	4,487	0.7	135	85.0%	900	C-D	409	142.5	859	1.7		
E	15,200	15,287	2.5	135	85.0%	900	D-E	10,800	135.0	900	47.4		
F	24,767	24,854	4.1	135	85.0%	900	E-F	9,567	135.0	900	42.0		
G	34,300	34,405	5.7	135	85.0%	310	F-G	9,551	135.0	605	41.9		
H	39,534	39,646	6.5	135	85.0%	50	G-H	5,240	135.0	180	23.0		
TOTAL	39,534	39,646	6.5					39,646	139.9			167.9	2.8

F/A-18 TOUCH AND GO PATTERN ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,079	0.7	150	97.0%	817	B-C	3,779	200.0	434	11.2		
D	4,400	4,487	0.7	135	85.0%	900	C-D	409	142.5	859	1.7		
E	14,100	14,187	2.3	135	85.0%	900	D-E	9,700	135.0	900	42.6		
F	22,467	22,554	3.7	135	85.0%	900	E-F	8,367	135.0	900	36.7		
G	32,000	32,105	5.3	135	85.0%	310	F-G	9,551	135.0	605	41.9		
H	37,234	37,346	6.1	135	85.0%	50	G-H	5,240	135.0	180	23.0		
TOTAL	37,234	37,346	6.1					37,346	140.2			157.8	2.6

F/A-18 TOUCH AND GO PATTERN ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,079	0.7	150	97.0%	817	B-C	3,779	200.0	434	11.2		
D	4,400	4,487	0.7	135	85.0%	900	C-D	409	142.5	859	1.7		
E	14,700	14,787	2.4	135	85.0%	900	D-E	10,300	135.0	900	45.2		
F	23,777	23,864	3.9	135	85.0%	900	E-F	9,077	135.0	900	39.8		
G	33,350	33,455	5.5	135	85.0%	310	F-G	9,591	135.0	605	42.1		
H	38,544	38,656	6.4	135	85.0%	50	G-H	5,201	135.0	180	22.8		
TOTAL	38,544	38,656	6.4					38,656	140.0			163.6	2.7

MEAN OF F/A-18 TOUCH AND GO PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
14	7.8%		38,656			163.6		2.7
21	84.2%		39,646			167.9		2.8
26	6.9%		37,346			157.8		2.6
32	1.1%		38,656			163.6		2.7
MEAN			39,400	139.9			166.8	2.8

F/A-18 FCLP PATTERN ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,033	0.7	150	97.0%	546	B-C	3,733	200.0	298	11.1		
D	4,400	4,437	0.7	135	85.0%	600	C-D	404	142.5	573	1.7		
E	14,700	14,737	2.4	135	85.0%	600	D-E	10,300	135.0	600	45.2		
F	23,800	23,837	3.9	135	85.0%	600	E-F	9,100	135.0	600	39.9		
G	33,300	33,341	5.5	135	85.0%	310	F-G	9,504	135.0	455	41.7		
H	38,544	38,592	6.4	135	85.0%	50	G-H	5,250	135.0	180	23.0		
TOTAL	38,544	38,592	6.4					38,592	140.0			163.3	2.7

F/A-18 FCLP PATTERN ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,033	0.7	150	97.0%	546	B-C	3,733	200.0	298	11.1		
D	4,400	4,437	0.7	135	85.0%	600	C-D	404	142.5	573	1.7		
E	15,200	15,237	2.5	135	85.0%	600	D-E	10,800	135.0	600	47.4		
F	24,767	24,804	4.1	135	85.0%	600	E-F	9,567	135.0	600	42.0		
G	34,300	34,341	5.7	135	85.0%	310	F-G	9,537	135.0	455	41.9		
H	39,534	39,582	6.5	135	85.0%	50	G-H	5,240	135.0	180	23.0		
TOTAL	39,534	39,582	6.5					39,582	139.8			167.7	2.8

F/A-18 FCLP PATTERN ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,033	0.7	150	97.0%	546	B-C	3,733	200.0	298	11.1		
D	4,400	4,437	0.7	135	85.0%	600	C-D	404	142.5	573	1.7		
E	14,100	14,137	2.3	135	85.0%	600	D-E	9,700	135.0	600	42.6		
F	22,467	22,504	3.7	135	85.0%	600	E-F	8,367	135.0	600	36.7		
G	32,000	32,041	5.3	135	85.0%	310	F-G	9,537	135.0	455	41.9		
H	37,234	37,282	6.1	135	85.0%	50	G-H	5,240	135.0	180	23.0		
TOTAL	37,234	37,282	6.1					37,282	140.2			157.6	2.6

F/A-18 FCLP PATTERN ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	250	97.0%	50							
B	300	300	0.0	250	97.0%	50	A-B	300	250.0	50	0.7		
C	4,000	4,033	0.7	150	97.0%	546	B-C	3,733	200.0	298	11.1		
D	4,400	4,437	0.7	135	85.0%	600	C-D	404	142.5	573	1.7		
E	14,700	14,737	2.4	135	85.0%	600	D-E	10,300	135.0	600	45.2		
F	23,777	23,814	3.9	135	85.0%	600	E-F	9,077	135.0	600	39.8		
G	33,350	33,391	5.5	135	85.0%	310	F-G	9,577	135.0	455	42.0		
H	38,544	38,592	6.4	135	85.0%	50	G-H	5,201	135.0	180	22.8		
TOTAL	38,544	38,592	6.4					38,592	140.0			163.3	2.7

MEAN OF F/A-18 FCLP PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
14	7.8%		38,592			163.3		2.7
21	83.6%		39,582			167.7		2.8
26	6.9%		37,282			157.6		2.6
32	1.7%		38,592			163.3		2.7
MEAN			39,329	139.9			166.6	2.8

TABLE D1-7. NAWS CHINA LAKE A-6 PROFILES (WYLE 1995)

A-6 DEPARTURE ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	2,000	2,000	0.3	150	100.0%	0	A-B	2,000	75.0	0	15.8		
C	9,000	9,071	1.5	150	100.0%	1,000	B-C	7,071	150.0	500	27.9		
D	20,000	20,071	3.3	150	100.0%	1,000	C-D	11,000	150.0	1,000	43.4		
E	29,300	29,442	4.8	250	100.0%	2,150	D-E	9,371	200.0	1,575	27.8		
F	100,000	100,681	16.6	250	100.0%	10,900	E-F	71,239	250.0	6,525	168.8		
G	200,000	200,681	33.0	250	100.0%	10,900	F-G	100,000	250.0	10,900	237.0		
500 FT	5,500	5,536	0.9	150	100.0%	500	B-500	3,536	150.0	250	14.0		
3k AGL	36,168	36,362	6.0	250	100.0%	3,000	E-3k	6,920	250.0	2,575	16.4		
TOTAL							0-500	5,536	110.2			0.50	
							500-3k	30,827	179.8				1.69

A-6 DEPARTURE ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	2,000	2,000	0.3	150	100.0%	0	A-B	2,000	75.0	0	15.8		
C	9,000	9,071	1.5	150	100.0%	1,000	B-C	7,071	150.0	500	27.9		
D	29,300	29,491	4.9	250	100.0%	3,208	C-D	20,420	200.0	2,104	60.5		
E	100,000	100,608	16.6	250	100.0%	10,900	D-E	71,117	250.0	7,054	168.5		
F	200,000	200,608	33.0	250	100.0%	10,900	E-F	100,000	250.0	10,900	237.0		
500 FT	5,500	5,536	0.9	150	100.0%	500	B-500	3,536	150.0	250	14.0		
3k AGL	27,388	27,567	4.5	241	100.0%	3,000	C-3k	18,496	195.3	2,000	56.1		
TOTAL							0-500	5,536	110.2			0.50	
							500-3k	22,032	186.3				1.17

A-6 DEPARTURE ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	2,000	2,000	0.3	150	100.0%	0	A-B	2,000	75.0	0	15.8		
C	9,000	9,071	1.5	150	100.0%	1,000	B-C	7,071	150.0	500	27.9		
D	29,300	29,491	4.9	250	100.0%	3,208	C-D	20,420	200.0	2,104	60.5		
E	100,000	100,608	16.6	250	100.0%	10,900	D-E	71,117	250.0	7,054	168.5		
F	200,000	200,608	33.0	250	100.0%	10,900	E-F	100,000	250.0	10,900	237.0		
500 FT	5,500	5,536	0.9	150	100.0%	500	B-500	3,536	150.0	250	14.0		
3k AGL	27,388	27,567	4.5	241	100.0%	3,000	C-3k	18,496	195.3	2,000	56.1		
TOTAL							0-500	5,536	110.2			0.50	
							500-3k	22,032	186.3				1.17

A-6 DEPARTURE ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	2,000	2,000	0.3	150	100.0%	0	A-B	2,000	75.0	0	15.8		
C	9,000	9,071	1.5	150	100.0%	1,000	B-C	7,071	150.0	500	27.9		
D	29,300	29,491	4.9	250	100.0%	3,208	C-D	20,420	200.0	2,104	60.5		
E	100,000	100,608	16.6	250	100.0%	10,900	D-E	71,117	250.0	7,054	168.5		
F	200,000	200,608	33.0	250	100.0%	10,900	E-F	100,000	250.0	10,900	237.0		
500 FT	5,500	5,536	0.9	150	100.0%	500	B-500	3,536	150.0	250	14.0		
3k AGL	27,388	27,567	4.5	241	100.0%	3,000	C-3k	18,496	195.3	2,000	56.1		
TOTAL							0-500	5,536	110.2			0.50	
							500-3k	22,032	186.3				1.17

MEAN OF A-6 DEPARTURE PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Takeoff Length (Ft)	Climbout Length (Ft)	Takeoff Time (Min)	Climbout Time (Min)
14	13.9%	0-3k	36,362		5,536	30,827	0.50	1.69
21	72.3%	0-3k	27,567		5,536	22,032	0.50	1.17
26	7.6%	0-3k	27,567		5,536	22,032	0.50	1.17
32	6.3%	0-3k	27,567		5,536	22,032	0.50	1.17
MEAN		0-500	5,536	110.2			0.50	
		500-3k	23,251	185.0				1.24

A-6 STRAIGHT IN APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,108	32.9	250	89.6%	4,000	G-H	110,000	250.0	4,000	260.7		
G	90,000	90,108	14.8	250	89.6%	4,000	F-G	41,076	250.0	2,750	97.3		
F	49,000	49,032	8.1	250	89.6%	1,500	E-F	10,018	250.0	1,200	23.7		
E	39,000	39,014	6.4	250	89.6%	900	D-E	11,000	200.0	900	32.6		
D	28,000	28,014	4.6	150	89.6%	900	C-D	1,000	150.0	888	4.0		
C	27,000	27,014	4.4	150	89.6%	875	B-C	13,003	150.0	738	51.4		
B	14,000	14,011	2.3	150	89.6%	600	A-B	14,011	150.0	325	55.3		
A	0	0	0.0	150	89.6%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	73,600	73,678	12.1	250	89.6%	3,000	3k-F	24,646	250.0	2,250	58.4		
TOTAL							3k-Taxi	78,678	176.0			264.9	4.4

A-6 STRAIGHT IN APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,100	32.9	250	89.6%	4,000	G-H	110,000	250.0	4,000	260.7		
G	90,000	90,100	14.8	250	89.6%	4,000	F-G	47,066	250.0	2,750	111.5		
F	43,000	43,033	7.1	250	89.6%	1,500	E-F	10,018	250.0	1,200	23.7		
E	33,000	33,015	5.4	250	89.6%	900	D-E	9,000	200.0	900	26.7		
D	24,000	24,015	4.0	150	89.6%	900	C-D	1,000	150.0	885	4.0		
C	23,000	23,015	3.8	150	89.6%	870	B-C	9,004	150.0	735	35.6		
B	14,000	14,011	2.3	150	89.6%	600	A-B	14,011	150.0	325	55.3		
A	0	0	0.0	150	89.6%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	71,200	71,273	11.7	250	89.6%	3,000	3k-F	28,240	250.0	2,250	66.9		
TOTAL							3k-Taxi	76,273	179.6			251.7	4.2

A-6 STRAIGHT IN APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,104	32.9	250	89.6%	4,000	F-G	110,000	250.0	4,000	260.7		
F	90,000	90,104	14.8	250	89.6%	4,000	E-F	59,053	250.0	2,750	140.0		
E	31,000	31,051	5.1	250	89.6%	1,500	D-E	9,036	200.0	1,095	26.8		
D	22,000	22,015	3.6	150	89.6%	690	C-D	1,004	150.0	645	4.0		
C	21,000	21,011	3.5	150	89.6%	600	B-C	7,000	150.0	600	27.6		
B	14,000	14,011	2.3	150	89.6%	600	A-B	14,011	150.0	325	55.3		
A	0	0	0.0	150	89.6%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	66,400	66,483	10.9	250	89.6%	3,000	3k-E	35,432	250.0	2,250	84.0		
TOTAL							3k-Taxi	71,483	178.6			237.2	4.0

A-6 STRAIGHT IN APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,100	32.9	250	89.6%	4,000	F-G	110,000	250.0	4,000	260.7		
F	90,000	90,100	14.8	250	89.6%	4,000	E-F	64,548	250.0	2,750	153.0		
E	25,500	25,551	4.2	250	89.6%	1,500	D-E	9,036	200.0	1,095	26.8		
D	16,500	16,515	2.7	150	89.6%	690	C-D	1,004	150.0	645	4.0		
C	15,500	15,511	2.6	150	89.6%	600	B-C	1,500	150.0	600	5.9		
B	14,000	14,011	2.3	150	89.6%	600	A-B	14,011	150.0	325	55.3		
A	0	0	0.0	150	89.6%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	64,200	64,280	10.6	250	89.6%	3,000	3k-E	38,729	250.0	2,250	91.8		
TOTAL							3k-Taxi	69,280	183.8			223.3	3.7

MEAN OF A-6 STRAIGHT IN APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	13.8%	3k-50	73,678			225.4		4.4
21	62.1%	3k-50	71,273			212.2		4.2
26	6.9%	3k-50	66,483			197.7		4.0
32	17.2%	3k-50	64,280			183.8		3.7
		50-TAXI	5,000			39.5		
MEAN		3k-Taxi	75,069	179.6			247.6	4.1

A-6 OVERHEAD BREAK APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,092	32.9	250	90.0%	5,000	H-I	117,555	250.0	3,200	278.6		
H	82,500	82,537	13.6	250	90.0%	1,400	G-H	52,050	250.0	1,400	123.4		
G	30,450	30,487	5.0	250	90.0%	1,400	F-G	1,000	250.0	1,400	2.4		
F	29,450	29,487	4.9	250	89.6%	1,400	E-F	9,036	250.0	1,181	21.4		
E	20,425	20,451	3.4	250	89.6%	962	D-E	1,277	250.0	931	3.0		
D	19,150	19,175	3.2	250	89.6%	900	C-D	4,450	200.0	900	13.2		
C	14,700	14,725	2.4	150	89.6%	900	B-C	10,720	140.0	575	45.4		
B	4,000	4,005	0.7	130	89.6%	250	A-B	4,005	130.0	150	18.3		
A	0	0	0.0	130	89.6%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	134,722	134,784	22.2	250	90.0%	3,000	3k-H	52,247	250.0	2,200	123.8		
TOTAL							3k-Taxi	139,784	208.9			396.4	6.6

A-6 OVERHEAD BREAK APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,087	32.9	250	90.0%	5,000	H-I	129,050	250.0	3,200	305.8		
H	71,000	71,037	11.7	250	90.0%	1,400	G-H	40,550	250.0	1,400	96.1		
G	30,450	30,487	5.0	250	90.0%	1,400	F-G	1,000	250.0	1,400	2.4		
F	29,450	29,487	4.9	250	89.6%	1,400	E-F	9,036	250.0	1,181	21.4		
E	20,425	20,451	3.4	250	89.6%	962	D-E	1,277	250.0	931	3.0		
D	19,150	19,175	3.2	250	89.6%	900	C-D	4,450	200.0	900	13.2		
C	14,700	14,725	2.4	150	89.6%	900	B-C	10,720	140.0	575	45.4		
B	4,000	4,005	0.7	130	89.6%	250	A-B	4,005	130.0	150	18.3		
A	0	0	0.0	130	89.6%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	128,333	128,393	21.1	250	90.0%	3,000	3k-H	57,356	250.0	2,200	135.9		
TOTAL							3k-Taxi	133,393	207.3			381.2	6.4

A-6 OVERHEAD BREAK APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,083	32.9	250	90.0%	5,000	H-I	140,546	250.0	3,200	333.1		
H	59,500	59,537	9.8	250	90.0%	1,400	G-H	29,050	250.0	1,400	68.8		
G	30,450	30,487	5.0	250	90.0%	1,400	F-G	1,000	250.0	1,400	2.4		
F	29,450	29,487	4.9	250	89.6%	1,400	E-F	9,036	250.0	1,181	21.4		
E	20,425	20,451	3.4	250	89.6%	962	D-E	1,277	250.0	931	3.0		
D	19,150	19,175	3.2	250	89.6%	900	C-D	4,450	200.0	900	13.2		
C	14,700	14,725	2.4	150	89.6%	900	B-C	10,720	140.0	575	45.4		
B	4,000	4,005	0.7	130	89.6%	250	A-B	4,005	130.0	150	18.3		
A	0	0	0.0	130	89.6%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	121,944	122,002	20.1	250	90.0%	3,000	3k-H	62,465	250.0	2,200	148.0		
TOTAL							3k-Taxi	127,002	205.6			366.1	6.1

A-6 OVERHEAD BREAK APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,083	32.9	250	90.0%	5,000	H-I	141,546	250.0	3,200	335.5		
H	58,500	58,537	9.6	250	90.0%	1,400	G-H	28,050	250.0	1,400	66.5		
G	30,450	30,487	5.0	250	90.0%	1,400	F-G	1,000	250.0	1,400	2.4		
F	29,450	29,487	4.9	250	89.6%	1,400	E-F	9,036	250.0	1,181	21.4		
E	20,425	20,451	3.4	250	89.6%	962	D-E	1,277	250.0	931	3.0		
D	19,150	19,175	3.2	250	89.6%	900	C-D	4,450	200.0	900	13.2		
C	14,700	14,725	2.4	150	89.6%	900	B-C	10,720	140.0	575	45.4		
B	4,000	4,005	0.7	130	89.6%	250	A-B	4,005	130.0	150	18.3		
A	0	0	0.0	130	89.6%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	121,389	121,446	20.0	250	90.0%	3,000	3k-H	62,909	250.0	2,200	149.1		
TOTAL							3k-Taxi	126,446	205.4			364.8	6.1

MEAN OF A-6 OVERHEAD BREAK APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	13.1%	3k-50	134,784			350.8		6.6
21	75.4%	3k-50	128,393			335.6		6.4
26	6.2%	3k-50	122,002			320.5		6.1
32	5.4%	3k-50	121,446			319.2		6.1
		50-TAXI	5,000			45.6		
MEAN		3k-Taxi	133,461	207.3			381.4	6.4

A-6 TOUCH AND GO PATTERN ON 14, NAWS CHINA LAKE

	Cumulative Feet					Altitude		Segment	Mean	Mean	Time On	T&G	T&G
	----------------------------		Nautical	Speed	Power	AGL		Length	Speed	Altitude	Segment	Time	Time
Node	Ground	Slant	Miles	(Knots)	(% RPM)	(Ft)	Segment	(Ft)	(Knots)	(Ft)	(Sec)	(Sec)	(Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,854	1.3	150	89.6%	900	B-C	6,754	150.0	475	26.7		
D	8,800	8,854	1.5	150	89.6%	900	C-D	1,000	150.0	900	3.9		
E	14,700	14,754	2.4	150	89.6%	900	D-E	5,900	150.0	900	23.3		
F	23,800	23,854	3.9	150	89.6%	900	E-F	9,100	150.0	900	35.9		
G	34,000	34,066	5.6	130	89.6%	400	F-G	10,212	140.0	650	43.2		
H	38,544	38,623	6.4	130	89.6%	50	G-H	4,557	130.0	225	20.8		
TOTAL	38,544	38,623	6.4					38,623	144.4			158.5	2.6

A-6 TOUCH AND GO PATTERN ON 21, NAWS CHINA LAKE

	Cumulative Feet					Altitude		Segment	Mean	Mean	Time On	T&G	T&G
	----------------------------		Nautical	Speed	Power	AGL		Length	Speed	Altitude	Segment	Time	Time
Node	Ground	Slant	Miles	(Knots)	(% RPM)	(Ft)	Segment	(Ft)	(Knots)	(Ft)	(Sec)	(Sec)	(Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,854	1.3	150	89.6%	900	B-C	6,754	150.0	475	26.7		
D	8,800	8,854	1.5	150	89.6%	900	C-D	1,000	150.0	900	3.9		
E	15,000	15,054	2.5	150	89.6%	900	D-E	6,200	150.0	900	24.5		
F	24,800	24,854	4.1	150	89.6%	900	E-F	9,800	150.0	900	38.7		
G	35,000	35,066	5.8	130	89.6%	400	F-G	10,212	140.0	650	43.2		
H	39,534	39,613	6.5	130	89.6%	50	G-H	4,547	130.0	225	20.7		
TOTAL	39,534	39,613	6.5					39,613	144.5			162.4	2.7

A-6 TOUCH AND GO PATTERN ON 26, NAWS CHINA LAKE

	Cumulative Feet					Altitude		Segment	Mean	Mean	Time On	T&G	T&G
	----------------------------		Nautical	Speed	Power	AGL		Length	Speed	Altitude	Segment	Time	Time
Node	Ground	Slant	Miles	(Knots)	(% RPM)	(Ft)	Segment	(Ft)	(Knots)	(Ft)	(Sec)	(Sec)	(Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,854	1.3	150	89.6%	900	B-C	6,754	150.0	475	26.7		
D	8,800	8,854	1.5	150	89.6%	900	C-D	1,000	150.0	900	3.9		
E	14,000	14,054	2.3	150	89.6%	900	D-E	5,200	150.0	900	20.5		
F	22,500	22,554	3.7	150	89.6%	900	E-F	8,500	150.0	900	33.6		
G	32,700	32,766	5.4	130	89.6%	400	F-G	10,212	140.0	650	43.2		
H	37,234	37,313	6.1	130	89.6%	50	G-H	4,547	130.0	225	20.7		
TOTAL	37,234	37,313	6.1					37,313	144.2			153.3	2.6

A-6 TOUCH AND GO PATTERN ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,854	1.3	150	89.6%	900	B-C	6,754	150.0	475	26.7		
D	8,800	8,854	1.5	150	89.6%	900	C-D	1,000	150.0	900	3.9		
E	14,700	14,754	2.4	150	89.6%	900	D-E	5,900	150.0	900	23.3		
F	23,800	23,854	3.9	150	89.6%	900	E-F	9,100	150.0	900	35.9		
G	34,000	34,066	5.6	130	89.6%	400	F-G	10,212	140.0	650	43.2		
H	38,544	38,623	6.4	130	89.6%	50	G-H	4,557	130.0	225	20.8		
TOTAL	38,544	38,623	6.4					38,623	144.4			158.5	2.6

MEAN OF A-6 TOUCH AND GO PATTERNS, NAWS CHINA LAKE

RUNWAY	RUNWAY USE	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	TIME On Segment (Sec)	Time On Time (Sec)	T&G Time (Min)
14	7.9%		38,623			158.5		2.6
21	84.0%		39,613			162.4		2.7
26	6.6%		37,313			153.3		2.6
32	1.5%		38,623			158.5		2.6
MEAN			39,368	144.5			161.5	2.7

A-6 FCLP PATTERN ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,823	1.3	150	89.6%	600	B-C	6,723	150.0	325	26.6		
D	8,800	8,823	1.5	150	89.6%	600	C-D	1,000	150.0	600	3.9		
E	14,700	14,723	2.4	150	89.6%	600	D-E	5,900	150.0	600	23.3		
F	23,800	23,823	3.9	150	89.6%	600	E-F	9,100	150.0	600	35.9		
G	34,000	34,024	5.6	130	89.6%	400	F-G	10,202	140.0	500	43.2		
H	38,544	38,582	6.3	130	89.6%	50	G-H	4,557	130.0	225	20.8		
TOTAL	38,544	38,582	6.3					38,582	144.4			158.4	2.6

A-6 FCLP PATTERN ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,823	1.3	150	89.6%	600	B-C	6,723	150.0	325	26.6		
D	8,800	8,823	1.5	150	89.6%	600	C-D	1,000	150.0	600	3.9		
E	15,000	15,023	2.5	150	89.6%	600	D-E	6,200	150.0	600	24.5		
F	24,800	24,823	4.1	150	89.6%	600	E-F	9,800	150.0	600	38.7		
G	35,000	35,024	5.8	130	89.6%	400	F-G	10,202	140.0	500	43.2		
H	39,534	39,572	6.5	130	89.6%	50	G-H	4,547	130.0	225	20.7		
TOTAL	39,534	39,572	6.5					39,572	144.5			162.3	2.7

A-6 FCLP PATTERN ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,823	1.3	150	89.6%	600	B-C	6,723	150.0	325	26.6		
D	8,800	8,823	1.5	150	89.6%	600	C-D	1,000	150.0	600	3.9		
E	14,000	14,023	2.3	150	89.6%	600	D-E	5,200	150.0	600	20.5		
F	22,500	22,523	3.7	150	89.6%	600	E-F	8,500	150.0	600	33.6		
G	32,700	32,724	5.4	130	89.6%	400	F-G	10,202	140.0	500	43.2		
H	37,234	37,272	6.1	130	89.6%	50	G-H	4,547	130.0	225	20.7		
TOTAL	37,234	37,272	6.1					37,272	144.2			153.2	2.6

A-6 FCLP PATTERN ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	130	100.0%	50							
B	1,100	1,100	0.2	150	100.0%	50	A-B	1,100	140.0	50	4.7		
C	7,800	7,823	1.3	150	89.6%	600	B-C	6,723	150.0	325	26.6		
D	8,800	8,823	1.5	150	89.6%	600	C-D	1,000	150.0	600	3.9		
E	14,700	14,723	2.4	150	89.6%	600	D-E	5,900	150.0	600	23.3		
F	23,800	23,823	3.9	150	89.6%	600	E-F	9,100	150.0	600	35.9		
G	34,000	34,024	5.6	130	89.6%	400	F-G	10,202	140.0	500	43.2		
H	38,544	38,582	6.3	130	89.6%	50	G-H	4,557	130.0	225	20.8		
TOTAL	38,544	38,582	6.3					38,582	144.4			158.4	2.6

MEAN OF A-6 FCLP PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
14	8.4%		38,582			158.4		2.6
21	83.2%		39,572			162.3		2.7
26	6.3%		37,272			153.2		2.6
32	2.1%		38,582			158.4		2.6
MEAN			39,323	144.5			161.3	2.7

TABLE D1-8. NAWS CHINA LAKE AV-8 PROFILES (WYLE 1995)

AV-8 DEPARTURE ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	103.5%	0							
B	3,000	3,000	0.5	110	103.5%	0	A-B	3,000	55.0	0	32.3		
C	13,700	13,747	2.3	300	93.0%	1,000	B-C	10,747	205.0	500	31.1		
D	14,700	14,750	2.4	300	93.0%	1,079	C-D	1,003	300.0	1,040	2.0		
E	20,000	20,066	3.3	300	85.0%	1,500	D-E	5,317	300.0	1,290	10.5		
F	42,300	42,389	7.0	300	85.0%	2,500	E-F	22,322	300.0	2,000	44.1		
G	100,000	100,143	16.5	300	85.0%	5,000	F-G	57,754	300.0	3,750	114.1		
H	200,000	200,143	32.9	300	85.0%	5,000	G-H	100,000	300.0	5,000	197.5		
500 FT	8,350	8,373	1.4	205	98.3%	500	B-500	5,373	157.5	250	20.2		
3k AGL	53,840	53,940	8.9	300	85.0%	3,000	F-3k	11,551	300.0	2,750	22.8		
TOTAL							0-500	8,373	94.4			0.88	
							500-3k	45,566	299.2				1.50

AV-8 DEPARTURE ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	103.5%	0							
B	3,000	3,000	0.5	110	103.5%	0	A-B	3,000	55.0	0	32.3		
C	13,700	13,747	2.3	300	93.0%	1,000	B-C	10,747	205.0	500	31.1		
D	14,700	14,748	2.4	300	93.0%	1,053	C-D	1,001	300.0	1,027	2.0		
E	23,200	23,260	3.8	300	85.0%	1,500	D-E	8,512	300.0	1,277	16.8		
F	42,300	42,386	7.0	300	85.0%	2,500	E-F	19,126	300.0	2,000	37.8		
G	100,000	100,140	16.5	300	85.0%	5,000	F-G	57,754	300.0	3,750	114.1		
H	200,000	200,140	32.9	300	85.0%	5,000	G-H	100,000	300.0	5,000	197.5		
500 FT	8,350	8,373	1.4	205	98.3%	500	B-500	5,373	157.5	250	20.2		
3k AGL	53,840	53,937	8.9	300	85.0%	3,000	F-3k	11,551	300.0	2,750	22.8		
TOTAL							0-500	8,373	94.4			0.88	
							500-3k	45,563	299.2				1.50

AV-8 DEPARTURE ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	103.5%	0							
B	3,000	3,000	0.5	110	103.5%	0	A-B	3,000	55.0	0	32.3		
C	13,700	13,747	2.3	300	93.0%	1,000	B-C	10,747	205.0	500	31.1		
D	14,700	14,748	2.4	300	93.0%	1,053	C-D	1,001	300.0	1,027	2.0		
E	23,200	23,260	3.8	300	85.0%	1,500	D-E	8,512	300.0	1,277	16.8		
F	42,300	42,386	7.0	300	85.0%	2,500	E-F	19,126	300.0	2,000	37.8		
G	100,000	100,140	16.5	300	85.0%	5,000	F-G	57,754	300.0	3,750	114.1		
H	200,000	200,140	32.9	300	85.0%	5,000	G-H	100,000	300.0	5,000	197.5		
500 FT	8,350	8,373	1.4	205	98.3%	500	B-500	5,373	157.5	250	20.2		
3k AGL	53,840	53,937	8.9	300	85.0%	3,000	F-3k	11,551	300.0	2,750	22.8		
TOTAL							0-500	8,373	94.4			0.88	
							500-3k	45,563	299.2				1.50

AV-8 DEPARTURE ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	103.5%	0							
B	3,000	3,000	0.5	110	103.5%	0	A-B	3,000	55.0	0	32.3		
C	13,700	13,747	2.3	300	93.0%	1,000	B-C	10,747	205.0	500	31.1		
D	14,700	14,748	2.4	300	93.0%	1,053	C-D	1,001	300.0	1,027	2.0		
E	23,200	23,260	3.8	300	85.0%	1,500	D-E	8,512	300.0	1,277	16.8		
F	42,300	42,386	7.0	300	85.0%	2,500	E-F	19,126	300.0	2,000	37.8		
G	100,000	100,140	16.5	300	85.0%	5,000	F-G	57,754	300.0	3,750	114.1		
H	200,000	200,140	32.9	300	85.0%	5,000	G-H	100,000	300.0	5,000	197.5		
500 FT	8,350	8,373	1.4	205	98.3%	500	B-500	5,373	157.5	250	20.2		
3k AGL	53,840	53,937	8.9	300	85.0%	3,000	F-3k	11,551	300.0	2,750	22.8		
TOTAL							0-500	8,373	94.4			0.88	
							500-3k	45,563	299.2				1.50

MEAN OF AV-8 DEPARTURE PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Takeoff Length (Dt)	Climbout Length (Ft)	Takeoff Time (Min)	Climbout Time (Min)
14	5.9%	0-3k	53,940		8,373	45,566	0.88	1.50
21	14.0%	0-3k	53,937		8,373	45,563	0.88	1.50
26	78.4%	0-3k	53,937		8,373	45,563	0.88	1.50
32	1.8%	0-3k	53,937		8,373	45,563	0.88	1.50
MEAN		0-500	8,373	94.4			0.88	
		500-3k	45,564	299.2				1.50

AV-8 STRAIGHT IN APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,110	32.9	230	75.0%	4,000	H-I	110,000	230.0	4,000	283.4		
H	90,000	90,110	14.8	230	75.0%	4,000	G-H	41,076	230.0	2,750	105.8		
G	49,000	49,034	8.1	230	75.0%	1,500	F-G	10,018	230.0	1,200	25.8		
F	39,000	39,016	6.4	230	75.0%	900	E-F	12,000	230.0	900	30.9		
E	27,000	27,016	4.4	230	75.0%	900	D-E	13,003	195.0	750	39.5		
D	14,000	14,012	2.3	160	75.0%	600	C-D	11,506	141.5	415	48.2		
C	2,500	2,506	0.4	123	75.0%	229	B-C	501	121.5	215	2.4		
B	2,000	2,006	0.3	120	93.0%	200	A-B	2,006	120.0	125	9.9		
A	0	0	0.0	120	93.0%	50							
TAXI				0		0	A-TAXI	5,000	60.0		49.4		
3k AGL	73,600	73,680	12.1	230	75.0%	3,000	3k-G	24,646	230.0	2,250	63.5		
TOTAL							3k-Taxi	78,680	172.9			269.6	4.5

AV-8 STRAIGHT IN APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,102	32.9	230	75.0%	4,000	H-I	110,000	230.0	4,000	283.4		
H	90,000	90,102	14.8	230	75.0%	4,000	G-H	47,066	230.0	2,750	121.2		
G	43,000	43,035	7.1	230	75.0%	1,500	F-G	10,018	230.0	1,200	25.8		
F	33,000	33,017	5.4	230	75.0%	900	E-F	10,000	230.0	900	25.8		
E	23,000	23,017	3.8	230	75.0%	900	D-E	9,005	195.0	750	27.4		
D	14,000	14,012	2.3	160	75.0%	600	C-D	11,506	141.5	415	48.2		
C	2,500	2,506	0.4	123	75.0%	229	B-C	501	121.5	215	2.4		
B	2,000	2,006	0.3	120	93.0%	200	A-B	2,006	120.0	125	9.9		
A	0	0	0.0	120	93.0%	50							
TAXI				0		0	A-TAXI	5,000	60.0		49.4		
3k AGL	71,200	71,275	11.7	230	75.0%	3,000	3k-G	28,240	230.0	2,250	72.7		
TOTAL							3k-Taxi	76,275	172.8			261.6	4.4

AV-8 STRAIGHT IN APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,098	32.9	230	75.0%	4,000	G-H	110,000	230.0	4,000	283.4		
G	90,000	90,098	14.8	230	75.0%	4,000	F-G	59,081	230.0	2,450	152.2		
F	31,000	31,017	5.1	230	75.0%	900	E-F	10,004	230.0	750	25.8		
E	21,000	21,012	3.5	230	75.0%	600	D-E	7,000	195.0	600	21.3		
D	14,000	14,012	2.3	160	75.0%	600	C-D	11,506	141.5	415	48.2		
C	2,500	2,506	0.4	123	75.0%	229	B-C	501	121.5	215	2.4		
B	2,000	2,006	0.3	120	93.0%	200	A-B	2,006	120.0	125	9.9		
A	0	0	0.0	120	93.0%	50							
TAXI				0		0	A-TAXI	5,000	60.0		49.4		
3k AGL	70,968	71,040	11.7	230	75.0%	3,000	3k-F	40,023	230.0	1,950	103.1		
TOTAL							3k-Taxi	76,040	173.3			260.0	4.3

AV-8 STRAIGHT IN APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,124	32.9	230	75.0%	4,000	H-I	110,000	230.0	4,000	283.4		
H	90,000	90,124	14.8	230	75.0%	4,000	G-H	41,076	230.0	2,750	105.8		
G	49,000	49,048	8.1	230	75.0%	1,500	F-G	23,505	230.0	1,250	60.6		
F	25,500	25,543	4.2	230	75.0%	1,000	E-F	10,000	230.0	950	25.8		
E	15,500	15,542	2.6	230	75.0%	900	D-E	1,530	195.0	750	4.6		
D	14,000	14,012	2.3	160	75.0%	600	C-D	11,506	141.5	415	48.2		
C	2,500	2,506	0.4	123	75.0%	229	B-C	501	121.5	215	2.4		
B	2,000	2,006	0.3	120	93.0%	200	A-B	2,006	120.0	125	9.9		
A	0	0	0.0	120	93.0%	50							
TAXI				0		0	A-TAXI	5,000	60.0		49.4		
3k AGL	73,600	73,694	12.1	230	75.0%	3,000	3k-G	24,646	230.0	2,250	63.5		
TOTAL							3k-Taxi	78,694	176.4			264.3	4.4

MEAN OF AV-8 STRAIGHT IN APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	15.4%	3k-50	73,680			220.2		4.5
21	15.4%	3k-50	71,275			212.2		4.4
26	61.5%	3k-50	71,040			210.7		4.3
32	7.7%	3k-50	73,694			215.0		4.4
		50-TAXI	5,000			49.4		
MEAN		3k-Taxi	76,686	173.4			262.1	4.4

AV-8 OVERHEAD BREAK APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,090	32.9	300	75.0%	5,000	F-G	121,151	325.0	3,250	220.9		
F	78,900	78,939	13.0	350	75.0%	1,500	E-F	49,450	350.0	1,500	83.7		
E	29,450	29,489	4.9	350	60.7%	1,500	D-E	14,758	225.0	1,250	38.9		
D	14,700	14,731	2.4	100	75.0%	1,000	C-D	12,725	100.0	600	75.4		
C	2,000	2,006	0.3	100	75.0%	200	B-C	501	100.0	182	3.0		
B	1,500	1,504	0.2	100	93.0%	163	A-B	1,504	100.0	107	8.9		
A	0	0	0.0	100	93.0%	50							
TAXI				0		0	A-TAXI	5,000	50.0		59.2		
3k AGL	130,800	130,861	21.5	329	75.0%	3,000	3k-F	51,922	339.3	2,250	90.7		
TOTAL							3k-Taxi	135,861	223.7			359.8	6.0

AV-8 OVERHEAD BREAK APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,085	32.9	300	75.0%	5,000	F-G	132,646	325.0	3,250	241.8		
F	67,400	67,439	11.1	350	75.0%	1,500	E-F	37,950	350.0	1,500	64.2		
E	29,450	29,489	4.9	350	60.7%	1,500	D-E	14,758	225.0	1,250	38.9		
D	14,700	14,731	2.4	100	75.0%	1,000	C-D	12,725	100.0	600	75.4		
C	2,000	2,006	0.3	100	75.0%	200	B-C	501	100.0	182	3.0		
B	1,500	1,504	0.2	100	93.0%	163	A-B	1,504	100.0	107	8.9		
A	0	0	0.0	100	93.0%	50							
TAXI				0		0	A-TAXI	5,000	50.0		59.2		
3k AGL	124,229	124,288	20.5	329	75.0%	3,000	3k-F	56,848	339.3	2,250	99.3		
TOTAL							3k-Taxi	129,288	219.5			348.9	5.8

AV-8 OVERHEAD BREAK APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,082	32.9	300	75.0%	5,000	F-G	144,542	325.0	3,250	263.5		
F	55,500	55,539	9.1	350	75.0%	1,500	E-F	26,050	350.0	1,500	44.1		
E	29,450	29,489	4.9	350	60.7%	1,500	D-E	14,758	225.0	1,250	38.9		
D	14,700	14,731	2.4	100	75.0%	1,000	C-D	12,725	100.0	600	75.4		
C	2,000	2,006	0.3	100	75.0%	200	B-C	501	100.0	182	3.0		
B	1,500	1,504	0.2	100	93.0%	163	A-B	1,504	100.0	107	8.9		
A	0	0	0.0	100	93.0%	50							
TAXI				0		0	A-TAXI	5,000	50.0		59.2		
3k AGL	117,429	117,486	19.3	329	75.0%	3,000	3k-F	61,947	339.3	2,250	108.2		
TOTAL							3k-Taxi	122,486	214.9			337.7	5.6

AV-8 OVERHEAD BREAK APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,081	32.9	300	75.0%	5,000	F-G	145,142	325.0	3,250	264.6		
F	54,900	54,939	9.0	350	75.0%	1,500	E-F	25,450	350.0	1,500	43.1		
E	29,450	29,489	4.9	350	60.7%	1,500	D-E	14,758	225.0	1,250	38.9		
D	14,700	14,731	2.4	100	75.0%	1,000	C-D	12,725	100.0	600	75.4		
C	2,000	2,006	0.3	100	75.0%	200	B-C	501	100.0	182	3.0		
B	1,500	1,504	0.2	100	93.0%	163	A-B	1,504	100.0	107	8.9		
A	0	0	0.0	100	93.0%	50							
TAXI				0		0	A-TAXI	5,000	50.0		59.2		
3k AGL	117,086	117,143	19.3	329	75.0%	3,000	3k-F	62,204	339.3	2,250	108.6		
TOTAL							3k-Taxi	122,143	214.7			337.1	5.6

MEAN OF AV-8 OVERHEAD BREAK APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	9.8%	3k-50	130,861			300.5		6.0
21	24.3%	3k-50	124,288			289.7		5.8
26	64.2%	3k-50	117,486			278.4		5.6
32	1.7%	3k-50	117,143			277.8		5.6
		50-TAXI	5,000			59.2		
MEAN		3k-Taxi	125,446	217.0			342.6	5.7

AV-8 TOUCH AND GO PATTERN ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	120	103.5%	50							
B	2,800	2,800	0.5	120	103.5%	50	A-B	2,800	120.0	50	13.8		
C	3,000	3,001	0.5	120	93.0%	67	B-C	201	120.0	59	1.0		
D	8,000	8,019	1.3	150	93.0%	500	C-D	5,019	135.0	284	22.0		
E	15,615	15,645	2.6	185	75.0%	900	D-E	7,625	167.5	700	27.0		
F	18,651	18,681	3.1	185	70.0%	900	E-F	3,036	185.0	900	9.7		
G	36,544	36,588	6.0	120	93.0%	200	F-G	17,907	152.5	550	69.6		
H	38,544	38,593	6.4	120	93.0%	50	G-H	2,006	120.0	125	9.9		
TOTAL	38,544	38,593	6.4					38,593	149.4			153.0	2.6

AV-8 TOUCH AND GO PATTERN ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	120	103.5%	50							
B	2,800	2,800	0.5	120	103.5%	50	A-B	2,800	120.0	50	13.8		
C	3,000	3,001	0.5	120	93.0%	67	B-C	201	120.0	59	1.0		
D	8,000	8,019	1.3	150	93.0%	500	C-D	5,019	135.0	284	22.0		
E	15,615	15,645	2.6	185	75.0%	900	D-E	7,625	167.5	700	27.0		
F	18,651	18,681	3.1	185	70.0%	900	E-F	3,036	185.0	900	9.7		
G	37,534	37,577	6.2	120	93.0%	200	F-G	18,896	152.5	550	73.4		
H	39,534	39,583	6.5	120	93.0%	50	G-H	2,006	120.0	125	9.9		
TOTAL	39,534	39,583	6.5					39,583	149.5			156.9	2.6

AV-8 TOUCH AND GO PATTERN ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	120	103.5%	50							
B	2,800	2,800	0.5	120	103.5%	50	A-B	2,800	120.0	50	13.8		
C	3,000	3,001	0.5	120	93.0%	67	B-C	201	120.0	59	1.0		
D	8,000	8,019	1.3	150	93.0%	500	C-D	5,019	135.0	284	22.0		
E	15,615	15,645	2.6	185	75.0%	900	D-E	7,625	167.5	700	27.0		
F	18,651	18,681	3.1	185	70.0%	900	E-F	3,036	185.0	900	9.7		
G	35,234	35,279	5.8	120	93.0%	200	F-G	16,598	152.5	550	64.5		
H	37,234	37,284	6.1	120	93.0%	50	G-H	2,006	120.0	125	9.9		
TOTAL	37,234	37,284	6.1					37,284	149.3			147.9	2.5

AV-8 TOUCH AND GO PATTERN ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	120	103.5%	50							
B	2,800	2,800	0.5	120	103.5%	50	A-B	2,800	120.0	50	13.8		
C	3,000	3,001	0.5	120	93.0%	67	B-C	201	120.0	59	1.0		
D	8,000	8,019	1.3	150	93.0%	500	C-D	5,019	135.0	284	22.0		
E	15,615	15,645	2.6	185	75.0%	900	D-E	7,625	167.5	700	27.0		
F	18,651	18,681	3.1	185	70.0%	900	E-F	3,036	185.0	900	9.7		
G	36,544	36,588	6.0	120	93.0%	200	F-G	17,907	152.5	550	69.6		
H	38,544	38,593	6.4	120	93.0%	50	G-H	2,006	120.0	125	9.9		
TOTAL	38,544	38,593	6.4					38,593	149.4			153.0	2.6

MEAN OF AV-8 TOUCH AND GO PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
14	9.7%		38,593			153.0		2.6
21	13.7%		39,583			156.9		2.6
26	75.8%		37,284			147.9		2.5
32	0.8%		38,593			153.0		2.6
MEAN			37,737	149.4			149.7	2.5

TABLE D1-9. NAWS CHINA LAKE A-4 PROFILES (WYLE 1995)

A-4 DEPARTURE ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	3,000	3,000	0.5	150	100.0%	0	A-B	3,000	75.0	0	23.7		
C	10,000	10,035	1.7	150	100.0%	700	B-C	7,035	150.0	350	27.8		
D	16,000	16,042	2.6	250	100.0%	1,000	C-D	6,007	200.0	850	17.8		
E	20,000	20,042	3.3	250	100.0%	1,000	D-E	4,000	250.0	1,000	9.5		
F	23,000	23,042	3.8	250	100.0%	1,000	E-F	3,000	250.0	1,000	7.1		
G	80,000	81,094	13.3	300	100.0%	12,000	F-G	58,052	275.0	6,500	125.1		
H	200,000	201,094	33.1	300	100.0%	12,000	G-H	120,000	300.0	12,000	237.0		
500 FT	8,000	8,025	1.3	150	100.0%	500	B-500	5,025	150.0	250	19.8		
3k AGL	33,364	33,597	5.5	259	100.0%	3,000	F-3k	10,555	254.5	2,000	24.6		
TOTAL							0-500	8,025	109.2			0.73	
							500-3k	25,572	226.5				1.11

A-4 DEPARTURE ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	3,000	3,000	0.5	150	100.0%	0	A-B	3,000	75.0	0	23.7		
C	10,000	10,035	1.7	150	100.0%	700	B-C	7,035	150.0	350	27.8		
D	16,000	16,042	2.6	250	100.0%	1,000	C-D	6,007	200.0	850	17.8		
E	20,000	20,101	3.3	250	100.0%	1,688	D-E	4,059	250.0	1,344	9.6		
F	80,000	80,981	13.3	300	100.0%	12,000	E-F	60,880	275.0	6,844	131.2		
G	200,000	200,981	33.1	300	100.0%	12,000	F-G	120,000	300.0	12,000	237.0		
500 FT	8,000	8,025	1.3	150	100.0%	500	B-500	5,025	150.0	250	19.8		
3k AGL	27,634	27,847	4.6	256	100.0%	3,000	E-3k	7,746	253.2	2,344	18.1		
TOTAL							0-500	8,025	109.2			0.73	
							500-3k	19,822	219.6				0.89

A-4 DEPARTURE ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	3,000	3,000	0.5	150	100.0%	0	A-B	3,000	75.0	0	23.7		
C	10,000	10,035	1.7	150	100.0%	700	B-C	7,035	150.0	350	27.8		
D	16,000	16,042	2.6	250	100.0%	1,000	C-D	6,007	200.0	850	17.8		
E	20,000	20,101	3.3	250	100.0%	1,688	D-E	4,059	250.0	1,344	9.6		
F	80,000	80,981	13.3	300	100.0%	12,000	E-F	60,880	275.0	6,844	131.2		
G	200,000	200,981	33.1	300	100.0%	12,000	F-G	120,000	300.0	12,000	237.0		
500 FT	8,000	8,025	1.3	150	100.0%	500	B-500	5,025	150.0	250	19.8		
3k AGL	27,634	27,847	4.6	256	100.0%	3,000	E-3k	7,746	253.2	2,344	18.1		
TOTAL							0-500	8,025	109.2			0.73	
							500-3k	19,822	219.6				0.89

A-4 DEPARTURE ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	3,000	3,000	0.5	150	100.0%	0	A-B	3,000	75.0	0	23.7		
C	10,000	10,035	1.7	150	100.0%	700	B-C	7,035	150.0	350	27.8		
D	16,000	16,042	2.6	250	100.0%	1,000	C-D	6,007	200.0	850	17.8		
E	20,000	20,042	3.3	250	100.0%	1,000	D-E	4,000	250.0	1,000	9.5		
F	36,000	36,042	5.9	250	100.0%	1,000	E-F	16,000	250.0	1,000	37.9		
G	80,000	81,397	13.4	300	100.0%	12,000	F-G	45,354	275.0	6,500	97.7		
H	200,000	201,397	33.1	300	100.0%	12,000	G-H	120,000	300.0	12,000	237.0		
500 FT	8,000	8,025	1.3	150	100.0%	500	B-500	5,025	150.0	250	19.8		
3k AGL	44,000	44,289	7.3	259	100.0%	3,000	F-3k	8,246	254.5	2,000	19.2		
TOTAL							0-500	8,025	109.2			0.73	
							500-3k	36,264	232.7				1.54

MEAN OF A-4 DEPARTURE PATTERNS, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Takeoff Length (Ft)	Climbout Length (Ft)	Takeoff Time (Min)	Climbout Time (Min)
14	14.7%	0-3k	33,597		8,025	25,572	0.73	1.11
21	72.1%	0-3k	27,847		8,025	19,822	0.73	0.89
26	5.9%	0-3k	27,847		8,025	19,822	0.73	0.89
32	7.4%	0-3k	44,289		8,025	36,264	0.73	1.54
MEAN		0-500	8,025	109.2			0.73	
		500-3k	21,877	222.3				0.97

A-4 STRAIGHT IN APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,111	32.9	225	85.0%	4,000	H-I	110,000	225.0	4,000	289.7		
H	90,000	90,111	14.8	225	85.0%	4,000	G-H	41,076	225.0	2,750	108.2		
G	49,000	49,035	8.1	225	85.0%	1,500	F-G	10,018	225.0	1,200	26.4		
F	39,000	39,017	6.4	225	85.0%	900	E-F	9,000	225.0	900	23.7		
E	30,000	30,017	4.9	225	85.0%	900	D-E	3,000	187.5	900	9.5		
D	27,000	27,017	4.4	150	85.0%	900	C-D	7,000	150.0	888	27.6		
C	20,000	20,017	3.3	150	85.0%	875	B-C	6,006	140.0	738	25.4		
B	14,000	14,011	2.3	130	85.0%	600	A-B	14,011	130.0	325	63.9		
A	0	0	0.0	130	85.0%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	73,600	73,681	12.1	225	85.0%	3,000	3k-G	24,646	225.0	2,250	64.9		
TOTAL							3k-Taxi	78,681	162.5			287.0	4.8

A-4 STRAIGHT IN APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,099	32.9	225	85.0%	4,000	F-G	110,000	225.0	4,000	289.7		
F	90,000	90,099	14.8	225	85.0%	4,000	E-F	47,066	225.0	2,750	123.9		
E	43,000	43,033	7.1	225	85.0%	1,500	D-E	10,018	225.0	1,200	26.4		
D	33,000	33,015	5.4	225	85.0%	900	C-D	13,000	187.5	853	41.1		
C	20,000	20,014	3.3	150	85.0%	805	B-C	6,004	140.0	703	25.4		
B	14,000	14,011	2.3	130	85.0%	600	A-B	14,011	130.0	325	63.9		
A	0	0	0.0	130	85.0%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	71,200	71,272	11.7	225	85.0%	3,000	3k-E	28,240	225.0	2,250	74.4		
TOTAL							3k-Taxi	76,272	163.3			276.7	4.6

A-4 STRAIGHT IN APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,103	32.9	225	85.0%	4,000	E-F	110,000	225.0	4,000	289.7		
E	90,000	90,103	14.8	225	85.0%	4,000	D-E	60,052	225.0	2,750	158.1		
D	30,000	30,051	4.9	225	85.0%	1,500	C-D	10,040	187.5	1,050	31.7		
C	20,000	20,011	3.3	150	85.0%	600	B-C	6,000	140.0	600	25.4		
B	14,000	14,011	2.3	130	85.0%	600	A-B	14,011	130.0	325	63.9		
A	0	0	0.0	130	85.0%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	66,000	66,082	10.9	225	85.0%	3,000	3k-D	36,031	225.0	2,250	94.9		
TOTAL							3k-Taxi	71,082	161.1			261.4	4.4

A-4 STRAIGHT IN APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,100	32.9	225	85.0%	4,000	F-G	110,000	225.0	4,000	289.7		
F	90,000	90,100	14.8	225	85.0%	4,000	E-F	60,045	225.0	2,837	158.1		
E	30,000	30,055	4.9	225	85.0%	1,674	D-E	4,503	187.5	1,587	14.2		
D	25,500	25,551	4.2	150	85.0%	1,500	C-D	10,040	150.0	1,050	39.7		
C	15,500	15,511	2.6	150	85.0%	600	B-C	1,500	140.0	600	6.3		
B	14,000	14,011	2.3	130	85.0%	600	A-B	14,011	130.0	325	63.9		
A	0	0	0.0	130	85.0%	50							
TAXI				0		0	A-TAXI	5,000	65.0		45.6		
3k AGL	64,205	64,285	10.6	225	85.0%	3,000	3k-E	34,230	225.0	2,337	90.1		
TOTAL							3k-Taxi	69,285	158.0			259.8	4.3

MEAN OF A-4 STRAIGHT IN APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	18.8%	3k-50	73,681			241.4		4.8
21	68.8%	3k-50	71,272			231.1		4.6
26	6.3%	3k-50	66,082			215.9		4.4
32	6.3%	3k-50	64,285			214.2		4.3
		50-TAXI	5,000			45.6		
MEAN		3k-Taxi	75,963	162.7			276.6	4.6

A-4 OVERHEAD BREAK APPROACH TO 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,090	32.9	300	85.0%	5,000	G-H	121,153	300.0	3,200	239.3		
G	78,900	78,937	13.0	300	85.0%	1,400	F-G	49,450	300.0	1,400	97.7		
F	29,450	29,487	4.9	300	85.0%	1,400	E-F	10,312	237.5	1,150	25.7		
E	19,150	19,175	3.2	175	85.0%	900	D-E	4,450	162.5	900	16.2		
D	14,700	14,725	2.4	150	85.0%	900	C-D	1,002	150.0	871	4.0		
C	13,700	13,723	2.3	150	85.0%	842	B-C	9,215	150.0	576	36.4		
B	4,500	4,508	0.7	150	85.0%	310	A-B	4,508	150.0	180	17.8		
A	0	0	0.0	150	85.0%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	132,722	132,783	21.9	300	85.0%	3,000	3k-G	53,846	300.0	2,200	106.3		
TOTAL							3k-Taxi	137,783	237.6			343.6	5.7

A-4 OVERHEAD BREAK APPROACH TO 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
I	200,000	200,086	32.9	300	85.0%	5,000	H-I	121,145	300.0	3,356	239.3		
H	78,900	78,941	13.0	300	85.0%	1,712	G-H	11,504	300.0	1,556	22.7		
G	67,400	67,437	11.1	300	85.0%	1,400	F-G	37,950	300.0	1,400	74.9		
F	29,450	29,487	4.9	300	85.0%	1,400	E-F	10,312	237.5	1,150	25.7		
E	19,150	19,175	3.2	175	85.0%	900	D-E	4,450	162.5	900	16.2		
D	14,700	14,725	2.4	150	85.0%	900	C-D	1,002	150.0	871	4.0		
C	13,700	13,723	2.3	150	85.0%	842	B-C	9,215	150.0	576	36.4		
B	4,500	4,508	0.7	150	85.0%	310	A-B	4,508	150.0	180	17.8		
A	0	0	0.0	150	85.0%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	126,338	126,397	20.8	300	85.0%	3,000	3k-H	47,456	300.0	2,356	93.7		
TOTAL							3k-Taxi	131,397	235.2			331.0	5.5

A-4 OVERHEAD BREAK APPROACH TO 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,082	32.9	300	85.0%	5,000	G-H	144,145	300.0	3,200	284.7		
G	55,900	55,937	9.2	300	85.0%	1,400	F-G	26,450	300.0	1,400	52.2		
F	29,450	29,487	4.9	300	85.0%	1,400	E-F	10,312	237.5	1,150	25.7		
E	19,150	19,175	3.2	175	85.0%	900	D-E	4,450	162.5	900	16.2		
D	14,700	14,725	2.4	150	85.0%	900	C-D	1,002	150.0	871	4.0		
C	13,700	13,723	2.3	150	85.0%	842	B-C	9,215	150.0	576	36.4		
B	4,500	4,508	0.7	150	85.0%	310	A-B	4,508	150.0	180	17.8		
A	0	0	0.0	150	85.0%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	119,944	120,001	19.7	300	85.0%	3,000	3k-G	64,064	300.0	2,200	126.5		
TOTAL							3k-Taxi	125,001	232.6			318.4	5.3

A-4 OVERHEAD BREAK APPROACH TO 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,081	32.9	300	85.0%	5,000	G-H	145,145	300.0	3,200	286.7		
G	54,900	54,937	9.0	300	85.0%	1,400	F-G	25,450	237.5	1,400	63.5		
F	29,450	29,487	4.9	175	85.0%	1,400	E-F	10,312	162.5	1,150	37.6		
E	19,150	19,175	3.2	150	85.0%	900	D-E	4,450	150.0	900	17.6		
D	14,700	14,725	2.4	150	85.0%	900	C-D	1,002	150.0	871	4.0		
C	13,700	13,723	2.3	150	85.0%	842	B-C	9,215	150.0	576	36.4		
B	4,500	4,508	0.7	150	85.0%	310	A-B	4,508	150.0	180	17.8		
A	0	0	0.0	150	85.0%	50							
TAXI				0		0	A-TAXI	5,000	75.0		39.5		
3k AGL	119,389	119,445	19.7	300	85.0%	3,000	3k-G	64,509	300.0	2,200	127.4		
TOTAL							3k-Taxi	124,445	214.5			343.7	5.7

MEAN OF A-4 OVERHEAD BREAK APPROACHES, NAWS CHINA LAKE

Runway	Runway Use	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Time (Min)
14	14.5%	3k-50	132,783			304.1		5.7
21	72.7%	3k-50	126,397			291.5		5.5
26	5.5%	3k-50	120,001			278.9		5.3
32	7.3%	3k-50	119,445			304.2		5.7
		50-TAXI	5,000			39.5		
MEAN		3k-Taxi	131,471	233.9			333.1	5.6

A-4 TOUCH AND GO PATTERN ON 14, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	130	100.0%	50							
B	200	200	0.0	130	100.0%	50	A-B	200	130.0	50	0.9		
C	4,000	4,055	0.7	130	98.0%	700	B-C	3,855	130.0	375	17.6		
D	14,715	14,772	2.4	150	85.0%	900	C-D	10,717	140.0	800	45.4		
E	24,767	24,824	4.1	150	85.0%	900	F-G	10,052	150.0	900	39.7		
F	38,544	38,627	6.4	130	85.0%	50	G-H	13,803	140.0	475	58.4		
TOTAL	38,544	38,627	6.4					38,627	141.3			162.0	2.7

A-4 TOUCH AND GO PATTERN ON 21, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	130	100.0%	50							
B	200	200	0.0	130	100.0%	50	A-B	200	130.0	50	0.9		
C	4,000	4,055	0.7	130	98.0%	700	B-C	3,855	130.0	375	17.6		
D	15,210	15,267	2.5	150	85.0%	900	C-D	11,212	140.0	800	47.4		
E	24,767	24,824	4.1	150	85.0%	900	F-G	9,557	150.0	900	37.7		
F	39,534	39,615	6.5	130	85.0%	50	G-H	14,791	140.0	475	62.6		
TOTAL	39,534	39,615	6.5					39,615	141.2			166.3	2.8

A-4 TOUCH AND GO PATTERN ON 26, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	130	100.0%	50							
B	200	200	0.0	130	100.0%	50	A-B	200	130.0	50	0.9		
C	4,000	4,055	0.7	130	98.0%	700	B-C	3,855	130.0	375	17.6		
D	14,060	14,117	2.3	150	85.0%	900	C-D	10,062	140.0	800	42.6		
E	22,467	22,524	3.7	150	85.0%	900	F-G	8,407	150.0	900	33.2		
F	37,234	37,316	6.1	130	85.0%	50	G-H	14,791	140.0	475	62.6		
TOTAL	37,234	37,316	6.1					37,316	140.9			156.9	2.6

A-4 TOUCH AND GO PATTERN ON 32, NAWS CHINA LAKE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	130	100.0%	50							
B	200	200	0.0	130	100.0%	50	A-B	200	130.0	50	0.9		
C	4,000	4,055	0.7	130	98.0%	700	B-C	3,855	130.0	375	17.6		
D	14,715	14,772	2.4	150	85.0%	900	C-D	10,717	140.0	800	45.4		
E	23,777	23,834	3.9	150	85.0%	900	F-G	9,062	150.0	900	35.8		
F	38,544	38,626	6.4	130	85.0%	50	G-H	14,791	140.0	475	62.6		
TOTAL	38,544	38,626	6.4					38,626	141.1			162.2	2.7

MEAN OF A-4 TOUCH AND GO PATTERNS, NAWS CHINA LAKE

RUNWAY	RUNWAY USE	SEGMENT	SEGMENT LENGTH (FT)	MEAN SPEED (KNOTS)	MEAN ALTITUDE (FT)	TIME ON SEGMENT (SEC)	T&G TIME (SEC)	T&G TIME (MIN)
14	17.4%		38,627			162.0		2.7
21	71.0%		39,615			166.3		2.8
26	5.8%		37,316			156.9		2.6
32	5.8%		38,626			162.2		2.7
MEAN			39,253	141.2			164.7	2.7

TABLE D1-10. NAF EL CENTRO F/A-18 PROFILES (WYLE 1997)

F/A-18 DEPARTURE ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	95.0%	0							
B	4,200	4,200	0.7	150	97.0%	0	A-B	4,200	75.0	0	33.2		
C	7,000	7,031	1.2	190	97.0%	415	B-C	2,831	170.0	208	9.9		
D	8,000	8,048	1.3	240	97.0%	600	C-D	1,017	215.0	508	2.8		
E	20,000	20,248	3.3	300	97.0%	2,800	D-E	12,200	270.0	1,700	26.8		
F	80,000	80,833	13.3	350	97.0%	11,200	E-F	60,585	325.0	7,000	110.4		
G	200,000	200,833	33.1	350	97.0%	11,200	F-G	120,000	350.0	11,200	203.1		
500 FT	7,459	7,498	1.2	213	97.0%	500	C-500	467	201.5	458	1.4		
3k AGL	21,429	21,690	3.6	301	97.0%	3,000	E-3k	1,443	300.6	2,900	2.8		
TOTAL							0-500	7,498	100.0			0.74	
							500-3k	14,192	270.9				0.52

F/A-18 STRAIGHT IN APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
E	200,000	200,732	33.0	300	84.0%	15,000	D-E	125,623	275.0	8,750	270.7		
D	75,000	75,108	12.4	250	84.0%	2,500	C-D	47,000	225.0	2,500	123.8		
C	28,000	28,108	4.6	200	84.0%	2,500	B-C	21,593	172.5	1,500	74.2		
B	6,500	6,516	1.1	145	92.0%	500	A-B	6,516	145.0	275	26.6		
A	0	0	0.0	145	92.0%	50							
TAXI				0		0	A-TAXI	5,000	72.5		40.9		
3k AGL	80,000	80,133	13.2	252	84.0%	3,000	3k-D	5,025	251.0	2,750	11.9		
TOTAL							3k-Taxi	85,133	181.9			277.3	4.6

F/A-18 OVERHEAD BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,295	33.0	250	81.0%	10,000	F-G	105,096	250.0	7,750	249.1		
F	95,000	95,199	15.7	250	81.0%	5,500	E-F	31,838	275.0	4,000	68.6		
E	63,304	63,361	10.4	300	90.0%	2,500	D-E	28,074	300.0	2,000	55.4		
D	35,248	35,288	5.8	300	90.0%	1,500	C-D	11,635	225.0	1,250	30.6		
C	23,624	23,653	3.9	150	87.0%	1,000	B-C	8,000	150.0	1,000	31.6		
B	15,624	15,653	2.6	150	87.0%	1,000	A-B	15,653	147.5	525	62.9		
A	0	0	0.0	145	92.0%	50							
TAXI				0		0	A-TAXI	5,000	72.5		40.9		
3k AGL	68,587	68,668	11.3	292	88.5%	3,000	3k-E	5,306	295.8	2,750	10.6		
TOTAL							3k-Taxi	73,668	188.1			232.0	3.9

F/A-18 CARRIER BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,300	33.0	250	81.0%	10,000	F-G	105,096	250.0	7,750	249.1		
F	95,000	95,203	15.7	250	81.0%	5,500	E-F	31,838	275.0	4,000	68.6		
E	63,304	63,366	10.4	300	90.0%	2,500	D-E	28,107	300.0	1,650	55.5		
D	35,248	35,258	5.8	300	90.0%	800	C-D	11,628	225.0	650	30.6		
C	23,624	23,630	3.9	150	87.0%	500	B-C	8,000	150.0	500	31.6		
B	15,624	15,630	2.6	150	87.0%	500	A-B	15,630	147.5	275	62.8		
A	0	0	0.0	145	92.0%	50							
TAXI				0		0	A-TAXI	5,000	72.5		40.9		
3k AGL	68,587	68,672	11.3	292	88.5%	3,000	3k-E	5,306	295.8	2,750	10.6		
TOTAL							0-3k	73,672	188.1			232.0	3.9

F/A-18 TOUCH AND GO PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	145	100.0%	0							
B	500	500	0.1	150	100.0%	0	A-B	500	147.5	0	2.0		
C	9,000	9,009	1.5	175	97.0%	400	B-C	8,509	162.5	200	31.0		
D	20,637	20,662	3.4	150	87.0%	1,000	C-D	11,652	162.5	700	42.5		
E	34,624	34,649	5.7	145	87.0%	1,000	D-E	13,987	147.5	1,000	56.2		
F	50,247	50,304	8.3	145	94.0%	0	E-F	15,655	145.0	500	64.0		
TOTAL	50,247	50,304	8.3					50,304	152.3			195.7	3.3

F/A-18 FCLP PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	145	100.0%	0							
B	500	500	0.1	150	100.0%	0	A-B	500	147.5	0	2.0		
C	9,000	9,009	1.5	175	97.0%	400	B-C	8,509	162.5	200	31.0		
D	20,637	20,648	3.4	150	87.0%	600	C-D	11,639	162.5	500	42.4		
E	34,624	34,635	5.7	145	87.0%	600	D-E	13,987	147.5	600	56.2		
F	50,247	50,270	8.3	145	94.0%	0	E-F	15,635	145.0	300	63.9		
TOTAL	50,247	50,270	8.3					50,270	152.3			195.5	3.3

TABLE D1-11. NAF EL CENTRO F-14 PROFILES (WYLE 1997)

F-14 DEPARTURE ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	MAX AB	0							
B	2,000	2,000	0.3	120	MAX AB	0	A-B	2,000	60.0	0	19.7		
C	8,000	8,067	1.3	225	100.0%	900	B-C	6,067	172.5	450	20.8		
D	11,922	12,035	2.0	250	100.0%	1,500	C-D	3,968	237.5	1,200	9.9		
E	45,861	46,066	7.6	250	88.0%	4,000	D-E	34,031	250.0	2,750	80.7		
F	90,000	90,611	14.9	250	88.0%	10,000	E-F	44,545	250.0	7,000	105.6		
G	200,000	200,611	33.0	250	88.0%	10,000	F-G	110,000	250.0	10,000	260.7		
500 FT	5,333	5,371	0.9	178	100.0%	500	B-500	3,371	149.2	250	13.4		
3k AGL	32,285	32,453	5.3	250	92.8%	3,000	D-3k	20,419	250.0	2,250	48.4		
TOTAL							0-500	5,371	96.0			0.55	
							500-3k	27,083	244.1				1.10

F-14 STRAIGHT IN APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
E	200,000	200,730	33.0	250	84.0%	15,000	D-E	125,623	250.0	8,750	297.7		
D	75,000	75,107	12.4	250	84.0%	2,500	C-D	47,000	225.0	2,500	123.8		
C	28,000	28,107	4.6	200	84.0%	2,500	B-C	21,584	167.5	1,550	76.3		
B	6,500	6,523	1.1	135	92.0%	600	A-B	6,523	135.0	325	28.6		
A	0	0	0.0	135	92.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	80,000	80,132	13.2	250	84.0%	3,000	3k-D	5,025	250.0	2,750	11.9		
TOTAL							3k-Taxi	85,132	177.3			284.5	4.7

F-14 OVERHEAD BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,295	33.0	250	86.0%	10,000	F-G	105,096	250.0	7,750	249.1		
F	95,000	95,199	15.7	250	86.0%	5,500	E-F	31,838	275.0	4,000	68.6		
E	63,304	63,361	10.4	300	88.0%	2,500	D-E	28,074	300.0	2,000	55.4		
D	35,248	35,288	5.8	300	88.0%	1,500	C-D	11,635	225.0	1,250	30.6		
C	23,624	23,653	3.9	150	88.0%	1,000	B-C	8,000	142.5	1,000	33.3		
B	15,624	15,653	2.6	135	92.0%	1,000	A-B	15,653	135.0	525	68.7		
A	0	0	0.0	135	92.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	68,587	68,668	11.3	292	87.7%	3,000	3k-E	5,306	295.8	2,750	10.6		
TOTAL							3k-Taxi	73,668	179.9			242.6	4.0

F-14 CARRIER BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,300	33.0	250	86.0%	10,000	F-G	105,096	250.0	7,750	249.1		
F	95,000	95,203	15.7	250	86.0%	5,500	E-F	31,838	275.0	4,000	68.6		
E	63,304	63,366	10.4	300	88.0%	2,500	D-E	28,107	300.0	1,650	55.5		
D	35,248	35,258	5.8	300	88.0%	800	C-D	11,628	225.0	650	30.6		
C	23,624	23,630	3.9	150	88.0%	500	B-C	8,000	142.5	500	33.3		
B	15,624	15,630	2.6	135	92.0%	500	A-B	15,630	135.0	275	68.6		
A	0	0	0.0	135	92.0%	50							
TAXI				0		0	A-TAXI	5,000	67.5		43.9		
3k AGL	68,587	68,672	11.3	292	87.7%	3,000	3k-E	5,306	295.8	2,750	10.6		
TOTAL							3k-Taxi	73,672	180.0			242.5	4.0

F-14 TOUCH AND GO PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	150	100.0%	0							
B	500	500	0.1	150	100.0%	0	A-B	500	150.0	0	2.0		
C	9,000	9,009	1.5	175	95.0%	400	B-C	8,509	162.5	200	31.0		
D	20,637	20,662	3.4	150	87.0%	1,000	C-D	11,652	162.5	700	42.5		
E	34,624	34,649	5.7	150	87.0%	1,000	D-E	13,987	150.0	1,000	55.2		
F	50,247	50,304	8.3	150	87.0%	0	E-F	15,655	150.0	500	61.8		
TOTAL	50,247	50,304	8.3					50,304	154.8			192.6	3.2

F-14 FCLP PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	150	100.0%	0							
B	500	500	0.1	150	100.0%	0	A-B	500	150.0	0	2.0		
C	9,000	9,009	1.5	175	95.0%	400	B-C	8,509	162.5	200	31.0		
D	20,637	20,648	3.4	150	87.0%	600	C-D	11,639	162.5	500	42.4		
E	34,624	34,635	5.7	150	87.0%	600	D-E	13,987	150.0	600	55.2		
F	50,247	50,270	8.3	150	87.0%	0	E-F	15,635	150.0	300	61.8		
TOTAL	50,247	50,270	8.3					50,270	154.8			192.4	3.2

TABLE D1-12. NAF EL CENTRO S-3 PROFILES (WYLE 1997)

S-3 DEPARTURE ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	96.0%	0							
B	2,000	2,000	0.3	120	100.0%	0	A-B	2,000	60.0	0	19.7		
C	11,922	11,927	2.0	200	100.0%	300	B-C	9,927	160.0	150	36.8		
D	29,861	30,068	4.9	220	85.0%	3,000	C-D	18,141	210.0	1,650	51.2		
E	90,000	90,613	14.9	220	85.0%	10,000	D-E	60,545	220.0	6,500	163.1		
F	200,000	200,613	33.0	220	85.0%	10,000	E-F	110,000	220.0	10,000	296.2		
500 FT	13,251	13,270	2.2	201	98.9%	500	C-500	1,344	200.7	400	4.0		
3k AGL	29,861	30,068	4.9	220	85.0%	3,000	D-3k	0	220.0	3,000	0.0		
TOTAL							0-500	13,270	130.0			1.01	
							500-3k	16,797	210.8				0.79

S-3 STRAIGHT IN APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
E	200,000	200,732	33.0	120	70.0%	15,000	D-E	125,623	120.0	8,750	620.2		
D	75,000	75,108	12.4	120	70.0%	2,500	C-D	47,000	120.0	2,500	232.1		
C	28,000	28,108	4.6	120	70.0%	2,500	B-C	21,593	120.0	1,500	106.6		
B	6,500	6,516	1.1	120	70.0%	500	A-B	6,516	115.0	275	33.6		
A	0	0	0.0	110	70.0%	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	80,000	80,133	13.2	120	70.0%	3,000	3k-D	5,025	120.0	2,750	24.8		
TOTAL							3k-Taxi	85,133	111.9			450.9	7.5

S-3 OVERHEAD BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,296	33.0	300	95.0%	10,000	F-G	105,096	300.0	7,750	207.6		
F	95,000	95,200	15.7	300	95.0%	5,500	E-F	31,838	300.0	4,000	62.9		
E	63,304	63,362	10.4	300	95.0%	2,500	D-E	28,074	300.0	2,000	55.4		
D	35,248	35,289	5.8	300	95.0%	1,500	C-D	5,833	250.0	1,250	13.8		
C	29,436	29,455	4.8	200	65.0%	1,000	B-C	5,812	160.0	1,000	21.5		
B	23,624	23,643	3.9	120	75.0%	1,000	A-B	23,643	115.0	525	121.8		
A	0	0	0.0	110	70.0%	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	68,587	68,669	11.3	300	95.0%	3,000	3k-E	5,306	300.0	2,750	10.5		
TOTAL							3k-Taxi	73,669	157.6			276.9	4.6

S-3 CARRIER BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,302	33.0	300	95.0%	10,000	F-G	105,096	300.0	7,750	207.6		
F	95,000	95,205	15.7	300	95.0%	5,500	E-F	31,838	300.0	4,000	62.9		
E	63,304	63,367	10.4	300	95.0%	2,500	D-E	28,107	300.0	1,650	55.5		
D	35,248	35,260	5.8	300	95.0%	800	C-D	5,820	250.0	650	13.8		
C	29,436	29,440	4.8	200	65.0%	500	B-C	5,812	160.0	500	21.5		
B	23,624	23,628	3.9	120	75.0%	500	A-B	23,628	115.0	275	121.7		
A	0	0	0.0	110	70.0%	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	68,587	68,674	11.3	300	95.0%	3,000	3k-E	5,306	300.0	2,750	10.5		
TOTAL							3k-Taxi	73,674	157.6			276.9	4.6

S-3 TOUCH AND GO PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	110	100.0%	50							
B	1,000	1,000	0.2	110	100.0%	50	A-B	1,000	110.0	50	5.4		
C	9,000	9,013	1.5	140	85.0%	500	B-C	8,013	125.0	275	38.0		
D	13,713	13,752	2.3	130	80.0%	1,000	C-D	4,739	135.0	750	20.8		
E	21,124	21,163	3.5	120	75.0%	1,000	D-E	7,411	125.0	1,000	35.1		
F	35,824	35,863	5.9	120	75.0%	1,000	E-F	14,700	120.0	1,000	72.6		
G	40,537	40,608	6.7	120	75.0%	450	F-G	4,745	120.0	725	23.4		
H	45,249	45,322	7.5	120	75.0%	325	G-H	4,714	120.0	388	23.3		
I	50,247	50,327	8.3	110	100.0%	50	H-I	5,006	115.0	188	25.8		
TOTAL	50,247	50,327	8.3					50,327	122.0			244.4	4.1

S-3 FCLP PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	110	100.0%	50							
B	1,000	1,000	0.2	110	100.0%	50	A-B	1,000	110.0	50	5.4		
C	9,000	9,013	1.5	140	85.0%	500	B-C	8,013	125.0	275	38.0		
D	13,713	13,727	2.3	130	80.0%	600	C-D	4,714	135.0	550	20.7		
E	21,124	21,138	3.5	120	75.0%	600	D-E	7,411	125.0	600	35.1		
F	35,824	35,838	5.9	120	75.0%	600	E-F	14,700	120.0	600	72.6		
G	40,537	40,553	6.7	120	75.0%	450	F-G	4,715	120.0	525	23.3		
H	45,249	45,267	7.4	120	75.0%	325	G-H	4,714	120.0	388	23.3		
I	50,247	50,272	8.3	110	100.0%	50	H-I	5,006	115.0	188	25.8		
TOTAL	50,247	50,272	8.3					50,272	122.0			244.1	4.1

TABLE D1-13. NAF EL CENTRO AV-8 PROFILES (WYLE 1997)

AV-8 DEPARTURE ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	96.0%	0							
B	2,000	2,000	0.3	120	100.0%	0	A-B	2,000	60.0	0	19.7		
C	11,922	11,927	2.0	200	100.0%	300	B-C	9,927	160.0	150	36.8		
D	29,861	30,068	4.9	220	85.0%	3,000	C-D	18,141	210.0	1,650	51.2		
E	90,000	90,613	14.9	220	85.0%	10,000	D-E	60,545	220.0	6,500	163.1		
F	200,000	200,613	33.0	220	85.0%	10,000	E-F	110,000	220.0	10,000	296.2		
500 FT	13,251	13,270	2.2	201	98.9%	500	C-500	1,344	200.7	400	4.0		
3k AGL	29,861	30,068	4.9	220	85.0%	3,000	D-3k	0	220.0	3,000	0.0		
TOTAL							0-500	13,270	130.0			1.01	
							500-3k	16,797	210.8				0.79

AV-8 STRAIGHT IN APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,479	33.0	300	75.0%	4,500	F-G	163,520	300.0	4,500	322.9		
F	36,480	36,959	6.1	300	75.0%	4,500	E-F	8,713	300.0	3,500	17.2		
E	28,000	28,247	4.6	300	75.0%	2,500	D-E	7,750	300.0	1,550	15.3		
D	20,486	20,496	3.4	300	75.0%	600	C-D	8,648	225.0	400	22.8		
C	11,847	11,848	1.9	150	65.0%	200	B-C	8,848	130.0	150	40.3		
B	3,000	3,000	0.5	110	90.0%	100	A-B	3,000	85.0	75	20.9		
A	0	0	0.0	60	90.0%	50							
TAXI				0		0	A-TAXI	5,000	30.0		98.7		
3k AGL	30,120	30,425	5.0	300	75.0%	3,000	3k-E	2,178	300.0	2,750	4.3		
TOTAL							3k-Taxi	35,425	103.7			202.4	3.4

AV-8 OVERHEAD BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,296	33.0	300	95.0%	10,000	F-G	105,096	300.0	7,750	207.6		
F	95,000	95,200	15.7	300	95.0%	5,500	E-F	31,838	300.0	4,000	62.9		
E	63,304	63,362	10.4	300	95.0%	2,500	D-E	28,074	300.0	2,000	55.4		
D	35,248	35,289	5.8	300	95.0%	1,500	C-D	5,833	250.0	1,250	13.8		
C	29,436	29,455	4.8	200	65.0%	1,000	B-C	5,812	160.0	1,000	21.5		
B	23,624	23,643	3.9	120	75.0%	1,000	A-B	23,643	115.0	525	121.8		
A	0	0	0.0	110	70.0%	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	68,587	68,669	11.3	300	95.0%	3,000	3k-E	5,306	300.0	2,750	10.5		
TOTAL							3k-Taxi	73,669	157.6			276.9	4.6

AV-8 CARRIER BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
G	200,000	200,302	33.0	300	95.0%	10,000	F-G	105,096	300.0	7,750	207.6		
F	95,000	95,205	15.7	300	95.0%	5,500	E-F	31,838	300.0	4,000	62.9		
E	63,304	63,367	10.4	300	95.0%	2,500	D-E	28,107	300.0	1,650	55.5		
D	35,248	35,260	5.8	300	95.0%	800	C-D	5,820	250.0	650	13.8		
C	29,436	29,440	4.8	200	65.0%	500	B-C	5,812	160.0	500	21.5		
B	23,624	23,628	3.9	120	75.0%	500	A-B	23,628	115.0	275	121.7		
A	0	0	0.0	110	70.0%	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	68,587	68,674	11.3	300	95.0%	3,000	3k-E	5,306	300.0	2,750	10.5		
TOTAL							3k-Taxi	73,674	157.6			276.9	4.6

AV-8 TOUCH AND GO PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	110	100.0%	50							
B	1,000	1,000	0.2	110	100.0%	50	A-B	1,000	110.0	50	5.4		
C	9,000	9,013	1.5	140	85.0%	500	B-C	8,013	125.0	275	38.0		
D	13,713	13,752	2.3	130	80.0%	1,000	C-D	4,739	135.0	750	20.8		
E	21,124	21,163	3.5	120	75.0%	1,000	D-E	7,411	125.0	1,000	35.1		
F	35,824	35,863	5.9	120	75.0%	1,000	E-F	14,700	120.0	1,000	72.6		
G	40,537	40,608	6.7	120	75.0%	450	F-G	4,745	120.0	725	23.4		
H	45,249	45,322	7.5	120	75.0%	325	G-H	4,714	120.0	388	23.3		
I	50,247	50,327	8.3	110	100.0%	50	H-I	5,006	115.0	188	25.8		
TOTAL	50,247	50,327	8.3					50,327	122.0			244.4	4.1

AV-8 FCLP PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	110	100.0%	50							
B	1,000	1,000	0.2	110	100.0%	50	A-B	1,000	110.0	50	5.4		
C	9,000	9,013	1.5	140	85.0%	500	B-C	8,013	125.0	275	38.0		
D	13,713	13,727	2.3	130	80.0%	600	C-D	4,714	135.0	550	20.7		
E	21,124	21,138	3.5	120	75.0%	600	D-E	7,411	125.0	600	35.1		
F	35,824	35,838	5.9	120	75.0%	600	E-F	14,700	120.0	600	72.6		
G	40,537	40,553	6.7	120	75.0%	450	F-G	4,715	120.0	525	23.3		
H	45,249	45,267	7.4	120	75.0%	325	G-H	4,714	120.0	388	23.3		
I	50,247	50,272	8.3	110	100.0%	50	H-I	5,006	115.0	188	25.8		
TOTAL	50,247	50,272	8.3					50,272	122.0			244.1	4.1

TABLE D1-14. NAF EL CENTRO T-45 PROFILES (WYLE 1997)

T-45 DEPARTURE ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	100.0%	0							
B	2,000	2,000	0.3	120	100.0%	0	A-B	2,000	60.0	0	19.7		
C	11,500	11,505	1.9	250	100.0%	300	B-C	9,505	185.0	150	30.4		
D	36,633	36,909	6.1	250	100.0%	4,000	C-D	25,404	250.0	2,150	60.2		
E	65,000	65,630	10.8	250	92.0%	8,500	D-E	28,722	250.0	6,250	68.1		
F	200,000	200,639	33.0	250	92.0%	10,000	E-F	135,008	250.0	9,250	320.0		
500 FT	12,859	12,878	2.1	250	100.0%	500	C-500	1,373	250.0	400	3.3		
3k AGL	29,840	30,043	4.9	250	100.0%	3,000	C-3k	18,538	250.0	1,650	43.9		
TOTAL							0-500	12,878	142.8			0.89	
							500-3k	17,165	250.0				0.68

T-45 STRAIGHT IN APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
E	200,000	200,741	33.0	250	89.0%	15,000	D-E	125,623	200.0	8,750	372.1		
D	75,000	75,118	12.4	150	89.0%	2,500	C-D	47,000	150.0	2,500	185.6		
C	28,000	28,118	4.6	150	95.0%	2,500	B-C	19,044	132.5	1,850	85.2		
B	9,000	9,073	1.5	115	95.0%	1,200	A-B	9,073	115.0	625	46.7		
A	0	0	0.0	115	95.0%	50							
TAXI				0		0	A-TAXI	5,000	57.5		51.5		
3k AGL	80,000	80,143	13.2	154	89.0%	3,000	3k-D	5,025	152.0	2,750	19.6		
TOTAL							3k-Taxi	85,143	129.8			388.7	6.5

T-45 OVERHEAD BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,311	33.0	300	95.0%	10,000	G-H	105,096	300.0	7,750	207.6		
G	95,000	95,215	15.7	300	95.0%	5,500	F-G	31,838	300.0	4,000	62.9		
F	63,304	63,377	10.4	300	95.0%	2,500	E-F	28,074	300.0	2,000	55.4		
E	35,248	35,303	5.8	300	95.0%	1,500	D-E	11,635	300.0	1,250	23.0		
D	23,624	23,669	3.9	300	95.0%	1,000	C-D	8,000	250.0	1,000	19.0		
C	15,624	15,669	2.6	200	74.0%	1,000	B-C	11,631	160.0	800	43.1		
B	4,000	4,038	0.7	120	92.0%	600	A-B	4,038	123.0	325	19.4		
A	0	0	0.0	126	100.0%	50							
TAXI				0		0	A-TAXI	5,000	63.0		47.0		
3k AGL	68,587	68,683	11.3	300	95.0%	3,000	3k-F	5,306	300.0	2,750	10.5		
TOTAL							3k-Taxi	73,683	200.8			217.4	3.6

T-45 CARRIER BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
H	200,000	200,329	33.0	300	95.0%	10,000	G-H	105,096	300.0	7,750	207.6		
G	95,000	95,232	15.7	300	95.0%	5,500	F-G	31,838	300.0	4,000	62.9		
F	63,304	63,395	10.4	300	95.0%	2,500	E-F	28,107	300.0	1,650	55.5		
E	35,248	35,287	5.8	300	95.0%	800	D-E	11,624	300.0	800	23.0		
D	23,624	23,663	3.9	300	95.0%	800	C-D	8,000	250.0	800	19.0		
C	15,624	15,663	2.6	200	74.0%	800	B-C	11,626	160.0	700	43.1		
B	4,000	4,038	0.7	120	92.0%	600	A-B	4,038	123.0	325	19.4		
A	0	0	0.0	126	100.0%	50							
TAXI				0		0	A-TAXI	5,000	63.0		47.0		
3k AGL	68,587	68,701	11.3	300	95.0%	3,000	3k-F	5,306	300.0	2,750	10.5		
TOTAL							3k-Taxi	73,701	200.8			217.4	3.6

T-45 TOUCH AND GO PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	115	100.0%	50							
B	500	500	0.1	126	100.0%	50	A-B	500	120.5	50	2.5		
C	9,000	9,004	1.5	130	100.0%	300	B-C	8,504	128.0	175	39.4		
D	20,637	20,662	3.4	120	95.0%	1,000	C-D	11,658	125.0	650	55.3		
E	34,624	34,649	5.7	115	92.0%	1,000	D-E	13,987	117.5	1,000	70.5		
F	46,248	46,291	7.6	115	92.0%	350	E-F	11,642	115.0	675	60.0		
G	50,247	50,301	8.3	115	90.0%	50	F-G	4,010	115.0	200	20.7		
TOTAL	50,247	50,301	8.3					50,301	120.1			248.2	4.1

T-45 FCLP PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	115	100.0%	50							
B	500	500	0.1	126	100.0%	50	A-B	500	120.5	50	2.5		
C	9,000	9,004	1.5	130	100.0%	300	B-C	8,504	128.0	175	39.4		
D	20,637	20,645	3.4	120	95.0%	600	C-D	11,641	125.0	450	55.2		
E	34,624	34,632	5.7	115	92.0%	600	D-E	13,987	117.5	600	70.5		
F	46,248	46,258	7.6	115	92.0%	350	E-F	11,627	115.0	475	59.9		
G	50,247	50,268	8.3	115	90.0%	50	F-G	4,010	115.0	200	20.7		
TOTAL	50,247	50,268	8.3					50,268	120.1			248.1	4.1

TABLE D1-15. NAF EL CENTRO E-2C PROFILES (WYLE 1997)

E-2C DEPARTURE ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	3,800	0							
B	5,000	5,000	0.8	125	4,650	0	A-B	5,000	62.5	0	47.4		
C	28,000	28,135	4.6	200	4,650	2,500	B-C	23,135	162.5	1,250	84.4		
D	37,000	37,149	6.1	200	4,600	3,000	C-D	9,014	200.0	2,750	26.7		
E	67,000	67,216	11.1	160	4,600	5,000	D-E	30,067	180.0	4,000	99.0		
F	200,000	200,310	33.0	160	4,600	10,000	E-F	133,094	160.0	7,500	492.9		
500 FT	9,600	9,627	1.6	140	4,650	500	B-500	4,627	132.5	250	20.7		
3k AGL	37,000	37,149	6.1	200	4,600	3,000	D-3k	0	200.0	3,000	0.0		
TOTAL							0-500	9,627	83.8			1.13	
							500-3k	27,522	180.5				1.51

E-2C STRAIGHT IN APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
D	200,000	200,129	32.9	250	3,500	5,000	C-D	143,622	225.0	3,750	378.2		
C	56,400	56,507	9.3	200	2,000	2,500	B-C	28,400	160.0	2,500	105.2		
B	28,000	28,107	4.6	120	1,500	2,500	A-B	28,107	115.0	1,275	144.8		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	85,120	85,231	14.0	210	2,300	3,000	3k-C	28,724	205.0	2,750	83.0		
TOTAL							3k-Taxi	90,231	138.2			386.9	6.4

E-2C OVERHEAD BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,125	32.9	260	2,500	5,000	E-F	159,861	260.0	3,250	364.3		
E	40,177	40,264	6.6	260	3,500	1,500	D-E	17,027	255.0	1,500	39.6		
D	23,150	23,237	3.8	250	3,500	1,500	C-D	10,437	187.5	1,250	33.0		
C	12,725	12,800	2.1	125	1,250	1,000	B-C	6,712	122.5	1,000	32.5		
B	6,013	6,088	1.0	120	1,100	1,000	A-B	6,088	115.0	525	31.4		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	108,673	108,776	17.9	260	3,071	3,000	3k-E	68,512	260.0	2,250	156.1		
TOTAL							3k-Taxi	113,776	194.6			346.4	5.8

E-2C CARRIER BREAK APPROACH TO 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,108	32.9	260	2,500	5,000	E-F	159,861	260.0	3,250	364.3		
E	40,177	40,247	6.6	260	3,500	1,500	D-E	17,027	255.0	1,500	39.6		
D	23,150	23,220	3.8	250	3,500	1,500	C-D	10,448	187.5	1,150	33.0		
C	12,725	12,772	2.1	125	1,250	800	B-C	6,712	122.5	800	32.5		
B	6,013	6,060	1.0	120	1,100	800	A-B	6,060	115.0	425	31.2		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	108,673	108,759	17.9	260	3,071	3,000	3k-E	68,512	260.0	2,250	156.1		
TOTAL							3k-Taxi	113,759	194.7			346.2	5.8

E-2C TOUCH AND GO PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	110	4,650	0							
B	6,250	6,301	1.0	125	4,650	800	A-B	6,301	117.5	400	31.8		
C	15,675	15,728	2.6	130	1,300	1,000	B-C	9,427	127.5	900	43.8		
D	34,183	34,236	5.6	120	1,200	1,000	C-D	18,508	125.0	1,000	87.7		
E	43,932	43,987	7.2	120	1,100	800	D-E	9,751	120.0	900	48.1		
F	50,932	51,033	8.4	110	1,200	0	E-F	7,046	115.0	400	36.3		
TOTAL	50,932	51,033	8.4					51,033	122.0			247.7	4.1

E-2C FCLP PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	110	4,650	0							
B	6,250	6,270	1.0	125	4,650	500	A-B	6,270	117.5	250	31.6		
C	15,675	15,695	2.6	130	1,300	600	B-C	9,426	127.5	550	43.8		
D	34,183	34,203	5.6	120	1,200	600	C-D	18,508	125.0	600	87.7		
E	43,932	43,953	7.2	120	1,100	500	D-E	9,750	120.0	550	48.1		
F	50,932	50,971	8.4	110	1,200	0	E-F	7,018	115.0	250	36.2		
TOTAL	50,932	50,971	8.4					50,971	122.1			247.4	4.1

E-2C ACLS PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	ACLS Time (Sec)	ACLS Time (Min)
A	0	0	0.0	110	4,650	0							
B	7,530	7,596	1.3	130	3,500	1,000	A-B	7,596	120.0	500	37.5		
C	21,875	21,950	3.6	130	2,000	1,500	B-C	14,354	130.0	1,250	65.4		
D	32,960	33,080	5.4	120	1,200	2,500	C-D	11,130	125.0	2,000	52.8		
E	42,825	42,945	7.1	120	1,200	2,500	D-E	9,865	120.0	2,500	48.7		
F	66,271	66,391	10.9	120	1,100	2,500	E-F	23,446	120.0	2,500	115.8		
G	78,873	78,993	13.0	120	1,100	2,500	F-G	12,602	120.0	2,500	62.2		
H	107,871	108,098	17.8	110	1,200	0	G-H	29,106	115.0	1,250	150.0		
TOTAL	107,871	108,098	17.8					108,098	120.3			532.3	8.9

E-2C GCA BOX PATTERN ON 26, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	GCA Time (Sec)	GCA Time (Min)
A	0	0	0.0	110	4,650	0							
B	7,530	7,596	1.3	130	3,500	1,000	A-B	7,596	120.0	500	37.5		
C	21,875	21,950	3.6	130	2,000	1,500	B-C	14,354	130.0	1,250	65.4		
D	32,960	33,080	5.4	120	1,200	2,500	C-D	11,130	125.0	2,000	52.8		
E	42,825	42,945	7.1	120	1,200	2,500	D-E	9,865	120.0	2,500	48.7		
F	66,271	66,391	10.9	120	1,100	2,500	E-F	23,446	120.0	2,500	115.8		
G	78,873	78,993	13.0	120	1,100	2,500	F-G	12,602	120.0	2,500	62.2		
H	107,871	108,098	17.8	110	1,200	0	G-H	29,106	115.0	1,250	150.0		
TOTAL	107,871	108,098	17.8					108,098	120.3			532.3	8.9

TABLE D1-16. NAF EL CENTRO UH-1 PROFILES (WYLE 1997)

UH-1 DEPARTURE, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	40	100%	0							
B	200	206	0.0	40	100%	50	A-B	206	40.0	25	3.1		
C	2,000	2,012	0.3	70	100%	200	B-C	1,806	55.0	125	19.5		
D	15,000	15,136	2.5	100	100%	2,000	C-D	13,124	85.0	1,100	91.5		
E	200,000	200,161	32.9	100	100%	5,000	D-E	185,024	100.0	3,500	1,096.2		
500 FT	4,167	4,200	0.7	75	100%	500	C-500	2,187	72.5	350	17.9		
3k AGL	76,667	76,811	12.6	100	100%	3,000	D-3k	61,675	100.0	2,500	365.4		
TOTAL							0-500	4,200	61.6			0.67	
							500-3k	72,611	98.0				7.32

UH-1 APPROACH, NAF EL CENTRO

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
D	200,000	200,076	32.9	100	100%	5,000	C-D	190,048	92.5	2,875	1,217.3		
C	10,000	10,028	1.7	85	100%	750	B-C	9,017	77.5	475	68.9		
B	1,000	1,011	0.2	70	100%	200	A-B	1,011	55.0	125	10.9		
A	0	0	0.0	40	100%	50							
TAXI				0		0	A-TAXI	50	12.5		2.4		
3k AGL	110,588	110,641	18.2	93	100%	3,000	3k-C	100,613	89.0	1,875	670.0		
TOTAL							3k-Taxi	110,691	87.2			752.2	12.5

TABLE D1-17. NAS LEMOORE E-2C PROFILES (WYLE 1994)

E-2C DEPARTURES (ALL RUNWAYS), NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	3,800	0							
B	5,000	5,000	0.8	125	4,650	0	A-B	5,000	62.5	0	47.4		
C	28,000	28,135	4.6	155	4,650	2,500	B-C	23,135	140.0	1,250	97.9		
D	37,000	37,149	6.1	155	4,600	3,000	C-D	9,014	155.0	2,750	34.5		
E	67,000	67,216	11.1	155	4,600	5,000	D-E	30,067	155.0	4,000	114.9		
F	250,000	250,284	41.2	155	2,000	10,000	E-F	183,068	155.0	7,500	699.8		
500 FT	9,600	9,627	1.6	131	4,650	500	B-500	4,627	128.0	250	21.4		
3k AGL	37,000	37,149	6.1	155	4,600	3,000	D-3k	0	155.0	3,000	0.0		
TOTAL							0-500	9,627	82.9			1.15	
							500-3k	27,522	147.0				1.85

E-2C STRAIGHT IN APPROACH (ALL RUNWAYS), NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
C	200,000	200,066	32.9	150	1,200	5,000	B-C	172,542	135.0	3,100	757.2		
B	27,500	27,524	4.5	120	1,200	1,200	A-B	27,524	120.0	625	135.9		
A	0	0	0.0	120	1,200	50							
TAXI				0		0	A-TAXI	5,000	60.0		49.4		
3k AGL	109,211	109,254	18.0	134	1,200	3,000	3k-B	81,730	127.1	2,100	381.0		
TOTAL							3k-Taxi	114,254	119.5			566.2	9.4

E-2C OVERHEAD BREAK APPROACH (ALL RUNWAYS), NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,306	33.0	260	2,000	10,000	E-F	140,757	260.0	5,750	320.8		
E	59,500	59,550	9.8	260	3,500	1,500	D-E	18,100	255.0	1,500	42.1		
D	41,400	41,450	6.8	250	3,500	1,500	C-D	17,707	187.5	1,250	56.0		
C	23,700	23,742	3.9	125	1,250	1,000	B-C	13,100	122.5	1,000	63.4		
B	10,600	10,642	1.8	120	1,100	1,000	A-B	10,642	115.0	525	54.8		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	84,294	84,389	13.9	260	3,235	3,000	3k-E	24,839	260.0	2,250	56.6		
TOTAL							3k-Taxi	89,389	162.1			326.7	5.4

E-2C TOUCH AND GO PATTERN (ALL RUNWAYS), NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	120	4,650	50							
B	17,000	17,017	2.8	125	3,500	800	A-B	17,017	122.5	425	82.3		
C	30,200	30,218	5.0	130	1,300	1,000	B-C	13,202	127.5	900	61.3		
D	41,000	41,018	6.8	120	1,200	1,000	C-D	10,800	125.0	1,000	51.2		
E	58,300	58,319	9.6	120	1,100	800	D-E	17,301	120.0	900	85.4		
F	69,389	69,434	11.4	120	1,200	50	E-F	11,114	120.0	425	54.9		
TOTAL	69,389	69,434	11.4					69,434	122.8			335.1	5.6

E-2C FCLP PATTERN (ALL RUNWAYS), NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	120	4,650	50							
B	7,000	7,040	1.2	125	3,500	800	A-B	7,040	122.5	425	34.0		
C	20,200	20,242	3.3	130	1,300	1,000	B-C	13,202	127.5	900	61.3		
D	25,700	25,742	4.2	120	1,200	1,000	C-D	5,500	125.0	1,000	26.1		
E	37,800	37,843	6.2	120	1,100	800	D-E	12,102	120.0	900	59.8		
F	48,389	48,459	8.0	120	1,200	50	E-F	10,616	120.0	425	52.4		
TOTAL	48,389	48,459	8.0					48,459	122.9			233.6	3.9

E-2C GCA BOX PATTERN ON 2L, NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	GCA Time (Sec)	GCA Time (Min)
A	0	0	0.0	120	4,650	50							
B	13,500	13,533	2.2	125	3,500	1,000	A-B	13,533	122.5	525	65.5		
C	44,200	44,270	7.3	130	1,300	2,500	B-C	30,737	127.5	1,750	142.8		
D	75,200	75,270	12.4	120	1,200	2,500	C-D	31,000	125.0	2,500	146.9		
E	127,400	127,480	21.0	120	1,100	1,500	D-E	52,210	120.0	2,000	257.8		
F	185,389	185,487	30.5	120	1,200	50	E-F	58,007	120.0	775	286.4		
TOTAL	185,389	185,487	30.5					185,487	122.2			899.4	15.0

E-2C GCA BOX PATTERN ON 2R, NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	GCA Time (Sec)	GCA Time (Min)
A	0	0	0.0	120	4,650	50							
B	13,500	13,533	2.2	125	3,500	1,000	A-B	13,533	122.5	525	65.5		
C	50,200	50,264	8.3	130	1,300	2,500	B-C	36,731	127.5	1,750	170.7		
D	82,700	82,764	13.6	120	1,200	2,500	C-D	32,500	125.0	2,500	154.0		
E	142,400	142,472	23.4	120	1,100	1,500	D-E	59,708	120.0	2,000	294.8		
F	203,389	203,479	33.5	120	1,200	50	E-F	61,006	120.0	775	301.2		
TOTAL	203,389	203,479	33.5					203,479	122.2			986.2	16.4

MEAN OF E-2C GCA BOX PATTERNS, NAS LEMOORE

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	GCA Time (Sec)	GCA Time (Min)
2L		76.8%						185,487			899.4		15.0
2R		23.2%						203,479			986.2		16.4
MEAN								189,667	122.2			919.6	15.3

TABLE D1-18. NAS NORTH ISLAND E-2C PROFILES (WYLE 1996)

E-2C DEPARTURES (ALL RUNWAYS), NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Takeoff Time (Min)	Climbout Time (Min)
A	0	0	0.0	0	3,800	0							
B	5,000	5,000	0.8	125	4,650	0	A-B	5,000	62.5	0	47.4		
C	28,000	28,135	4.6	200	4,650	2,500	B-C	23,135	162.5	1,250	84.4		
D	37,000	37,149	6.1	200	4,600	3,000	C-D	9,014	200.0	2,750	26.7		
E	67,000	67,216	11.1	160	4,600	5,000	D-E	30,067	180.0	4,000	99.0		
F	200,000	200,310	33.0	160	2,000	10,000	E-F	133,094	160.0	7,500	492.9		
500 FT	9,600	9,627	1.6	140	4,650	500	B-500	4,627	132.5	250	20.7		
3k AGL	37,000	37,149	6.1	200	4,600	3,000	D-3k	0	200.0	3,000	0.0		
TOTAL							0-500	9,627	83.8			1.13	
							500-3k	27,522	180.5				1.51

E-2C STRAIGHT IN APPROACH TO 18, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
D	200,000	200,075	32.9	150	2,500	5,000	C-D	143,572	140.0	3,750	607.6		
C	56,450	56,503	9.3	130	2,000	2,500	B-C	28,979	125.0	1,850	137.4		
B	27,500	27,524	4.5	120	1,500	1,200	A-B	27,524	115.0	625	141.8		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	85,160	85,218	14.0	134	2,100	3,000	3k-B	28,714	132.0	2,750	128.9		
TOTAL							3k-Taxi	90,218	115.7			461.9	7.7

E-2C STRAIGHT IN APPROACH TO 29, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
C	200,000	200,066	32.9	150	2,500	5,000	B-C	172,542	135.0	3,100	757.2		
B	27,500	27,524	4.5	120	1,500	1,200	A-B	27,524	115.0	625	141.8		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	109,211	109,254	18.0	134	1,974	3,000	3k-B	81,730	127.1	2,100	381.0		
TOTAL							3k-Taxi	114,254	117.4			576.6	9.6

E-2C STRAIGHT IN APPROACH TO 36, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% rpm)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
C	200,000	200,066	32.9	150	2,500	5,000	B-C	172,542	135.0	3,100	757.2		
B	27,500	27,524	4.5	120	1,500	1,200	A-B	27,524	115.0	625	141.8		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	109,211	109,254	18.0	134	1,974	3,000	3k-B	81,730	127.1	2,100	381.0		
TOTAL							3k-Taxi	114,254	117.4			576.6	9.6

MEAN OF E-2C STRAIGHT IN APPROACHES, NAS NORTH ISLAND

RUNWAY	RUNWAY USE	SEGMENT	SEGMENT LENGTH (FT)	MEAN SPEED (KNOTS)	MEAN ALTITUDE (FT)	TIME ON SEGMENT (SEC)	APPROACH TIME (SEC)	APPROACH TIME (MIN)
18	5.8%	3k-50	85,218			408.0		7.7
29	78.8%	3k-50	109,254			522.8		9.6
36	15.4%	3k-50	109,254			522.8		9.6
		50-TAXI	5,000			53.9		
MEAN		3k-Taxi	112,868	117.3			570.0	9.5

E-2C GCA APPROACH TO 29, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
E	250,000	250,061	41.2	150	1,800	3,000	D-E	50,002	150.0	2,750	197.5		
D	200,000	200,059	32.9	150	1,800	2,500	C-D	156,825	135.0	2,400	688.3		
C	43,175	43,234	7.1	120	1,200	2,300	B-C	12,271	120.0	1,988	60.6		
B	30,920	30,963	5.1	120	1,200	1,675	A-B	30,963	115.0	863	159.5		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	250,000	250,061	41.2	150	1,800	3,000	3k-E	0	150.0	3,000	0.0		
TOTAL							3k-Taxi	255,061	130.3			1,159.7	19.3

E-2C GCA APPROACH TO 36, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
E	250,000	250,035	41.2	150	1,800	3,000	D-E	50,002	150.0	2,750	197.5		
D	200,000	200,032	32.9	150	1,800	2,500	C-D	162,028	135.0	2,000	711.1		
C	37,975	38,004	6.3	120	1,200	1,500	B-C	27,490	120.0	1,050	135.7		
B	10,500	10,514	1.7	120	1,200	600	A-B	10,514	115.0	325	54.2		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	250,000	250,035	41.2	150	1,800	3,000	3k-E	0	150.0	3,000	0.0		
TOTAL							3k-Taxi	255,035	131.1			1,152.4	19.2

MEAN OF E-2C GCA APPROACHES, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	GCA Time (Sec)	GCA Time (Min)
29		86.5%					3k-50	250,061			1,105.9		19.3
36		13.5%					3k-50	250,035			1,098.5		19.2
							50-TAXI	5,000			53.9		
MEAN							3k-Taxi	255,058	130.4			1,158.7	19.3

E-2C OVERHEAD BREAK APPROACH ON 29, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	Approach Time (Sec)	Approach Ti me (Min)
F	200,000	200,125	32.9	260	2,500	5,000	E-F	159,861	260.0	3,250	364.3		
E	40,177	40,264	6.6	260	3,500	1,500	D-E	17,027	255.0	1,500	39.6		
D	23,150	23,237	3.8	250	3,500	1,500	C-D	10,437	187.5	1,250	33.0		
C	12,725	12,800	2.1	125	1,250	1,000	B-C	6,712	122.5	1,000	32.5		
B	6,013	6,088	1.0	120	1,100	1,000	A-B	6,088	115.0	525	31.4		
A	0	0	0.0	110	1,200	50							
TAXI				0		0	A-TAXI	5,000	55.0		53.9		
3k AGL	108,673	108,776	17.9	260	3,071	3,000	3k-E	68,512	260.0	2,250	156.1		
TOTAL							3k-Taxi	113,776	194.6			346.4	5.8

E-2C TOUCH AND GO PATTERN ON 29, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	T&G Time (Sec)	T&G Time (Min)
A	0	0	0.0	120	4,650	50							
B	6,250	6,295	1.0	125	4,650	800	A-B	6,295	122.5	425	30.4		
C	15,675	15,722	2.6	130	1,300	1,000	B-C	9,427	127.5	900	43.8		
D	20,200	20,247	3.3	120	1,200	1,000	C-D	4,525	125.0	1,000	21.4		
E	29,438	29,487	4.9	120	1,100	800	D-E	9,240	120.0	900	45.6		
F	36,949	37,035	6.1	120	1,200	50	E-F	7,548	120.0	425	37.3		
TOTAL	36,949	37,035	6.1					37,035	122.9			178.6	3.0

E-2C FCLP PATTERN ON 29, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (% RPM)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	FCLP Time (Sec)	FCLP Time (Min)
A	0	0	0.0	110	4,650	50							
B	5,412	5,431	0.9	125	4,650	500	A-B	5,431	117.5	275	27.4		
C	10,125	10,145	1.7	130	1,300	600	B-C	4,714	127.5	550	21.9		
D	11,875	11,895	2.0	120	1,200	600	C-D	1,750	125.0	600	8.3		
E	18,338	18,359	3.0	120	1,100	500	D-E	6,464	120.0	550	31.9		
F	25,849	25,883	4.3	110	1,200	50	E-F	7,524	115.0	275	38.8		
TOTAL	25,849	25,883	4.3					25,883	119.6			128.3	2.1

E-2C GCA BOX PATTERN ON 29, NAS NORTH ISLAND

Node	Cumulative Feet Ground	Cumulative Feet Slant	Nautical Miles	Speed (Knots)	Power (EHP)	Altitude AGL (Ft)	Segment	Segment Length (Ft)	Mean Speed (Knots)	Mean Altitude (Ft)	Time On Segment (Sec)	GCA Time (Sec)	GCA Time (Min)
A	0	0	0.0	110	4,650	0							
B	7,530	7,596	1.3	130	3,500	1,000	A-B	7,596	120.0	500	37.5		
C	21,875	21,950	3.6	130	2,000	1,500	B-C	14,354	130.0	1,250	65.4		
D	32,960	33,064	5.4	120	1,200	2,300	C-D	11,114	125.0	1,900	52.7		
E	42,825	42,929	7.1	120	1,200	2,300	D-E	9,865	120.0	2,300	48.7		
F	82,288	82,392	13.6	120	1,100	2,300	E-F	39,463	120.0	2,300	194.8		
G	90,455	90,577	14.9	120	1,100	1,750	F-G	8,185	120.0	2,025	40.4		
H	123,888	124,056	20.4	110	1,200	0	G-H	33,479	115.0	875	172.5		
TOTAL	123,888	124,056	20.4					124,056	120.1			612.0	10.2

Table D1-18, page 4 of 4

Data Sources For Tables D1-6 Through D1-18:

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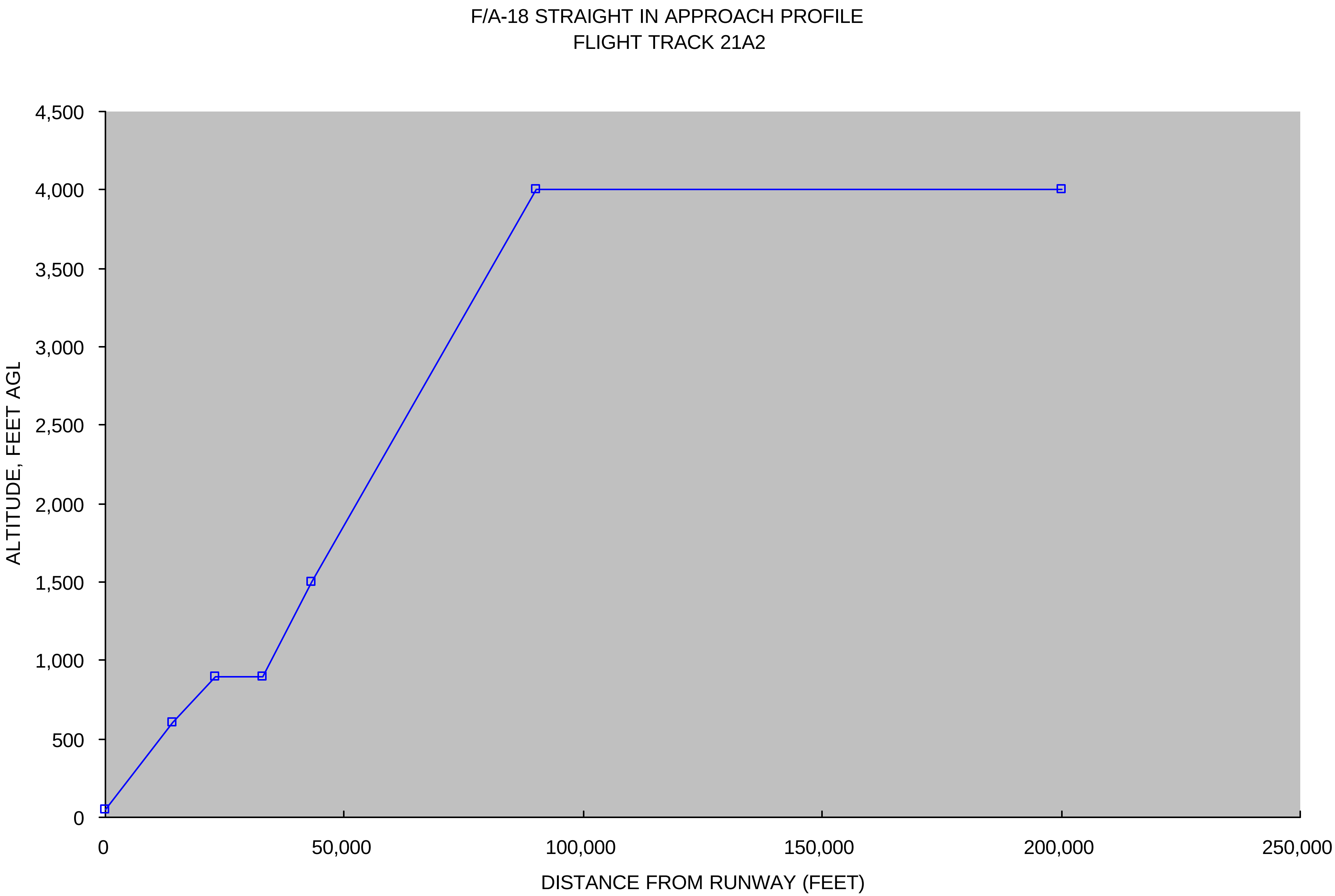
F/A-18 STRAIGHT IN APPROACH PROFILE
FLIGHT TRACK 21A2
ALTITUDE, FEET AGL
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
0
50,000
100,000
150,000
200,000
250,000
DISTANCE FROM RUNWAY (FEET)

TABLE D1-19. SUMMARY OF MEAN DISTANCE ESTIMATES FROM WYLE FLIGHT TRACK PROFILES

Aircraft Type	Airfield	MEAN DISTANCE ESTIMATES (NAUTICAL MILES)									
		Takeoff	Climbout	Straigh In Landing	Overhead Break Landing	Carrier Break Landing	GCA Landing	T&G Pattern	FCLP Pattern	ACLS Pattern	GCA BOX Pattern
F/A-18	NAWS CHINA LAKE	1.24	4.03	12.37	21.64			6.48	6.47		
	NAF EL CENTRO	1.23	2.34	14.01	12.12	12.12		8.28	8.27		
A-6	NAWS CHINA LAKE	0.91	3.83	12.35	21.96			6.48	6.47		
AV-8B	NAWS CHINA LAKE	1.38	7.50	12.62	20.65			6.21			
	NAF EL CENTRO	2.18	2.76	5.83	12.12	12.13		8.28	8.27		
A-4	NAWS CHINA LAKE	1.32	3.60	12.50	21.64			6.46			
F-14	NAF EL CENTRO	0.88	4.46	14.01	12.12	12.12		8.28	8.27		
S-3	NAF EL CENTRO	2.18	2.76	14.01	12.12	12.13		8.28	8.27		
T-45	NAF EL CENTRO	2.12	2.82	14.01	12.13	12.13		8.28	8.27		
E-2C	NAF EL CENTRO	1.58	4.53	14.85	18.73	18.72		8.40	8.39	17.79	17.79
	NAS LEMOORE	1.58	4.53	18.80	14.71			11.43	7.98		31.22
	NAS NORTH ISLAND	1.58	4.53	18.58	18.73		41.98	6.10	4.26		20.42
UH-1	NAF EL CENTRO	0.69	11.95	18.22							

Flight track profiles are from Noise Study Reports prepared by Wyle Laboratories (Wyle Research 1994, 1995, 1996, 1997).
Takeoff = start of takeoff roll to 500 feet AGL
Climbout = 500 feet AGL to 3,000 feet AGL
Landing = 3,000 feet AGL to turn from active runway
Aircraft landings include a 5,000 foot segment for 50 feet AGL to the turn from the active runway.
Helicopter landings include a 50 foot descent to touchdown, with the final 25 feet at 2.5 knots.

TABLE D1-20. SUMMARY OF MEAN AIR SPEED ESTIMATES FROM WYLE FLIGHT TRACK PROFILES

AIRCRAFT TYPE	AIRFIELD	MEAN AIR SPEED ESTIMATES (KNOTS)									
		TAKEOFF	CLIMBOUT	STRAIGHT IN LANDING	OVERHEAD BREAK LANDING	CARRIER BREAK LANDING	GCA LANDING	T&G PATTERN	FCLP PATTERN	ACLS PATTERN	GCA BOX PATTERN
F/A-18	NAWS CHINA LAKE	98	292	146	249			140	140		
	NAF EL CENTRO	100	271	182	188	188		152	152		
A-6	NAWS CHINA LAKE	110	185	180	207			144	144		
AV-8B	NAWS CHINA LAKE	94	299	173	217			149			
	NAF EL CENTRO	130	211	104	158	158		122	122		
A-4	NAWS CHINA LAKE	109	222	163	234			141			
F-14	NAF EL CENTRO	96	244	177	180	180		155	155		
S-3	NAF EL CENTRO	130	211	112	158	158		122	122		
T-45	NAF EL CENTRO	143	250	130	201	201		120	120		
E-2C	NAF EL CENTRO	84	180	138	195	195		122	122	120	120
	NAS LEMOORE	83	147	120	162			123	123		122
	NAS NORTH ISLAND	84	180	117	195		130	123	120		120
UH-1	NAF EL CENTRO	62	98	87							

Flight track profiles are from Noise Study Reports prepared by Wyle Laboratories (Wyle Research 1994, 1995, 1996, 1997).
Takeoff = start of takeoff roll to 500 feet AGL
Climbout = 500 feet AGL to 3,000 feet AGL
Landing = 3,000 feet AGL to turn from active runway
Aircraft landings include a 5,000 foot segment for 50 feet AGL to the turn from the active runway.
Helicopter landings include a 50 foot descent to touchdown, with the final 25 feet at 2.5 knots.

TABLE D1-21. SUMMARY OF TIME-IN-MODE ESTIMATES FROM WYLE FLIGHT TRACK PROFILES

		TIME-IN-MODE ESTIMATE (MINUTES)									
Aircraft Type	Airfield	Takeoff	Climbout	Straight In Landing	Overhead Break Landing	Carrier Break Landing	GCA Landing	T&G Pattern	FCLP Pattern	ACLS Pattern	GCA BOX Pattern
F/A-18	NAWS CHINA LAKE	0.76	0.83	5.10	5.21			2.78	2.78		
	NAF EL CENTRO	0.74	0.52	4.62	3.87	3.87		3.26	3.26		
A-6	NAWS CHINA LAKE	0.50	1.24	4.13	6.36			2.69	2.69		
AV-8B	NAWS CHINA LAKE	0.88	1.50	4.37	5.71			2.49			
	NAF EL CENTRO	1.01	0.79	3.37	4.62	4.62		4.07	4.07		
A-4	NAWS CHINA LAKE	0.73	0.97	4.61	5.55			2.75			
F-14	NAF EL CENTRO	0.55	1.10	4.74	4.04	4.04		3.21	3.21		
S-3	NAF EL CENTRO	1.01	0.79	7.52	4.62	4.62		4.07	4.07		
T-45	NAF EL CENTRO	0.89	0.68	6.48	3.62	3.62		4.14	4.13		
E-2C	NAF EL CENTRO	1.13	1.51	6.45	5.77	5.77		4.13	4.12	8.87	8.87
	NAS LEMOORE	1.15	1.85	9.44	5.44			5.59	3.89		15.33
	NAS NORTH ISLAND	1.13	1.51	9.50	5.77		19.31	2.98	2.14		10.20
UH-1	NAF EL CENTRO	0.67	7.32	12.54							

Flight track profiles are from Noise Study Reports prepared by Wyle Laboratories (Wyle Research 1994, 1995, 1996, 1997).
Takeoff = start of takeoff roll to 500 feet AGL
Climbout = 500 feet AGL to 3,000 feet AGL
Landing = 3,000 feet AGL to turn from active runway
Time estimates for aircraft landings include a 5,000 foot segment for 50 feet AGL to the turn from the active runway.
Time estimates for helicopter landings include a 50 foot descent to touchdown, with the final 25 feet at 2.5 knots.

TABLE D1-22. CALCULATION OF TIME-IN-MODE ESTIMATES FOR AIRCRAFT USING ARMITAGE AIRFIELD

Aircraft Type	Flight Track Segment Length (Nautical Miles)					Average Air Speed Estimate (Knots)					Resulting Time in Mode Estimate (Minutes)				
	Takeoff	Climbout	Landing	OB Lndg	Pattern	Takeoff	Climbout	Landing	OB Lndg	Pattern	Takeoff	Climbout	Landing	OB Lndg	Pattern
F/A-18	1.24	4.03	12.37	21.64	6.48	98	292	146	249	140	0.76	0.83	5.08	5.21	2.78
AV-8B	1.38	7.50	12.62	20.65	6.21	94	299	173	217	149	0.88	1.51	4.38	5.71	2.50
A-6	0.91	3.83	12.35	21.96	6.48	110	185	180	207	144	0.50	1.24	4.12	6.37	2.70
EA-6B	0.91	3.83	12.35	21.96	6.48	110	185	180	207	144	0.50	1.24	4.12	6.37	2.70
F-3	1.24	4.03	12.37	NA	6.48	98	292	146	NA	140	0.76	0.83	5.08	NA	2.78
F-15	1.20	4.00	12.37	NA	6.48	100	300	150	NA	140	0.72	0.80	4.95	NA	2.78
F-16	1.20	4.00	12.37	NA	6.48	100	300	150	NA	140	0.72	0.80	4.95	NA	2.78
F-4	1.20	4.00	12.37	NA	6.48	98	292	146	NA	140	0.73	0.82	5.08	NA	2.78
F-86	1.20	4.50	12.37	NA	6.48	95	275	150	NA	140	0.76	0.98	4.95	NA	2.78
T-38	0.90	3.60	12.37	NA	6.48	100	275	150	NA	140	0.54	0.79	4.95	NA	2.78
T-39D	0.90	3.60	12.37	NA	6.48	95	275	150	NA	140	0.57	0.79	4.95	NA	2.78
C-9B	1.60	4.50	12.37	NA	6.48	95	185	150	NA	140	1.01	1.46	4.95	NA	2.78
UC-8A	1.60	4.50	12.37	NA	6.48	85	150	120	NA	120	1.13	1.80	6.19	NA	3.24
UC-12B	1.60	4.50	12.37	NA	6.48	85	150	120	NA	120	1.13	1.80	6.19	NA	3.24
U-21	1.60	4.50	12.37	NA	6.48	85	150	120	NA	120	1.13	1.80	6.19	NA	3.24
T-34	1.60	6.00	12.37	NA	6.48	80	140	120	NA	120	1.20	2.57	6.19	NA	3.24
MU-2	1.60	4.50	12.37	NA	6.48	85	150	120	NA	120	1.13	1.80	6.19	NA	3.24
OV-10	1.60	4.50	12.37	NA	6.48	85	150	120	NA	120	1.13	1.80	6.19	NA	3.24
OV-1	1.20	4.50	12.37	NA	6.48	85	150	120	NA	120	0.85	1.80	6.19	NA	3.24
P-3	1.60	4.50	12.37	NA	6.48	90	160	125	NA	120	1.07	1.69	5.94	NA	3.24
C-130H	1.60	6.00	12.37	NA	6.48	85	150	120	NA	120	1.13	2.40	6.19	NA	3.24
AH-1W	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18

TABLE D1-22. CALCULATION OF TIME-IN-MODE ESTIMATES FOR AIRCRAFT USING ARMITAGE AIRFIELD

Aircraft Type	Flight Track Segment Length (Nautical Miles)					Average Air Speed Estimate (Knots)					Resulting Time in Mode Estimate (Minutes)				
	Takeoff	Climbout	Landing	OB Lndg	Pattern	Takeoff	Climbout	Landing	OB Lndg	Pattern	Takeoff	Climbout	Landing	OB Lndg	Pattern
AH-64	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18
CH-46	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18
CH-53E	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18
UH-1L	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18
HH-1N	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18
OH-58	0.70	7.50	12.37	NA	6.48	40	75	75	NA	75	1.05	6.00	9.90	NA	5.18
Beechcraft	1.60	7.50	12.37	NA	6.48	70	110	100	NA	100	1.37	4.09	7.42	NA	3.89
Cessna	1.60	7.50	12.37	NA	6.48	70	90	90	NA	90	1.37	5.00	8.25	NA	4.32
Mooney	1.60	7.50	12.37	NA	6.48	70	110	100	NA	100	1.37	4.09	7.42	NA	3.89
Gulfstream	1.60	7.50	12.37	NA	6.48	70	95	90	NA	90	1.37	4.74	8.25	NA	4.32

Takeoff = start of takeoff roll to 500 feet AGL (EPA default definition)
Climbout = 500 feet AGL to 3,000 feet AGL (EPA default definition); see below for treatment of helicopters
Landing = staight-in approach and landing, 3,000 feet AGL to turn from active runway (EPA default definition); see below for treatment of helicopters
OB Lndng = overhead break approach and landing, 3,000 feet AGL to turn from active runway (EPA default definition)
Pattern = touch-and-go or field carrier landing practice (FCLP) pattern cycle

Flight track segment length estimates and average flight speeds for F/A-18, AV-8B, A-6, and EA-6B aircraft are based on flight track profiles in Wyle (1995).
All other flight track segment length and flight speed estimates are extrapolated from flight track profiles for various aircraft types at NAWS China Lake, NAF El Centro, NAS Lemoore, and NAS North Island (Wyle 1994, 1995, 1996, 1997), taking into account aircraft type, engine power rating, maximum takeoff weight, and maximum speed.
Takeoff segment lengths as modeled by Wyle (1994, 1995, 1996, 1997) range from 0.9 to 2.2 nautical miles.
Climbout segment lengths as modeled by Wyle (1994, 1995, 1996, 1997) range from 2.3 to 7.5 nautical miles, but the shortest climbout segments are at airfields where some flight tracks have been modified to reduce noise impacts or to avoid airspace conflicts with nearby airfields.
Except for aircraft specifically modeled by Wyle (1995), a standardized flight track length is assumed for straight-in landings and pattern cycles.
Helicopter takeoff segment length based on UH-1 flight profile for NAF El Centro (Wyle 1997).
Helicopter climbout and landing approach segment lengths fixed at 7.5 and 12.37 nautical miles, respectively; remaining flight operations below 3,000 feet are assumed to be covered in the range-related flight operations analysis.
Helicopter pattern segment length based on the fixed wing aircraft pattern flight track.

TABLE D1-23. ENGINE MODEL IDENTIFICATIONS FOR AIRCRAFT EMISSION ESTIMATES AT NAWS CHINA LAKE

Aircraft Model	Number of Engines	Actual Engine Model(s)	Engine Power Rating		Engine Type		Engine Models Used for Emission Factors			Maximum Takeoff Wt (Lbs)	Max Level Speed (Knots)	Aircraft Manufacturer
							ROG/NOx/CO	PM10	APU			
F-3 IDS	2	RB199-34R-103	16,075	lb st	TF	AB	F404-GE-400	F404-GE-400	GTC 36-200	61,620	1,323	Panavia
F-3 ADV		RB199-34R-104	16,520	lb st	TF	AB	F404-GE-400	F404-GE-400	GTC 36-200	61,700	1,323	
F-4J,S	2	J79-GE-10	17,900	lb st	TJ	AB	J79-GE-10B	J79-GE-10B	none	56,000	1,260	McDonell Douglas
F-4		J79-GE-10B	17,900	lb st	TJ	AB	J79-GE-10B	J79-GE-10B	none			
F-4E,G		J79-GE-17	17,900	lb st	TJ	AB	J79-GE-10B	J79-GE-10B	none	61,795	1,303	
F-14A	2	TF30-P-412A	20,900	lb st	TF	AB	TF30-P-412A	TF30-P-414	none	74,348	1,342	Grumman
F-14A		TF30-P-414A	20,900	lb st	TF	AB	TF30-P-412A	TF30-P-414	none	74,348	1,342	
F-14B,D		F110-GE-400	27,000	lb st	TF	AB	F110-GE-400	F404-GE-400	none	74,348	1,078	
F-15A	2	F100-PW-100	25,000	lb st	TF	AB	F100-PW-100	TF30-P-414	GTC 36-200	56,000	1,434	McDonell Douglas
F-15C		F100-PW-220	23,770	lb st	TF	AB	F100-PW-100	TF30-P-414	GTC 36-200	68,000	1,434	
F-15E		F100-PW-229	29,000	lb st	TF	AB	F100-PW-100	TF30-P-414	GTC 36-200	81,000	1,434	
F-16A	1	F100-PW-100	25,000	lb st	TF	AB	F100-PW-100	TF30-P-414	GTC 36-200	33,000	1,323	Lockheed
F-16B,C,D		F100-PW-220	23,770	lb st	TF	AB	F100-PW-100	TF30-P-414	GTC 36-200			(General Dynamics)
F-16C,D		F100-PW-229	29,000	lb st	TF	AB	F100-PW-100	TF30-P-414	GTC 36-200			
F-16C		F101DFE	23,770	lb st	TF	AB	F101DFE	F404-GE-400	GTC 36-200			
F-16C,D,N		F110-GE-100	28,984	lb st	TF	AB	F110-GE-400	F404-GE-400	GTC 36-200	42,300	1,323	
F-16C,D		F110-GE-129	29,000	lb st	TF	AB	F110-GE-400	F404-GE-400	GTC 36-200			
F/A-18A-D	2	F404-GE-400	16,000	lb st	TF	AB	F404-GE-400	F404-GE-400	GTC 36-200	56,000	1,191	McDonell Douglas
F/A-18E/F		F414-GE-400	22,000	lb st	TF	AB	F414-GE-400	F404-GE-400	GTC 36-200	66,000	1,191	
F-86E	1	J47-GE-13	5,200	lb st	TJ		J52-P-8B	J52-P-6B	none			North American
F-86D,K,L		J47-GE-17	7,650	lb st	TJ	AB	J52-P-8B	J52-P-6B	none	17,100	614	
F-86F		J47-GE-27	5,970	lb st	TJ		J52-P-8B	J52-P-6B	none	20,610	597	
F-86H		J73-GE-3E	8,920	lb st	TJ	AB	J52-P-8B	J52-P-6B	none			
A-4,TA-4	1	J52-P-8A	9,300	lb st	TJ		J52-P-8B	J52-P-6B	none	24,500	560	McDonell Douglas
A-4M		J52-P-408	11,200	lb st	TJ		J52-P-408	J52-P-6B	GTC 36-200	24,500	560	
A-6	2	J52-P-8A	9,300	lb st	TJ		J52-P-8B	J52-P-6B	none	60,400	563	Grumman
EA-6B	2	J52-P-408	11,200	lb st	TJ		J52-P-408	J52-P-6B	none	65,000	566	Grumman
AV-8B	1	F402-RR-406	21,450	lb st	TF		F402-RR-406	F404-GE-400	GTC 36-200	31,000	648	McDonell Douglas
		F402-RR-408	23,800	lb st	TF		F402-RR-406	F404-GE-400	GTC 36-200			
T-38	2	J85-GE-5	3,850	lb st	TJ	AB	J85-GE-2	J85-GE-5	none	12,093	804	Northrop
T-39D	2	JT12A-8	3,300	lb st	TJ		J85-GE-2	J85-GE-5	GTC 36-200	10,886	562	Rockwell
(Sabreliner 40,65)		TFE731-3-1D	3,700	lb st	TF		TFE731-3	J85-GE-5	GTC 36-200			
C-9B	2	JT8D-9	16,000	lb st	TF		JT8D-9	F404-GE-400	GTC85-72	121,000	490	McDonell Douglas
OV-10	2	T76-G-416	715	ehp	TP		T76-G-12A	TPE331-3	none	14,444	244	Rockwell
		T76-G-417	715	ehp	TP		T76-G-12A	TPE331-3	none			
OV-1	2	T53-L-701	1,400	shp	TP		T53-L-11D	T58-GE-5/8F	none	18,109	251	Grumman
P-3	4	T56-A-14	4,910	ehp	TP		T56-A-16	J79-GE-10B	GTCP95-2	142,000	411	Lockheed
T-34	1	PT6A-25	400	shp	TP		PT6A-27	TPE331-3	none	4,274	223	Beechcraft
(Beechcraft 45)												
MU-2	2	TPE331-10-501M	715	shp	TP		TPE331-3	TPE331-3	none	11,575	308	Mitsubishi
UC-8A	2	T64-GE-820	3,133	shp	TP		T64-GE-6B	T64-GE-6B/415	T62T-27	49,200	227	de Havilland
(DHC-5 Buffalo)												
UC-12B	2	PT6A-41	850	shp	TP		PT6A-41	TPE331-3	none	12,500	278	Raytheon
(King Air 200)		PT6A-38	750	shp	TP		PT6A-41	TPE331-3	none			(Beechcraft)
U-21	2	PT6A-28	680	ehp	TP		PT6A-27	TPE331-3	none	11,500	235	Raytheon
(King Air A100)												(Beechcraft)
C-130E	4	T56-A-7	4,050	ehp	TP		T56-A-7	J79-GE-10B	GTC85-72	155,000	320	Lockheed
C-130H		T56-A-15	4,508	ehp	TP		T56-A-16	J79-GE-10B	GTC85-72	175,000	335	

TABLE D1-23. ENGINE MODEL IDENTIFICATIONS FOR AIRCRAFT EMISSION ESTIMATES AT NAWS CHINA LAKE

Aircraft Model	Number of Engines	Actual Engine Model(s)	Engine Power Rating		Engine Type	Engine Models Used for Emission Factors: ROG/NOx/CO	PM10	APU	Maximum Takeoff Wt (Lbs)	Max Level Speed (Knots)	Aircraft Manufacturer
AH-1G	1	T53-L-13	1,400	shp	TS	T53-L-11D	T58-GE-5/8F	none	9,500	149	Bell
AH-1R,1S		T53-L-703	1,800	shp	TS	T53-L-11D	T58-GE-5/8F	none	10,000	123	
AH-1J	2	T400-CP-400	900	shp	TS	T400-CP-400	T58-GE-5/8F	none	10,000	180	Bell
AH-1T		T400-WV-402	985	shp	TS	T400-CP-400	T58-GE-5/8F	none	14,000	149	
AH-1W	2	T700-GE-401	1,625	shp	TS	T700-GE	T58-GE-5/8F	none	14,750	190	Bell
AH-64	2	T700-GE-700	1,536	shp	TS	T700-GE	T58-GE-5/8F	T62T-27	17,650	167	McDonell Douglas
		T700-GE-701C	1,890	shp	TS	T700-GE	T58-GE-5/8F	T62T-27			
CH-46A	2	T58-GE-8B	1,250	shp	TS	T58-GE-8F	T58-GE-5/8F	T62T-27			Boeing
CH-46D		T58-GE-10	1,400	shp	TS	T58-GE-16	T58-GE-5/8F	T62T-27	23,000	143	
CH-46E,F		T58-GE-16	1,870	shp	TS	T58-GE-16	T58-GE-5/8F	T62T-27	24,300	143	
CH-53A-D	2	T64-GE-413	3,925	shp	TS	T64-GE-413	T64-GE-6B/415	T62T-27	42,000	170	Sikorsky
CH-53E	3	T64-GE-415	3,696	shp	TS	T64-GE-415	T64-GE-6B/415	T62T-27	73,500	170	Sikorsky
		T64-GE-416	3,696	shp	TS	T64-GE-415	T64-GE-6B/415	T62T-27			
OH-58A	1	T63-A-700	317	shp	TS	T63-A-5	T58-GE-5/8F	none	3,000	102	Bell
OH-58D		T703-AD-700	650	shp	TS	T63-A-5	T58-GE-5/8F	none	5,500	128	
UH-1A	1	T53-L-1A	770	shp	TS	T53-L-11D	T58-GE-5/8F	none			Bell
UH-1B		T53-L-5	960	shp	TS	T53-L-11D	T58-GE-5/8F	none			
UH-1B-E		T53-L-11	1,100	shp	TS	T53-L-11D	T58-GE-5/8F	none	9,500	120	
UH-1K,L		T53-L-13	1,100	shp	TS	T53-L-11D	T58-GE-5/8F	none			
UH-1H		T53-L-13	1,400	shp	TS	T53-L-11D	T58-GE-5/8F	none	9,500	110	
UH-1F,P		T58-GE-3	1,100	shp	TS	T58-GE-8F	T58-GE-5/8F	none			
HH-1N	2	PT6T-3	900	shp	TS	T400-CP-400	T58-GE-5/8F	none	10,500	100	Bell
		T400-CP-400	900	shp	TS	T400-CP-400	T58-GE-5/8F	none	11,200	111	
UH-60	2	T700-GE-700	1,543	shp	TS	T700-GE	T58-GE-5/8F	T62T-27	16,478	160	Sikorsky
BEECHCRAI (Dutchess 76)	2	O-360-A1G6D	180	hp	P	TSIO-360C	AP-42, 3.3	none	3,900	166	Beechcraft
CESSNA (Model 172)	1	O-320-H2AD	160	hp	P	O-320	AP-42, 3.3	none	2,300	125	Cessna
MOONEY (Turbo 231)	1	TSIO-360-GE	210	hp	P	TSIO-360C	AP-42, 3.3	none	2,740	182	Mooney
GULFSTRE/ AA-5A	1	O-320-E2G	150	hp	P	O-320	AP-42, 3.3	none	2,200	136	Gulfstream

Engine type codes: TF = turbofan; TJ = turbojet; AB = with afterburner; TP = turboprop; TS = turboshaft; P = piston

Power Ratings: lb st = pounds static thrust; shp = shaft horsepower; ehp = equivalent horsepower (shaft and residual thrust); hp = horsepower

APU = on-board auxiliary power unit

Actual aircraft engines, engine specifications, and aircraft performance data based on Jane's Encyclopedia of Aviation (Taylor 1993), The Vital Guide to Military Aircraft (Moeng 1994), Encyclopedia of Modern U.S. Military Weapons (Laur, Llanso, and Boyne 1995), The Complete Encyclopedia of Worlc Aircraft (Donald 1997), The Encyclopedia of Modern Warplanes (Gunston 1995), Jane's Aircraft Recognition Guide (Rendall 1996), The Internationa Directory of Military Aircraft 1998/99 (Frawley 1998), The Development of Jet and Turbo Aero Engines (Gunston 1997), and EPA Emission Inventory Procedures Volume IV, Mobile Sources (U.S. EPA 1992).

Engines used for emission factors reflect the availability of emissions test data for engines of comparable type and power rating in comparison to aircraft size and performance.

Emission factors for aircraft engines will be from AESO Report No. 6-90, supplemental AESO memo reports, EPA Emission Inventory Procedures Volume IV, Mobile Sources (U.S. EPA 1992), and AP-42 Volume II, 4th Edition (U.S. EPA 1985).

SOx emissions for turbine engines will assume 0.02% sulfur content in the fuel.

PM10 emission factors for all APUs will be based on data for the GTC 36-200 APU.

PM10 emissions from general aviation piston engines will be based on emission factors for industrial gasoline engines (AP-42 Volume I, 5th Edition since PM10 emission rates have not been measured from aviation piston engines.

AP-42, Volume I, Section 3.3: Gasoline and Diesel Industrial Engines (10-96 version)

PM10 = 0.000721 LBS/HP-HR or 0.10 LBS/MMBTU fuel input, with 18,272 BTU/LB for gasoline

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18A-D	2	F404-GE-400 (AESO 9734A)	F404-GE-400 (AESO 9734A)	GTC 36-200 (AESO Fax)	7,562	Departure	APU Use	2,829	37.41%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
							Warm-Up	2,829	37.41%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	2,829	37.41%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Taxi Out	2,829	37.41%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Final Checks	2,829	37.41%	86% rpm	0.40	2,836	0.46	5.80	3.32	0.40	7.25
							AB Takeoff	2,829	37.41%	Max AB	0.76	28,397	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	8,587	0.31	25.16	1.05	0.40	2.81
							Climbout	2,829	37.41%	IRP	0.83	8,587	0.31	25.16	1.05	0.40	2.81
						Arrival	Straight In	590	7.80%	86% rpm	5.08	2,836	0.46	5.80	3.32	0.40	7.25
							Overhead In	2,239	29.61%	86% rpm	5.21	2,836	0.46	5.80	3.32	0.40	7.25
							Taxi In	2,829	37.41%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Refuel Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Hot Refuel	0	0.00%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	0	0.00%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Apron Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Shutdown	2,829	37.41%	G Idle	2.25	624	58.18	1.16	137.34	0.40	13.50
						Touch-and-Go	Approach	857	11.33%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	857	11.33%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	857	11.33%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25
						FCLP	Approach	95	1.26%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	95	1.26%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	95	1.26%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18E/F	2	F414-GE-400	F404-GE-400	GTC 36-200	8,190	Departure	APU Use	3,064	37.41%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9725A)	(Regression	(AESO Fax)			Warm-Up	3,064	37.41%	G Idle	15.00	749	54.20	3.29	88.85	0.40	12.75
			Equation				Unstick	3,064	37.41%	F Idle	0.10	862	36.63	3.55	72.17	0.40	12.17
			Presented in				Taxi Out	3,064	37.41%	G Idle	5.00	749	54.20	3.29	88.85	0.40	12.75
			AESO 9734A)				Final Checks	3,064	37.41%	86% rpm	0.40	3,666	0.12	10.53	1.09	0.40	6.19
							AB Takeoff	3,064	37.41%	Max AB	0.76	35,603	4.72	9.47	262.11	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	10,986	0.12	34.94	0.89	0.40	1.66
							Climbout	3,064	37.41%	IRP	0.83	10,986	0.12	34.94	0.89	0.40	1.66
						Arrival	Straight In	639	7.80%	86% rpm	5.08	3,666	0.12	10.53	1.09	0.40	6.19
							Overhead In	2,425	29.61%	86% rpm	5.21	3,666	0.12	10.53	1.09	0.40	6.19
							Taxi In	3,064	37.41%	G Idle	5.00	749	54.20	3.29	88.85	0.40	12.75
							Refuel Taxi	0	0.00%	G Idle	2.50	749	54.20	3.29	88.85	0.40	12.75
							Hot Refuel	0	0.00%	G Idle	15.00	749	54.20	3.29	88.85	0.40	12.75
							Unstick	0	0.00%	F Idle	0.10	862	36.63	3.55	72.17	0.40	12.17
							Apron Taxi	0	0.00%	G Idle	2.50	749	54.20	3.29	88.85	0.40	12.75
							Shutdown	3,064	37.41%	G Idle	2.25	749	54.20	3.29	88.85	0.40	12.75
						Touch-and-Go	Approach	929	11.34%	86% rpm	1.08	3,666	0.12	10.53	1.09	0.40	6.19
							Climbout	929	11.34%	IRP	0.23	10,986	0.12	34.94	0.89	0.40	1.66
							Circle	929	11.34%	86% rpm	1.47	3,666	0.12	10.53	1.09	0.40	6.19
						FCLP	Approach	102	1.25%	86% rpm	1.08	3,666	0.12	10.53	1.09	0.40	6.19
							Climbout	102	1.25%	IRP	0.23	10,986	0.12	34.94	0.89	0.40	1.66
							Circle	102	1.25%	86% rpm	1.47	3,666	0.12	10.53	1.09	0.40	6.19

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
EA-6B	2	J52-P-408	J52-P-6B	none	1,052	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	291	27.66%	Idle	20.00	779	28.33	2.38	55.96	0.40	20.42
			Equation				Unstick	291	27.66%	Int 1	0.10	2,547	1.40	6.17	11.12	0.40	13.45
			Derived From				Taxi Out	291	27.66%	Idle	5.00	779	28.33	2.38	55.96	0.40	20.42
			Data in				Final Checks	291	27.66%	NR	0.40	8,078	0.61	10.29	1.95	0.40	6.67
			AESO 6-90)				Mil Takeoff	291	27.66%	Mil	0.50	9,479	0.57	12.32	1.47	0.40	5.73
							Climbout	291	27.66%	NR	1.24	8,078	0.61	10.29	1.95	0.40	6.67
						Arrival	Straight In	28	2.66%	Int 2	4.12	5,752	0.67	8.38	3.18	0.40	8.67
							Overhead In	263	25.00%	Int 2	6.37	5,752	0.67	8.38	3.18	0.40	8.67
							Taxi In	291	27.66%	Idle	5.00	779	28.33	2.38	55.96	0.40	20.42
							Refuel Taxi	0	0.00%	Idle	2.50	779	28.33	2.38	55.96	0.40	20.42
							Hot Refuel	0	0.00%	Idle	15.00	779	28.33	2.38	55.96	0.40	20.42
							Unstick	0	0.00%	Int 1	0.10	2,547	1.40	6.17	11.12	0.40	13.45
							Apron Taxi	0	0.00%	Idle	2.50	779	28.33	2.38	55.96	0.40	20.42
							Shutdown	291	27.66%	Idle	1.00	779	28.33	2.38	55.96	0.40	20.42
						Touch-and-Go	Approach	184	17.49%	Int 2	1.07	5,752	0.67	8.38	3.18	0.40	8.67
							Climbout	184	17.49%	NR	0.51	8,078	0.61	10.29	1.95	0.40	6.67
							Circle	184	17.49%	Int 2	1.12	5,752	0.67	8.38	3.18	0.40	8.67
						FCLP	Approach	51	4.85%	Int 2	1.07	5,752	0.67	8.38	3.18	0.40	8.67
							Climbout	51	4.85%	NR	0.51	8,078	0.61	10.29	1.95	0.40	6.67
							Circle	51	4.85%	Int 2	1.12	5,752	0.67	8.38	3.18	0.40	8.67

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
AV-8B	1	F402-RR-406A (AESO 9912)	F404-GE-400 (AESO Regression Analysis in AESO 9912)	GTC 36-200 (AESO Fax)	1,498	Departure	APU Use	575	38.38%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
							Warm-Up	575	38.38%	Idle	20.00	1,137	19.66	1.80	106.30	0.40	11.10
							Unstick	575	38.38%	Idle	0.10	1,137	19.66	1.80	106.30	0.40	11.10
							Taxi Out	575	38.38%	Idle	5.00	1,137	19.66	1.80	106.30	0.40	11.10
							Final Checks	575	38.38%	85% rpm	0.40	6,811	0.50	9.20	6.80	0.40	3.60
							Mil Takeoff	575	38.38%	N Lift D	0.88	13,085	0.24	17.60	1.90	0.40	1.70
							Climbout	575	38.38%	Combat	1.51	12,258	0.26	16.50	2.20	0.40	1.90
						Arrival	Straight In	37	2.47%	85% rpm	4.38	6,811	0.50	9.20	6.80	0.40	3.60
							Overhead In	538	35.91%	85% rpm	5.71	6,811	0.50	9.20	6.80	0.40	3.60
							Taxi In	575	38.38%	Idle	5.00	1,137	19.66	1.80	106.30	0.40	11.10
							Refuel Taxi	0	0.00%	Idle	2.50	1,137	19.66	1.80	106.30	0.40	11.10
							Hot Refuel	0	0.00%	Idle	15.00	1,137	19.66	1.80	106.30	0.40	11.10
							Unstick	0	0.00%	Idle	0.10	1,137	19.66	1.80	106.30	0.40	11.10
							Apron Taxi	0	0.00%	Idle	2.50	1,137	19.66	1.80	106.30	0.40	11.10
							Shutdown	575	38.38%	Idle	1.00	1,137	19.66	1.80	106.30	0.40	11.10
						Touch-and-Go	Approach	174	11.62%	85% rpm	1.24	6,811	0.50	9.20	6.80	0.40	3.60
							Climbout	174	11.62%	Combat	1.06	12,258	0.26	16.50	2.20	0.40	1.90
							Circle	174	11.62%	85% rpm	0.20	6,811	0.50	9.20	6.80	0.40	3.60

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-3	2	F404-GE-400	F404-GE-400	GTC 36-200	142	Departure	APU Use	34	23.94%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)			Warm-Up	34	23.94%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	34	23.94%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Taxi Out	34	23.94%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Final Checks	34	23.94%	86% rpm	0.40	2,836	0.46	5.80	3.32	0.40	7.25
							AB Takeoff	34	23.94%	Max AB	0.76	28,397	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	8,587	0.31	25.16	1.05	0.40	2.81
							Climbout	34	23.94%	IRP	0.83	8,587	0.31	25.16	1.05	0.40	2.81
						Arrival	Straight In	34	23.94%	86% rpm	5.08	2,836	0.46	5.80	3.32	0.40	7.25
							Overhead In	0	0.00%	86% rpm	NA	2,836	0.46	5.80	3.32	0.40	7.25
							Taxi In	34	23.94%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Refuel Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Hot Refuel	0	0.00%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	0	0.00%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Apron Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Shutdown	34	23.94%	G Idle	1.00	624	58.18	1.16	137.34	0.40	13.50
						Touch-and-Go	Approach	37	26.06%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	37	26.06%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	37	26.06%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25
F-15	2	F100-PW-100	TF30-P-414	GTC 36-200	162	Departure	APU Use	39	24.07%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(AESO 6-90)	(AESO Fax)			Warm-Up	39	24.07%	Idle	15.00	1,060	2.26	3.96	19.34	0.40	8.96
							Unstick	39	24.07%	Idle	0.10	1,060	2.26	3.96	19.34	0.40	8.96
							Taxi Out	39	24.07%	Idle	5.00	1,060	2.26	3.96	19.34	0.40	8.96
							Final Checks	39	24.07%	95%	0.40	10,400	0.05	44.00	1.80	0.40	2.98
							AB Takeoff	39	24.07%	Max AB	0.72	44,200	0.10	16.50	55.10	0.40	no data
							Mil Takeoff	0	0.00%	95%	0.86	10,400	0.05	44.00	1.80	0.40	2.98
							Climbout	39	24.07%	95%	0.80	10,400	0.05	44.00	1.80	0.40	2.98
						Arrival	Straight In	39	24.07%	30%	4.95	3,000	0.60	11.00	3.00	0.40	7.98
							Overhead In	0	0.00%	30%	NA	3,000	0.60	11.00	3.00	0.40	7.98
							Taxi In	39	24.07%	Idle	5.00	1,060	2.26	3.96	19.34	0.40	8.96
							Refuel Taxi	0	0.00%	Idle	2.50	1,060	2.26	3.96	19.34	0.40	8.96
							Hot Refuel	0	0.00%	Idle	15.00	1,060	2.26	3.96	19.34	0.40	8.96
							Unstick	0	0.00%	Idle	0.10	1,060	2.26	3.96	19.34	0.40	8.96
							Apron Taxi	0	0.00%	Idle	2.50	1,060	2.26	3.96	19.34	0.40	8.96
							Shutdown	39	24.07%	Idle	1.00	1,060	2.26	3.96	19.34	0.40	8.96
						Touch-and-Go	Approach	42	25.93%	30%	1.08	3,000	0.60	11.00	3.00	0.40	7.98
							Climbout	42	25.93%	95%	0.23	10,400	0.05	44.00	1.80	0.40	2.98
							Circle	42	25.93%	30%	1.47	3,000	0.60	11.00	3.00	0.40	7.98

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-16	1	F110-GE-400	F404-GE-400	GTC 36-200	162	Departure	APU Use	39	24.07%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9821)	(Regression	(AESO Fax)			Warm-Up	39	24.07%	Idle	15.00	1,171	3.65	2.77	16.60	0.40	10.90
		F404-GE-400	Equation				Unstick	39	24.07%	77% rpm	0.10	1,793	2.33	4.26	7.73	0.40	9.14
		for Max AB	Presented in				Taxi Out	39	24.07%	Idle	5.00	1,171	3.65	2.77	16.60	0.40	10.90
		(AESO 9734A)	AESO 9734A)				Final Checks	39	24.07%	92% rpm	0.40	6,752	0.41	14.86	0.94	0.40	3.67
							AB Takeoff	39	24.07%	Max AB	0.72	56,703	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.86	11,719	0.40	28.63	0.84	0.40	1.39
							Climbout	39	24.07%	96% rpm	0.80	9,324	0.38	21.15	0.93	0.40	2.33
						Arrival	Straight In	39	24.07%	88% rpm	4.95	4,786	0.56	10.43	1.05	0.40	5.09
							Overhead In	0	0.00%	88% rpm	NA	4,786	0.56	10.43	1.05	0.40	5.09
							Taxi In	39	24.07%	Idle	5.00	1,171	3.65	2.77	16.60	0.40	10.90
							Refuel Taxi	0	0.00%	Idle	2.50	1,171	3.65	2.77	16.60	0.40	10.90
							Hot Refuel	0	0.00%	Idle	15.00	1,171	3.65	2.77	16.60	0.40	10.90
							Unstick	0	0.00%	77% rpm	0.10	1,793	2.33	4.26	7.73	0.40	9.14
							Apron Taxi	0	0.00%	Idle	2.50	1,171	3.65	2.77	16.60	0.40	10.90
							Shutdown	39	24.07%	Idle	1.00	1,171	3.65	2.77	16.60	0.40	10.90
						Touch-and-Go	Approach	42	25.93%	88% rpm	1.08	4,786	0.56	10.43	1.05	0.40	5.09
							Climbout	42	25.93%	96% rpm	0.23	9,324	0.38	21.15	0.93	0.40	2.33
							Circle	42	25.93%	88% rpm	1.47	4,786	0.56	10.43	1.05	0.40	5.09
F-86	1	J52-P-8B	J52-P-6B	none	1,016	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	243	23.92%	Idle	15.00	680	48.96	1.79	63.78	0.40	21.21
			Equation				Unstick	243	23.92%	37% T	0.10	2,300	1.99	6.34	10.54	0.40	14.05
			Derived From				Taxi Out	243	23.92%	Idle	5.00	680	48.96	1.79	63.78	0.40	21.21
			Data in				Final Checks	243	23.92%	NR	0.40	6,130	0.69	12.13	0.87	0.40	8.29
			AESO 6-90)				Mil Takeoff	243	23.92%	Mil	0.76	7,370	1.08	13.05	0.71	0.40	7.21
							Climbout	243	23.92%	NR	0.98	6,130	0.69	12.13	0.87	0.40	8.29
						Arrival	Straight In	243	23.92%	75% T	4.95	4,320	0.67	10.10	3.00	0.40	10.35
							Overhead In	0	0.00%	75% T	NA	4,320	0.67	10.10	3.00	0.40	10.35
							Taxi In	243	23.92%	Idle	5.00	680	48.96	1.79	63.78	0.40	21.21
							Refuel Taxi	0	0.00%	Idle	2.50	680	48.96	1.79	63.78	0.40	21.21
							Hot Refuel	0	0.00%	Idle	15.00	680	48.96	1.79	63.78	0.40	21.21
							Unstick	0	0.00%	37% T	0.10	2,300	1.99	6.34	10.54	0.40	14.05
							Apron Taxi	0	0.00%	Idle	2.50	680	48.96	1.79	63.78	0.40	21.21
							Shutdown	243	23.92%	Idle	1.00	680	48.96	1.79	63.78	0.40	21.21
						Touch-and-Go	Approach	265	26.08%	75% T	1.08	4,320	0.67	10.10	3.00	0.40	10.35
							Climbout	265	26.08%	NR	0.23	6,130	0.69	12.13	0.87	0.40	8.29
							Circle	265	26.08%	75% T	1.47	4,320	0.67	10.10	3.00	0.40	10.35

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
C-9B	2	JT8D-9	F404-GE-400	GTC85-72	100	Departure	APU Use	25	25.00%	On	3.50	210	0.13	3.88	14.83	0.40	0.22
		(EPA 1992)	(Regression	(EPA 1992)			Warm-Up	25	25.00%	Idle	16.00	1,048	10.00	2.90	34.50	0.40	11.36
			Equation	GTC 36-200			Unstick	25	25.00%	30%	0.10	2,365	1.73	5.64	9.43	0.40	8.00
			Presented in	for PM10			Taxi Out	25	25.00%	Idle	5.00	1,048	10.00	2.90	34.50	0.40	11.36
			AESO 9734A)	(AESO Fax)			Final Checks	25	25.00%	85%	0.40	6,715	0.47	14.21	1.66	0.40	3.69
							Mil Takeoff	25	25.00%	100%	1.01	8,254	0.47	17.92	1.24	0.40	2.84
							Climbout	25	25.00%	85%	1.46	6,715	0.47	14.21	1.66	0.40	3.69
						Arrival	Straight In	25	25.00%	30%	4.95	2,365	1.73	5.64	9.43	0.40	8.00
							Overhead In	0	0.00%	30%	NA	2,365	1.73	5.64	9.43	0.40	8.00
							Taxi In	25	25.00%	Idle	5.00	1,048	10.00	2.90	34.50	0.40	11.36
							Refuel Taxi	0	0.00%	Idle	2.50	1,048	10.00	2.90	34.50	0.40	11.36
							Hot Refuel	0	0.00%	Idle	15.00	1,048	10.00	2.90	34.50	0.40	11.36
							Unstick	0	0.00%	30%	0.10	2,365	1.73	5.64	9.43	0.40	8.00
							Apron Taxi	0	0.00%	Idle	2.50	1,048	10.00	2.90	34.50	0.40	11.36
							Shutdown	25	25.00%	Idle	1.00	1,048	10.00	2.90	34.50	0.40	11.36
						Touch-and-Go	Approach	25	25.00%	30%	1.08	2,365	1.73	5.64	9.43	0.40	8.00
							Climbout	25	25.00%	85%	0.23	6,715	0.47	14.21	1.66	0.40	3.69
							Circle	25	25.00%	30%	1.47	2,365	1.73	5.64	9.43	0.40	8.00
UC-8A	2	T64-GE-6B	T64-GE-6B/415	T62T-27	28	Departure	APU Use	12	42.86%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)	(EPA 1992)			Warm-Up	12	42.86%	Idle	15.00	321	15.36	2.75	57.27	0.40	2.21
				GTC 36-200			Unstick	12	42.86%	75% hp	0.10	1,063	0.48	7.80	4.27	0.40	2.21
				for PM10			Taxi Out	12	42.86%	Idle	5.00	321	15.36	2.75	57.27	0.40	2.21
				(AESO Fax)			Final Checks	12	42.86%	NR	0.40	1,262	0.56	8.97	2.66	0.40	2.21
							Mil Takeoff	12	42.86%	Max Cont	1.13	1,428	0.64	10.11	1.50	0.40	2.21
							Climbout	12	42.86%	Mil	1.80	1,370	0.59	9.80	1.87	0.40	2.21
						Arrival	Straight In	12	42.86%	75% hp	6.19	1,063	0.48	7.80	4.27	0.40	2.21
							Overhead In	0	0.00%	75% hp	NA	1,063	0.48	7.80	4.27	0.40	2.21
							Taxi In	12	42.86%	Idle	5.00	321	15.36	2.75	57.27	0.40	2.21
							Refuel Taxi	0	0.00%	Idle	2.50	321	15.36	2.75	57.27	0.40	2.21
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	75% hp	0.10	1,063	0.48	7.80	4.27	0.40	2.21
							Apron Taxi	0	0.00%	Idle	2.50	321	15.36	2.75	57.27	0.40	2.21
							Shutdown	12	42.86%	Idle	1.00	321	15.36	2.75	57.27	0.40	2.21
						Touch-and-Go	Approach	2	7.14%	75% hp	1.26	1,063	0.48	7.80	4.27	0.40	2.21
							Climbout	2	7.14%	Mil	0.26	1,370	0.59	9.80	1.87	0.40	2.21
							Circle	2	7.14%	75% hp	1.72	1,063	0.48	7.80	4.27	0.40	2.21

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates			Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
		ROG, NOx, CO	PM10	APU									ROG	NOx	CO	SOx	PM10
UC-12B	2	PT6A-41	TPE331-3	none	486	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	210	43.21%	Idle	15.00	147	101.63	1.97	115.31	0.40	2.95
							Unstick	210	43.21%	30%	0.10	273	22.71	4.65	34.80	0.40	2.40
							Taxi Out	210	43.21%	Idle	5.00	147	101.63	1.97	115.31	0.40	2.95
							Final Checks	210	43.21%	90%	0.40	473	2.03	7.57	6.49	0.40	1.47
							Mil Takeoff	210	43.21%	100%	1.13	510	1.75	7.98	5.10	0.40	1.75
							Climbout	210	43.21%	90%	1.80	473	2.03	7.57	6.49	0.40	1.47
						Arrival	Straight In	210	43.21%	30%	6.19	273	22.71	4.65	34.80	0.40	2.40
							Overhead In	0	0.00%	30%	NA	273	22.71	4.65	34.80	0.40	2.40
							Taxi In	210	43.21%	Idle	5.00	147	101.63	1.97	115.31	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	147	101.63	1.97	115.31	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	273	22.71	4.65	34.80	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	147	101.63	1.97	115.31	0.40	2.95
							Shutdown	210	43.21%	Idle	1.00	147	101.63	1.97	115.31	0.40	2.95
						Touch-and-Go	Approach	33	6.79%	30%	1.26	273	22.71	4.65	34.80	0.40	2.40
							Climbout	33	6.79%	90%	0.26	473	2.03	7.57	6.49	0.40	1.47
							Circle	33	6.79%	30%	1.72	273	22.71	4.65	34.80	0.40	2.40
U-21	2	PT6A-27	TPE331-3	none	20	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	9	45.00%	Idle	15.00	115	50.17	2.43	64.00	0.40	2.95
							Unstick	9	45.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Taxi Out	9	45.00%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Final Checks	9	45.00%	90%	0.40	400	0.00	7.00	1.20	0.40	1.47
							Mil Takeoff	9	45.00%	100%	1.13	425	0.00	7.81	1.01	0.40	1.75
							Climbout	9	45.00%	90%	1.80	400	0.00	7.00	1.20	0.40	1.47
						Arrival	Straight In	9	45.00%	30%	6.19	215	2.19	8.37	23.02	0.40	2.40
							Overhead In	0	0.00%	30%	NA	215	2.19	8.37	23.02	0.40	2.40
							Taxi In	9	45.00%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Shutdown	9	45.00%	Idle	1.00	115	50.17	2.43	64.00	0.40	2.95
						Touch-and-Go	Approach	1	5.00%	30%	1.26	215	2.19	8.37	23.02	0.40	2.40
							Climbout	1	5.00%	90%	0.26	400	0.00	7.00	1.20	0.40	1.47
							Circle	1	5.00%	30%	1.72	215	2.19	8.37	23.02	0.40	2.40

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
MU-2	2	TPE331-3	TPE331-3	none	2,700	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	1,166	43.19%	Idle	15.00	112	79.11	2.86	61.52	0.40	2.95
							Unstick	1,166	43.19%	30%	0.10	250	0.64	9.92	6.96	0.40	2.40
							Taxi Out	1,166	43.19%	Idle	5.00	112	79.11	2.86	61.52	0.40	2.95
							Final Checks	1,166	43.19%	90%	0.40	409	0.15	11.86	0.98	0.40	1.47
							Mil Takeoff	1,166	43.19%	100%	1.13	458	0.11	12.36	0.76	0.40	1.75
							Climbout	1,166	43.19%	90%	1.80	409	0.15	11.86	0.98	0.40	1.47
						Arrival	Straight In	1,166	43.19%	30%	6.19	250	0.64	9.92	6.96	0.40	2.40
							Overhead In	0	0.00%	30%	NA	250	0.64	9.92	6.96	0.40	2.40
							Taxi In	1,166	43.19%	Idle	5.00	112	79.11	2.86	61.52	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	112	79.11	2.86	61.52	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	250	0.64	9.92	6.96	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	112	79.11	2.86	61.52	0.40	2.95
							Shutdown	1,166	43.19%	Idle	1.00	112	79.11	2.86	61.52	0.40	2.95
						Touch-and-Go	Approach	184	6.81%	30%	1.26	250	0.64	9.92	6.96	0.40	2.40
							Climbout	184	6.81%	90%	0.26	409	0.15	11.86	0.98	0.40	1.47
							Circle	184	6.81%	30%	1.72	250	0.64	9.92	6.96	0.40	2.40

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
OV-10	2	T76-G-12A	TPE331-3	none	56	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(EPA 1992)				Warm-Up	24	42.86%	G Start	15.00	180	11.85	4.30	28.29	0.40	2.95
							Unstick	24	42.86%	H Idle	0.10	212	7.12	4.50	24.59	0.40	2.40
							Taxi Out	24	42.86%	G Start	5.00	180	11.85	4.30	28.29	0.40	2.95
							Final Checks	24	42.86%	Mil	0.40	382	0.06	7.18	1.69	0.40	1.47
							Mil Takeoff	24	42.86%	Mil	1.13	382	0.06	7.18	1.69	0.40	1.47
							Climbout	24	42.86%	Mil	1.80	382	0.06	7.18	1.69	0.40	1.47
						Arrival	Straight In	24	42.86%	H Idle	6.19	212	7.12	4.50	24.59	0.40	2.40
							Overhead In	0	0.00%	H Idle	NA	212	7.12	4.50	24.59	0.40	2.40
							Taxi In	24	42.86%	G Start	5.00	180	11.85	4.30	28.29	0.40	2.95
							Refuel Taxi	0	0.00%	G Start	2.50	180	11.85	4.30	28.29	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	H Idle	0.10	212	7.12	4.50	24.59	0.40	2.40
							Apron Taxi	0	0.00%	G Start	2.50	180	11.85	4.30	28.29	0.40	2.95
							Shutdown	24	42.86%	G Start	1.00	180	11.85	4.30	28.29	0.40	2.95
						Touch-and-Go	Approach	4	7.14%	H Idle	1.26	212	7.12	4.50	24.59	0.40	2.40
							Climbout	4	7.14%	Mil	0.26	382	0.06	7.18	1.69	0.40	1.47
							Circle	4	7.14%	H Idle	1.72	212	7.12	4.50	24.59	0.40	2.40
OV-1	2	T53-L-11D	T58-GE-5/8F	none	82	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	35	42.68%	G Idle	15.00	145	67.41	1.58	31.51	0.40	4.20
							Unstick	35	42.68%	F Idle	0.10	222	15.75	2.53	37.79	0.40	4.20
							Taxi Out	35	42.68%	G Idle	5.00	145	67.41	1.58	31.51	0.40	4.20
							Final Checks	35	42.68%	NR	0.40	645	0.66	6.43	6.83	0.40	4.20
							Mil Takeoff	35	42.68%	100% hp	0.85	690	0.32	7.75	3.85	0.40	4.20
							Climbout	35	42.68%	Mil	1.80	685	0.30	6.34	3.34	0.40	4.20
						Arrival	Straight In	35	42.68%	NR	6.19	645	0.66	6.43	6.83	0.40	4.20
							Overhead In	0	0.00%	NR	NA	645	0.66	6.43	6.83	0.40	4.20
							Taxi In	35	42.68%	G Idle	5.00	145	67.41	1.58	31.51	0.40	4.20
							Refuel Taxi	0	0.00%	G Idle	2.50	145	67.41	1.58	31.51	0.40	4.20
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	222	15.75	2.53	37.79	0.40	4.20
							Apron Taxi	0	0.00%	G Idle	2.50	145	67.41	1.58	31.51	0.40	4.20
							Shutdown	35	42.68%	G Idle	1.00	145	67.41	1.58	31.51	0.40	4.20
						Touch-and-Go	Approach	6	7.32%	NR	1.26	645	0.66	6.43	6.83	0.40	4.20
							Climbout	6	7.32%	Mil	0.26	685	0.30	6.34	3.34	0.40	4.20
							Circle	6	7.32%	NR	1.72	645	0.66	6.43	6.83	0.40	4.20

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
P-3	4	T56-A-16	J79-GE-10B	GTC95-2	28	Departure	APU Use	12	42.86%	On	180.00	293	0.36	5.65	3.20	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)			Warm-Up	12	42.86%	G Idle L	15.00	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200			Unstick	12	42.86%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
			Analysis in	for PM10			Taxi Out	12	42.86%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
			AESO 9908A)	(AESO Fax)			Final Checks	12	42.86%	96% shp	0.40	2,150	0.16	10.30	0.73	0.40	11.70
							Mil Takeoff	12	42.86%	Mil	1.07	2,219	0.16	10.45	0.65	0.40	11.40
							Climbout	12	42.86%	96% shp	1.69	2,150	0.16	10.30	0.73	0.40	11.70
						Arrival	Straight In	12	42.86%	87% shp	5.94	2,000	0.18	10.12	0.81	0.40	12.10
							Overhead In	0	0.00%	87% shp	NA	2,000	0.18	10.12	0.81	0.40	12.10
							Taxi In	12	42.86%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
							Refuel Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
							Apron Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Shutdown	12	42.86%	G Idle L	1.00	599	22.32	3.53	30.11	0.40	17.10
							APU Use	12	42.86%	On	11.94	293	0.36	5.65	3.20	0.40	0.22
						Touch-and-Go	Approach	2	7.14%	87% shp	1.26	2,000	0.18	10.12	0.81	0.40	12.10
							Climbout	2	7.14%	96% shp	0.26	2,150	0.16	10.30	0.73	0.40	11.70
							Circle	2	7.14%	87% shp	1.72	2,000	0.18	10.12	0.81	0.40	12.10
							APU Use	2	7.14%	On	3.24	293	0.36	5.65	3.20	0.40	0.22
C-130	4	T56-A-16	J79-GE-10B	GTC85-72	140	Departure	APU Use	67	47.86%	On	180.00	210	0.13	3.88	14.83	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)			Warm-Up	67	47.86%	G Idle L	15.00	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200			Unstick	67	47.86%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
			Analysis in	for PM10			Taxi Out	67	47.86%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
			AESO 9908A)	(AESO Fax)			Final Checks	67	47.86%	96% shp	0.40	2,150	0.16	10.30	0.73	0.40	11.70
							Mil Takeoff	67	47.86%	Mil	1.13	2,219	0.16	10.45	0.65	0.40	11.40
							Climbout	67	47.86%	96% shp	2.40	2,150	0.16	10.30	0.73	0.40	11.70
						Arrival	Straight In	67	47.86%	87% shp	6.19	2,000	0.18	10.12	0.81	0.40	12.10
							Overhead In	0	0.00%	87% shp	NA	2,000	0.18	10.12	0.81	0.40	12.10
							Taxi In	67	47.86%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
							Refuel Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
							Apron Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Shutdown	67	47.86%	G Idle L	1.00	599	22.32	3.53	30.11	0.40	17.10
							APU Use	67	47.86%	On	15.00	210	0.13	3.88	14.83	0.40	0.22
						Touch-and-Go	Approach	3	2.14%	87% shp	1.26	2,000	0.18	10.12	0.81	0.40	12.10
							Climbout	3	2.14%	96% shp	0.26	2,150	0.16	10.30	0.73	0.40	11.70
							Circle	3	2.14%	87% shp	1.72	2,000	0.18	10.12	0.81	0.40	12.10
							APU Use	0	0.00%	Off	0.00	210	0.13	3.88	14.83	0.40	0.22

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-34	1	PT6A-27	TPE331-3	none	40	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	17	42.50%	Idle	15.00	115	50.17	2.43	64.00	0.40	2.95
							Unstick	17	42.50%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Taxi Out	17	42.50%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Final Checks	17	42.50%	90%	0.40	400	0.00	7.00	1.20	0.40	1.47
							Mil Takeoff	17	42.50%	100%	1.20	425	0.00	7.81	1.01	0.40	1.75
							Climbout	17	42.50%	90%	2.57	400	0.00	7.00	1.20	0.40	1.47
						Arrival	Straight In	17	42.50%	30%	6.19	215	2.19	8.37	23.02	0.40	2.40
							Overhead In	0	0.00%	30%	NA	215	2.19	8.37	23.02	0.40	2.40
							Taxi In	17	42.50%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Shutdown	17	42.50%	Idle	1.00	115	50.17	2.43	64.00	0.40	2.95
						Touch-and-Go	Approach	3	7.50%	30%	1.26	215	2.19	8.37	23.02	0.40	2.40
							Climbout	3	7.50%	90%	0.26	400	0.00	7.00	1.20	0.40	1.47
							Circle	3	7.50%	30%	1.72	215	2.19	8.37	23.02	0.40	2.40
T-38	2	J85-GE-2	J85-GE-5	none	102	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	25	24.51%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
		J85-GE-21	Equation				Unstick	25	24.51%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
		for Max AB	Derived From				Taxi Out	25	24.51%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
		(EPA 1992)	Data in				Final Checks	25	24.51%	NR	0.40	2,875	0.45	6.35	21.78	0.40	9.46
			AESO 9620)				AB Takeoff	25	24.51%	Max AB	0.54	10,650	0.10	5.60	36.50	0.40	no data
							Mil Takeoff	0	0.00%	Mil	0.65	2,890	0.45	6.40	21.56	0.40	9.43
							Climbout	25	24.51%	Mil	0.79	2,890	0.45	6.40	21.56	0.40	9.43
						Arrival	Straight In	25	24.51%	75% NR	4.95	2,155	0.64	5.67	28.38	0.40	11.28
							Overhead In	0	0.00%	75% NR	NA	2,155	0.64	5.67	28.38	0.40	11.28
							Taxi In	25	24.51%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
							Refuel Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Hot Refuel	0	0.00%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
							Unstick	0	0.00%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
							Apron Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Shutdown	25	24.51%	G Idle	1.00	560	11.86	3.68	111.86	0.40	22.03
						Touch-and-Go	Approach	26	25.49%	75% NR	1.08	2,155	0.64	5.67	28.38	0.40	11.28
							Climbout	26	25.49%	Mil	0.23	2,890	0.45	6.40	21.56	0.40	9.43
							Circle	26	25.49%	75% NR	1.47	2,155	0.64	5.67	28.38	0.40	11.28

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-39D	2	J85-GE-2	J85-GE-5	GTC 36-200	264	Departure	APU Use	44	16.67%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression	(AESO Fax)			Warm-Up	44	16.67%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
			Equation				Unstick	44	16.67%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
			Derived From				Taxi Out	44	16.67%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
			Data in				Final Checks	44	16.67%	NR	0.40	2,875	0.45	6.35	21.78	0.40	9.46
			AESO 9620)				Mil Takeoff	44	16.67%	Mil	0.57	2,890	0.45	6.40	21.56	0.40	9.43
							Climbout	44	16.67%	Mil	0.79	2,890	0.45	6.40	21.56	0.40	9.43
						Arrival	Straight In	44	16.67%	75% NR	4.95	2,155	0.64	5.67	28.38	0.40	11.28
							Overhead In	0	0.00%	75% NR	NA	2,155	0.64	5.67	28.38	0.40	11.28
							Taxi In	44	16.67%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
							Refuel Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Hot Refuel	0	0.00%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
							Unstick	0	0.00%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
							Apron Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Shutdown	44	16.67%	G Idle	1.00	560	11.86	3.68	111.86	0.40	22.03
						Touch-and-Go	Approach	88	33.33%	75% NR	1.08	2,155	0.64	5.67	28.38	0.40	11.28
							Climbout	88	33.33%	Mil	0.23	2,890	0.45	6.40	21.56	0.40	9.43
							Circle	88	33.33%	75% NR	1.47	2,155	0.64	5.67	28.38	0.40	11.28
AH-1W	2	T700-GE	T58-GE-5/8F	none	280	Departure	APU Use	0	0.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)				Warm-Up	57	20.36%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
							Taxi Out	57	20.36%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hover	57	20.36%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
							Climbout	57	20.36%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	57	20.36%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	57	20.36%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	57	20.36%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	57	20.36%	Idle	2.00	164	2.54	3.28	39.81	0.40	4.20
						Touch-and-Go	Approach	83	29.64%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	83	29.64%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	83	29.64%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
AH-64	2	T700-GE	T58-GE-5/8F	T62T-27	56	Departure	APU Use	11	19.64%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)	(EPA 1992)			Warm-Up	11	19.64%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
				GTC 36-200			Taxi Out	11	19.64%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
				for PM10			Hover	11	19.64%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
				(AESO Fax)			Climbout	11	19.64%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	11	19.64%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	11	19.64%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	11	19.64%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	11	19.64%	Idle	2.00	164	2.54	3.28	39.81	0.40	4.20
						Touch-and-Go	Approach	17	30.36%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	17	30.36%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	17	30.36%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20
CH-46E	2	T58-GE-16	T58-GE-5/8F	T62T-27	34	Departure	APU Use	7	20.59%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9820)	(AESO 6-90)	(EPA 1992)			Warm-Up	7	20.59%	20% Q	5.00	311	4.69	4.64	45.09	0.40	4.20
				GTC 36-200			Taxi Out	7	20.59%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
				for PM10			Hover	7	20.59%	45% Q	1.05	551	0.91	6.96	18.74	0.40	4.20
				(AESO Fax)			Climbout	7	20.59%	58% Q	6.00	666	0.81	8.07	14.08	0.40	4.20
						Arrival	Straight In	7	20.59%	40% Q	9.90	505	1.03	6.52	21.38	0.40	4.20
							Descent	7	20.59%	40% Q	1.00	505	1.03	6.52	21.38	0.40	4.20
							Taxi In	7	20.59%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Refuel Taxi	0	0.00%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Hot Refuel	0	0.00%	20% Q	8.00	311	4.69	4.64	45.09	0.40	4.20
							Apron Taxi	0	0.00%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Shutdown	7	20.59%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							APU Use	7	20.59%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	10	29.41%	40% Q	2.02	505	1.03	6.52	21.38	0.40	4.20
							Climbout	10	29.41%	58% Q	0.42	666	0.81	8.07	14.08	0.40	4.20
							Circle	10	29.41%	45% Q	2.74	551	0.91	6.96	18.74	0.40	4.20

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
CH-53E	3	T64-GE-415	T64-GE-6B/415	T62T-27	14	Departure	APU Use	3	21.43%	On	20.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9905)	(AESO 6-90)	(EPA 1992)			Warm-Up	3	21.43%	6% Q	13.00	360	20.12	2.56	42.42	0.40	2.21
				GTC 36-200			Taxi Out	3	21.43%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
				for PM10			Hover	3	21.43%	61% Q	1.05	1,329	0.38	7.44	2.93	0.40	2.21
				(AESO Fax)			Climbout	3	21.43%	83% Q	6.00	1,717	0.14	9.08	1.48	0.40	2.21
						Arrival	Straight In	3	21.43%	49% Q	9.90	1,118	1.22	6.54	4.57	0.40	2.21
							Descent	3	21.43%	49% Q	1.00	1,118	1.22	6.54	4.57	0.40	2.21
							Taxi In	3	21.43%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Refuel Taxi	0	0.00%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Hot Refuel	0	0.00%	15% Q	8.00	518	11.76	3.43	21.25	0.40	2.21
							Apron Taxi	0	0.00%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Shutdown	3	21.43%	12% Q	6.00	466	14.01	3.14	26.02	0.40	2.21
							APU Use	3	21.43%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	4	28.57%	49% Q	2.02	1,118	1.22	6.54	4.57	0.40	2.21
							Climbout	4	28.57%	83% Q	0.42	1,717	0.14	9.08	1.48	0.40	2.21
							Circle	4	28.57%	64% Q	2.74	1,382	0.28	7.65	2.63	0.40	2.21
UH-1L	1	T53-L-11D	T58-GE-5/8F	none	212	Departure	APU Use	0	0.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	43	20.28%	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
							Taxi Out	43	20.28%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Hover	43	20.28%	95% rpm	1.05	645	0.66	6.43	6.83	0.40	4.20
							Climbout	43	20.28%	100% rpm	6.00	690	0.32	7.75	3.85	0.40	4.20
						Arrival	Straight In	43	20.28%	95% rpm	9.90	645	0.66	6.43	6.83	0.40	4.20
							Descent	43	20.28%	95% rpm	1.00	645	0.66	6.43	6.83	0.40	4.20
							Taxi In	43	20.28%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Refuel Taxi	0	0.00%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Hot Refuel	0	0.00%	G Idle	8.00	145	67.41	1.58	31.51	0.40	4.20
							Apron Taxi	0	0.00%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Shutdown	43	20.28%	G Idle	1.00	145	67.41	1.58	31.51	0.40	4.20
						Touch-and-Go	Approach	63	29.72%	95% rpm	2.02	645	0.66	6.43	6.83	0.40	4.20
							Climbout	63	29.72%	100% rpm	0.42	690	0.32	7.75	3.85	0.40	4.20
							Circle	63	29.72%	98% rpm	2.74	685	0.30	6.34	3.34	0.40	4.20

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
HH-1N	2	T400-CP-400	T58-GE-5/8F	none	636	Departure	APU Use	0	0.00%	On	0.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9809)	(AESO 6-90)				Warm-Up	129	20.28%	7% Q	15.00	148	6.21	3.13	28.36	0.40	4.20
							Taxi Out	129	20.28%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Hover	129	20.28%	54% Q	1.05	346	0.13	5.79	1.01	0.40	4.20
							Climbout	129	20.28%	56% Q	6.00	355	0.13	5.90	0.94	0.40	4.20
						Arrival	Straight In	129	20.28%	33% Q	9.90	258	0.20	4.54	4.22	0.40	4.20
							Descent	129	20.28%	29% Q	1.00	241	0.28	4.30	5.76	0.40	4.20
							Taxi In	129	20.28%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Refuel Taxi	0	0.00%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Hot Refuel	0	0.00%	7% Q	8.00	148	6.21	3.13	28.36	0.40	4.20
							Apron Taxi	0	0.00%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Shutdown	129	20.28%	7% Q	1.00	148	6.21	3.13	28.36	0.40	4.20
						Touch-and-Go	Approach	189	29.72%	33% Q	2.02	258	0.20	4.54	4.22	0.40	4.20
							Climbout	189	29.72%	56% Q	0.42	355	0.13	5.90	0.94	0.40	4.20
							Circle	189	29.72%	54% Q	2.74	346	0.13	5.79	1.01	0.40	4.20
OH-58	1	T63-A-5A	T58-GE-5/8F	none	90	Departure	APU Use	0	0.00%	On	0.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	18	20.00%	G Idle	10.00	61	20.30	1.42	79.15	0.40	4.20
							Taxi Out	18	20.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Hover	18	20.00%	60%	1.05	157	0.68	4.11	20.79	0.40	4.20
							Climbout	18	20.00%	75%	6.00	175	0.24	4.61	14.31	0.40	4.20
						Arrival	Straight In	18	20.00%	60%	9.90	157	0.68	4.11	20.79	0.40	4.20
							Descent	18	20.00%	60%	1.00	157	0.68	4.11	20.79	0.40	4.20
							Taxi In	18	20.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Refuel Taxi	0	0.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Hot Refuel	0	0.00%	G Idle	8.00	61	20.30	1.42	79.15	0.40	4.20
							Apron Taxi	0	0.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Shutdown	18	20.00%	30%	1.00	105	3.27	2.90	38.59	0.40	4.20
						Touch-and-Go	Approach	27	30.00%	60%	2.02	157	0.68	4.11	20.79	0.40	4.20
							Climbout	27	30.00%	75%	0.42	175	0.24	4.61	14.31	0.40	4.20
							Circle	27	30.00%	60%	2.74	157	0.68	4.11	20.79	0.40	4.20

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UH-60	2	T700-GE	T58-GE-5/8F	T62T-27	70	Departure	APU Use	14	20.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)	(EPA 1992)			Warm-Up	14	20.00%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
				GTC 36-200			Taxi Out	14	20.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
				for PM10			Hover	14	20.00%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
				(AESO Fax)			Climbout	14	20.00%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	14	20.00%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	14	20.00%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	14	20.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	14	20.00%	Idle	1.00	164	2.54	3.28	39.81	0.40	4.20
							APU Use	14	20.00%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	21	30.00%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	21	30.00%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	21	30.00%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20
Beechcraft	2	TSIO-360C	AP-42, 3.3	none	64	Departure	Warm-Up	19	29.69%	Idle	7.00	11	138.26	1.91	592.17	0.11	1.83
Dutches 76		(EPA 1992)					Taxi Out	19	29.69%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
							Takeoff	19	29.69%	100%	1.37	133	9.17	2.71	1081.95	0.11	1.83
							Climbout	19	29.69%	85%	4.09	100	9.55	4.32	960.80	0.11	1.83
						Arrival	Straight In	19	29.69%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Overhead In	0	0.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Taxi In	19	29.69%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
						Touch-and-Go	Approach	13	20.31%	40%	1.51	61	11.31	3.77	995.08	0.11	1.83
							Climbout	13	20.31%	85%	0.32	100	9.55	4.32	960.80	0.11	1.83
							Circle	13	20.31%	40%	2.06	61	11.31	3.77	995.08	0.11	1.83
Cessna 172	1	O-320	AP-42, 3.3	none	1,670	Departure	Warm-Up	501	30.00%	Idle	7.00	10	36.92	0.52	1077.00	0.11	1.83
		(EPA 1992)					Taxi Out	501	30.00%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
							Takeoff	501	30.00%	100%	1.37	89	11.78	2.19	1077.44	0.11	1.83
							Climbout	501	30.00%	85%	5.00	67	12.38	3.97	989.51	0.11	1.83
						Arrival	Straight In	501	30.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Overhead In	0	0.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Taxi In	501	30.00%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
						Touch-and-Go	Approach	334	20.00%	40%	1.68	47	19.25	0.95	1221.51	0.11	1.83
							Climbout	334	20.00%	85%	0.35	67	12.38	3.97	989.51	0.11	1.83
							Circle	334	20.00%	40%	2.29	47	19.25	0.95	1221.51	0.11	1.83

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
Mooney Turbo 231	1	TSIO-360C (EPA 1992)	AP-42, 3.3	none	14	Departure	Warm-Up	4	28.57%	Idle	7.00	11	138.26	1.91	592.17	0.11	1.83
							Taxi Out	4	28.57%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
							Takeoff	4	28.57%	100%	1.37	133	9.17	2.71	1081.95	0.11	1.83
							Climbout	4	28.57%	85%	4.09	100	9.55	4.32	960.80	0.11	1.83
						Arrival	Straight In	4	28.57%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Overhead In	0	0.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Taxi In	4	28.57%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
						Touch-and-Go	Approach	3	21.43%	40%	1.51	61	11.31	3.77	995.08	0.11	1.83
							Climbout	3	21.43%	85%	0.32	100	9.55	4.32	960.80	0.11	1.83
							Circle	3	21.43%	40%	2.06	61	11.31	3.77	995.08	0.11	1.83
Gulfstream AA-5A	1	O-320 (EPA 1992)	AP-42, 3.3	none	14	Departure	Warm-Up	4	28.57%	Idle	7.00	10	36.92	0.52	1077.00	0.11	1.83
							Taxi Out	4	28.57%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
							Takeoff	4	28.57%	100%	1.37	89	11.78	2.19	1077.44	0.11	1.83
							Climbout	4	28.57%	85%	4.74	67	12.38	3.97	989.51	0.11	1.83
						Arrival	Straight In	4	28.57%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Overhead In	0	0.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Taxi In	4	28.57%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
						Touch-and-Go	Approach	3	21.43%	40%	1.68	47	19.25	0.95	1221.51	0.11	1.83
							Climbout	3	21.43%	85%	0.35	67	12.38	3.97	989.51	0.11	1.83
							Circle	3	21.43%	40%	2.29	47	19.25	0.95	1221.51	0.11	1.83

Armitage Airfield Flight Operations below 3,000 Feet AGL: 26,984

Notes:
- ROG = reactive organic compounds
- NOx = oxides of nitrogen
- CO = carbon monoxide
- PM10 = inhalable particulate matter
- APU = auxiliary power unit (provides electrical power and air conditioning prior to start of main engines; starts main engines; also provides continuous power for equipment on some aircraft
- FLCP = field carrier landing practice
- G Idle = ground idle; some aircraft have separate low speed (L) and high speed (H) ground idle settings
- F Idle = flight idle
- NR = normal rated power
- AB = afterburner
- IRP = intermediate rated power
- Mil = military power setting
- Int = intermediate power setting; some aircraft have more than one intermediate power setting
- Max Cont = maximum continuous power
- N Lift D = normal lift, dry
- % rpm = percent of rated core revolutions per minute (% N2)
- % T = percent of rated thrust

TABLE D1-24. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10

Notes (continued):
% hp = percent of rated horsepower
% shp = percent of rated shaft horsepower
% Q = percent torque (for turboshaft engines)
Annual flight operations based on analyses summarized in Table D1-3
Engines used for emission rate data are based on information presented in Table D1-23
Flight operation totals and subtotals are the sum of approach mode and climbout mode numbers
Departures and arrivals each represent a single flight operation; Touch-and-Go and FCLP pattern events each represent two flight operations (an approach and a climbout)
Engine power settings and associated fuel flow rates based on data in emission factor source documents and AESO LTO cycle evaluation documents
Time-in-mode estimates based on analysis of flight track profiles for from various airfields (Tables D1-6 through D1-22), AESO LTO cycle evaluation documents, draft AESO analysis of NAWS China Lake aircraft emissions for FY93, and estimates provided by AESO and NAWS China Lake personnel.
Hot refueling (refueling while engines are idling) does not occur at NAWS China Lake.
Sulfur oxide emission rates for turbine engines (jets, turboprops, and helicopters) are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90
PM10 emission factor for piston engines based on industrial gasoline engines (U.S. EPA 1996, Section 3.3), assuming a fuel density of 673 kilogram per cubic meter and an energy content of 40,282 BTU per kilogram (18,272 BTU per pound).

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TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F/A-18A-D	Departure	APU Use	0.00	0.10	0.03	0.01	0.00	Departure	24.51	13.39	74.50	0.57	6.59
		Warm-Up	25.68	0.51	60.61	0.18	5.96						
		Unstick	0.17	0.01	0.47	0.00	0.05						
		Taxi Out	8.56	0.17	20.20	0.06	1.99						
		Final Checks	0.02	0.31	0.18	0.02	0.39						
		AB Takeoff	0.13	9.38	23.53	0.41	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.10	8.45	0.35	0.13	0.94						
	Arrival	Straight In	0.07	0.82	0.47	0.06	1.03	Arrival	9.00	3.02	22.34	0.26	5.59
		Overhead In	0.25	3.20	1.83	0.22	4.00						
		Taxi In	8.56	0.17	20.20	0.06	1.99						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	3.85	0.08	9.09	0.03	0.89						
	Touch-and-Go	Approach	0.02	0.25	0.15	0.02	0.32	Touch-and-Go	0.13	3.03	0.87	0.12	1.93
		Climbout	0.01	0.70	0.03	0.01	0.08						
		Circle	0.03	0.35	0.20	0.02	0.43						
	FCLP	Approach	0.00	0.03	0.02	0.00	0.04	FCLP	0.13	3.03	0.87	0.12	1.93
		Climbout	0.00	0.08	0.00	0.00	0.01						
		Circle	0.00	0.04	0.02	0.00	0.05						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F/A-18E/F	Departure	APU Use	0.00	0.11	0.04	0.01	0.00	Departure	31.48	21.40	281.34	0.71	7.21
		Warm-Up	31.10	1.89	50.98	0.23	7.32						
		Unstick	0.16	0.02	0.32	0.00	0.05						
		Taxi Out	10.37	0.63	16.99	0.08	2.44						
		Final Checks	0.01	0.79	0.08	0.03	0.46						
		AB Takeoff	6.52	13.09	362.18	0.55	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.06	16.27	0.41	0.19	0.77						
	Arrival	Straight In	0.02	2.09	0.22	0.08	1.23	Arrival	9.89	7.27	16.78	0.33	6.23
		Overhead In	0.09	8.13	0.84	0.31	4.78						
		Taxi In	10.37	0.63	16.99	0.08	2.44						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	4.67	0.28	7.65	0.03	1.10						
	Touch-and-Go	Approach	0.01	0.65	0.07	0.02	0.38	Touch-and-Go	0.05	6.19	0.41	0.16	2.07
		Climbout	0.00	1.35	0.03	0.02	0.06						
		Circle	0.01	0.88	0.09	0.03	0.52						
	FCLP	Approach	0.00	0.07	0.01	0.00	0.04	FCLP	0.05	6.19	0.41	0.16	2.07
		Climbout	0.00	0.15	0.00	0.00	0.01						
		Circle	0.00	0.10	0.01	0.00	0.06						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
EA-6B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	18.76	8.09	37.52	0.50	17.22
		Warm-Up	2.14	0.18	4.23	0.03	1.54						
		Unstick	0.00	0.01	0.01	0.00	0.02						
		Taxi Out	0.54	0.04	1.06	0.01	0.39						
		Final Checks	0.01	0.16	0.03	0.01	0.10						
		Mil Takeoff	0.01	0.28	0.03	0.01	0.13						
		Climbout	0.03	0.50	0.09	0.02	0.32						
	Arrival	Straight In	0.01	0.09	0.04	0.00	0.10	Arrival	5.20	10.26	12.47	0.53	13.41
		Overhead In	0.11	1.35	0.51	0.06	1.39						
		Taxi In	0.54	0.04	1.06	0.01	0.39						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.11	0.01	0.21	0.00	0.08						
	Touch-and-Go	Approach	0.01	0.16	0.06	0.01	0.16	Touch-and-Go	0.37	4.93	1.60	0.22	4.56
		Climbout	0.01	0.13	0.02	0.01	0.08						
		Circle	0.01	0.17	0.06	0.01	0.17						
	FCLP	Approach	0.00	0.04	0.02	0.00	0.05	FCLP	0.37	4.93	1.60	0.22	4.56
		Climbout	0.00	0.04	0.01	0.00	0.02						
		Circle	0.00	0.05	0.02	0.00	0.05						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year)					Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event)				
			ROG	NOx	CO	SOx	PM		ROG	NOx	CO	SOx	PM10
AV-8B	Departure	APU Use	0.00	0.02	0.01	0.00	0.00	Departure	9.50	9.81	51.94	0.41	6.36
		Warm-Up	2.14	0.20	11.58	0.04	1.21						
		Unstick	0.01	0.00	0.06	0.00	0.01						
		Taxi Out	0.54	0.05	2.90	0.01	0.30						
		Final Checks	0.01	0.12	0.09	0.01	0.05						
		Mil Takeoff	0.01	0.97	0.10	0.02	0.09						
		Climbout	0.02	1.46	0.20	0.04	0.17						
	Arrival	Straight In	0.00	0.08	0.06	0.00	0.03	Arrival	2.55	6.08	16.43	0.30	3.56
		Overhead In	0.09	1.60	1.19	0.07	0.63						
		Taxi In	0.54	0.05	2.90	0.01	0.30						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.11	0.01	0.58	0.00	0.06						
	Touch-and-Go	Approach	0.01	0.11	0.08	0.00	0.04	Touch-and-Go	0.14	5.08	1.59	0.15	1.00
		Climbout	0.00	0.31	0.04	0.01	0.04						
		Circle	0.00	0.02	0.01	0.00	0.01						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F-3	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	24.51	13.39	74.50	0.57	6.59
		Warm-Up	0.31	0.01	0.73	0.00	0.07						
		Unstick	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.10	0.00	0.24	0.00	0.02						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		AB Takeoff	0.00	0.11	0.28	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.10	0.00	0.00	0.01						
	Arrival	Straight In	0.00	0.05	0.03	0.00	0.06	Arrival	7.48	2.93	18.73	0.24	5.17
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.10	0.00	0.24	0.00	0.02						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.02	0.00	0.05	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.13	3.03	0.87	0.12	1.93
		Climbout	0.00	0.03	0.00	0.00	0.00						
		Circle	0.00	0.01	0.01	0.00	0.02						
F-15	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.74	38.69	72.96	0.88	7.61
		Warm-Up	0.02	0.04	0.20	0.00	0.09						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.01	0.07	0.00	0.03						
		Final Checks	0.00	0.12	0.00	0.00	0.01						
		AB Takeoff	0.00	0.34	1.14	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.24	0.01	0.00	0.02						
	Arrival	Straight In	0.01	0.11	0.03	0.00	0.08	Arrival	0.78	6.28	5.59	0.28	5.85
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.01	0.07	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.02	0.01	0.00	0.02	Touch-and-Go	0.16	6.27	0.91	0.13	2.27
		Climbout	0.00	0.07	0.00	0.00	0.00						
		Circle	0.00	0.03	0.01	0.00	0.02						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F-16	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.59	10.74	22.42	0.50	4.74
		Warm-Up	0.02	0.02	0.09	0.00	0.06						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.01	0.03	0.00	0.02						
		Final Checks	0.00	0.01	0.00	0.00	0.00						
		AB Takeoff	0.00	0.12	0.31	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.05	0.00	0.00	0.01						
	Arrival	Straight In	0.00	0.08	0.01	0.00	0.04	Arrival	0.65	4.44	2.36	0.20	3.29
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.01	0.03	0.00	0.02						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.02	0.00	0.00	0.01	Touch-and-Go	0.13	2.87	0.25	0.10	1.12
		Climbout	0.00	0.02	0.00	0.00	0.00						
		Circle	0.00	0.03	0.00	0.00	0.01						
F-86	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	11.30	3.36	14.69	0.19	6.70
		Warm-Up	1.01	0.04	1.32	0.01	0.44						
		Unstick	0.00	0.00	0.00	0.00	0.01						
		Taxi Out	0.34	0.01	0.44	0.00	0.15						
		Final Checks	0.00	0.06	0.00	0.00	0.04						
		Mil Takeoff	0.01	0.15	0.01	0.00	0.08						
		Climbout	0.01	0.15	0.01	0.00	0.10						
	Arrival	Straight In	0.03	0.44	0.13	0.02	0.45	Arrival	3.57	3.72	5.41	0.17	5.13
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.34	0.01	0.44	0.00	0.15						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.07	0.00	0.09	0.00	0.03						
	Touch-and-Go	Approach	0.01	0.10	0.03	0.00	0.11	Touch-and-Go	0.14	2.14	0.57	0.08	2.09
		Climbout	0.00	0.04	0.00	0.00	0.03						
		Circle	0.01	0.14	0.04	0.01	0.15						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
C-9B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	7.67	13.11	26.59	0.58	10.72
		Warm-Up	0.07	0.02	0.24	0.00	0.08						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.02	0.01	0.08	0.00	0.02						
		Final Checks	0.00	0.02	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.06	0.00	0.00	0.01						
		Climbout	0.00	0.06	0.01	0.00	0.02						
	Arrival	Straight In	0.01	0.03	0.05	0.00	0.04	Arrival	2.77	2.81	10.91	0.24	5.50
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.02	0.01	0.08	0.00	0.02						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.02	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.37	1.86	1.98	0.10	1.80
		Climbout	0.00	0.01	0.00	0.00	0.00						
		Circle	0.00	0.01	0.01	0.00	0.01						
UC-8A	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	3.43	2.14	12.80	0.15	0.82
		Warm-Up	0.01	0.00	0.06	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.02	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.01	0.00	0.00	Arrival	1.09	1.89	4.61	0.11	0.63
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.02	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.06	0.94	0.47	0.05	0.26
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
UC-12B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	10.08	0.61	11.66	0.06	0.38
		Warm-Up	0.78	0.02	0.89	0.00	0.02						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.26	0.01	0.30	0.00	0.01						
		Final Checks	0.00	0.01	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.02	0.01	0.00	0.00						
		Climbout	0.01	0.02	0.02	0.00	0.00						
	Arrival	Straight In	0.13	0.03	0.21	0.00	0.01	Arrival	4.27	0.32	5.35	0.03	0.22
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.26	0.01	0.30	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.05	0.00	0.06	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.01	0.00	0.00	Touch-and-Go	0.62	0.16	0.97	0.01	0.07
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.01	0.00	0.01	0.00	0.00						
U-21	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	3.85	0.52	4.98	0.05	0.30
		Warm-Up	0.01	0.00	0.02	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.00	0.00	0.00	Arrival	1.25	0.43	2.49	0.03	0.17
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.05	0.20	0.49	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
MU-2	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	5.92	0.79	4.65	0.05	0.30
		Warm-Up	2.59	0.09	2.01	0.01	0.10						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.86	0.03	0.67	0.00	0.03						
		Final Checks	0.00	0.04	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.12	0.01	0.00	0.02						
		Climbout	0.00	0.17	0.01	0.01	0.02						
	Arrival	Straight In	0.02	0.30	0.21	0.01	0.07	Arrival	1.81	0.58	1.74	0.03	0.19
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.86	0.03	0.67	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.17	0.01	0.13	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.00	Touch-and-Go	0.02	0.29	0.18	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.01	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
OV-10	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.43	0.82	3.48	0.07	0.42
		Warm-Up	0.01	0.00	0.03	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.74	0.35	2.09	0.03	0.21
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.15	0.12	0.52	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
OV-1	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	6.55	0.62	3.35	0.07	0.70
		Warm-Up	0.09	0.00	0.04	0.00	0.01						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.02	0.00	0.01	Arrival	2.04	0.90	1.82	0.06	0.68
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.45	0.46	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
P-3	Departure	APU Use	0.00	0.03	0.02	0.00	0.00	Departure	18.22	12.56	27.21	0.86	19.25
		Warm-Up	0.08	0.01	0.11	0.00	0.06						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.00	0.04	0.00	0.02						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.01	0.00	0.00	0.01						
		Climbout	0.00	0.01	0.00	0.00	0.02						
	Arrival	Straight In	0.00	0.05	0.00	0.00	0.06	Arrival	5.51	9.19	8.04	0.44	13.69
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.00	0.04	0.00	0.02						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.08	4.49	0.40	0.18	5.25
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
C-130	Departure	APU Use	0.00	0.08	0.31	0.01	0.00	Departure	18.01	11.18	33.82	0.80	20.49
		Warm-Up	0.45	0.07	0.60	0.01	0.34						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.15	0.02	0.20	0.00	0.11						
		Final Checks	0.00	0.02	0.00	0.00	0.02						
		Mil Takeoff	0.00	0.06	0.00	0.00	0.06						
		Climbout	0.00	0.12	0.01	0.00	0.13						
	Arrival	Straight In	0.00	0.28	0.02	0.01	0.33	Arrival	5.50	9.40	8.66	0.45	14.10
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.15	0.02	0.20	0.00	0.11						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.03	0.00	0.04	0.00	0.02						
		APU Use	0.00	0.01	0.03	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.08	4.41	0.35	0.17	5.24
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
T-34	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.93	0.30	2.50	0.03	0.16
		Warm-Up	0.01	0.00	0.02	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.00	0.00	0.00	Arrival	0.63	0.21	1.25	0.01	0.09
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.02	0.10	0.25	0.00	0.03
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
T-38	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	4.51	3.19	51.50	0.27	9.35
		Warm-Up	0.04	0.01	0.39	0.00	0.08						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.00	0.13	0.00	0.03						
		Final Checks	0.00	0.00	0.01	0.00	0.00						
		AB Takeoff	0.00	0.01	0.09	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.02	0.00	0.01						
	Arrival	Straight In	0.00	0.03	0.13	0.00	0.05	Arrival	1.55	2.43	22.62	0.19	6.48
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.13	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.03	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.03	0.00	0.01	Touch-and-Go	0.13	1.18	5.68	0.08	2.27
		Climbout	0.00	0.00	0.01	0.00	0.00						
		Circle	0.00	0.01	0.04	0.00	0.02						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
T-39D	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	4.52	2.54	45.71	0.22	9.87
		Warm-Up	0.07	0.02	0.69	0.00	0.14						
		Unstick	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.02	0.01	0.23	0.00	0.05						
		Final Checks	0.00	0.01	0.02	0.00	0.01						
		Mil Takeoff	0.00	0.01	0.03	0.00	0.01						
		Climbout	0.00	0.01	0.04	0.00	0.02						
	Arrival	Straight In	0.00	0.04	0.22	0.00	0.09	Arrival	1.55	2.43	22.62	0.19	6.48
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.02	0.01	0.23	0.00	0.05						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.05	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.02	0.10	0.00	0.04	Touch-and-Go	0.13	1.18	5.68	0.08	2.27
		Climbout	0.00	0.01	0.02	0.00	0.01						
		Circle	0.00	0.03	0.13	0.00	0.05						
AH-1W	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.16	1.12	3.30	0.09	0.92
		Warm-Up	0.00	0.01	0.05	0.00	0.01						
		Taxi Out	0.00	0.01	0.01	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.03	0.00	0.01						
	Arrival	Straight In	0.00	0.02	0.05	0.00	0.01	Arrival	0.13	0.88	2.64	0.07	0.73
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.01	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.01	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.02	0.00	0.01						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
AH-64	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.20	1.14	3.55	0.09	0.93
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.13	0.88	2.64	0.07	0.73
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
CH-46E	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.65	1.66	6.70	0.10	0.99
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.61	1.55	7.45	0.11	1.04
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.09	0.65	1.80	0.04	0.39
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
CH-53E	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	5.66	6.48	13.51	0.39	2.07
		Warm-Up	0.01	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.00	0.00	0.00	Arrival	3.42	5.04	8.31	0.35	1.91
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.20	2.52	1.07	0.14	0.75
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
UH-1L	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.68	0.85	1.32	0.05	0.57
		Warm-Up	0.04	0.00	0.02	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.01	0.00	0.01						
	Arrival	Straight In	0.00	0.01	0.02	0.00	0.01	Arrival	0.26	0.96	1.10	0.06	0.64
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.03	0.38	0.27	0.02	0.24
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
HH-1N	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.47	0.91	2.22	0.08	0.80
		Warm-Up	0.03	0.01	0.14	0.00	0.02						
		Taxi Out	0.00	0.01	0.00	0.00	0.01						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.03	0.00	0.00	0.02						
	Arrival	Straight In	0.00	0.02	0.02	0.00	0.02	Arrival	0.05	0.63	0.58	0.05	0.55
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.01	0.00	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.01	0.29	0.11	0.02	0.23
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.02	0.00	0.00	0.01						
OH-58	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.23	0.12	1.31	0.01	0.15
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.00	0.00	0.00	Arrival	0.04	0.14	0.86	0.01	0.15
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.01	0.06	0.28	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
UH-60	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.20	1.14	3.55	0.09	0.93
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.24	0.92	3.15	0.07	0.71
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
Beechcraft Dutches 76	Departure	Warm-Up	0.00	0.00	0.01	0.00	0.00	Departure	0.82	0.08	22.33	0.00	0.04
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Takeoff	0.00	0.00	0.06	0.00	0.00						
		Climbout	0.00	0.00	0.12	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.14	0.00	0.00	Arrival	0.43	0.06	16.19	0.00	0.03
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.02	0.00	0.00	Touch-and-Go	0.09	0.03	8.26	0.00	0.02
		Climbout	0.00	0.00	0.01	0.00	0.00						
		Circle	0.00	0.00	0.03	0.00	0.00						
Cessna 172	Departure	Warm-Up	0.01	0.00	0.30	0.00	0.00	Departure	0.16	0.03	9.74	0.00	0.02
		Taxi Out	0.01	0.00	0.22	0.00	0.00						
		Takeoff	0.01	0.00	0.55	0.00	0.00						
		Climbout	0.02	0.01	1.38	0.00	0.00						
	Arrival	Straight In	0.03	0.00	1.97	0.00	0.00	Arrival	0.15	0.01	8.72	0.00	0.01
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.22	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.27	0.00	0.00	Touch-and-Go	0.06	0.00	4.17	0.00	0.01
		Climbout	0.00	0.00	0.06	0.00	0.00						
		Circle	0.01	0.00	0.36	0.00	0.00						

TABLE D1-25. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE NO ACTION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
Mooney Turbo 231	Departure	Warm-Up	0.00	0.00	0.00	0.00	0.00	Departure	0.41	0.04	11.16	0.00	0.02
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Takeoff	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.22	0.03	8.09	0.00	0.02
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.05	0.02	4.13	0.00	0.01
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
Gulfstream	Departure	Warm-Up	0.00	0.00	0.00	0.00	0.00	Departure	0.16	0.03	9.46	0.00	0.02
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.15	0.01	8.72	0.00	0.01
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.06	0.00	4.17	0.00	0.01
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
Flight Operations Below 3,000 ft AGL			128.11	85.50	644.98	3.57	53.12						

Notes:
F/A-18 aircraft approach flight tracks used to estimate the portion of approach segment emissions occurring over San Bernardino County: 44.4% of straight-ir approaches and 63.7% of overhead break approaches.

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18A-D	2	F404-GE-400	F404-GE-400	GTC 36-200	8,696	Departure	APU Use	3,254	37.42%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)			Warm-Up	3,254	37.42%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	3,254	37.42%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Taxi Out	3,254	37.42%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Final Checks	3,254	37.42%	86% rpm	0.40	2,836	0.46	5.80	3.32	0.40	7.25
							AB Takeoff	3,254	37.42%	Max AB	0.76	28,397	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	8,587	0.31	25.16	1.05	0.40	2.81
							Climbout	3,254	37.42%	IRP	0.83	8,587	0.31	25.16	1.05	0.40	2.81
						Arrival	Straight In	678	7.80%	86% rpm	5.08	2,836	0.46	5.80	3.32	0.40	7.25
							Overhead In	2,576	29.62%	86% rpm	5.21	2,836	0.46	5.80	3.32	0.40	7.25
							Taxi In	3,254	37.42%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Refuel Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Hot Refuel	0	0.00%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	0	0.00%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Apron Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Shutdown	3,254	37.42%	G Idle	2.25	624	58.18	1.16	137.34	0.40	13.50
						Touch-and-Go	Approach	986	11.34%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	986	11.34%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	986	11.34%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25
						FCLP	Approach	108	1.24%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	108	1.24%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	108	1.24%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18E/F	2	F414-GE-400	F404-GE-400	GTC 36-200	9,420	Departure	APU Use	3,524	37.41%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9725A)	(Regression	(AESO Fax)			Warm-Up	3,524	37.41%	G Idle	15.00	749	54.20	3.29	88.85	0.40	12.75
			Equation				Unstick	3,524	37.41%	F Idle	0.10	862	36.63	3.55	72.17	0.40	12.17
			Presented in				Taxi Out	3,524	37.41%	G Idle	5.00	749	54.20	3.29	88.85	0.40	12.75
			AESO 9734A)				Final Checks	3,524	37.41%	86% rpm	0.40	3,666	0.12	10.53	1.09	0.40	6.19
							AB Takeoff	3,524	37.41%	Max AB	0.76	35,603	4.72	9.47	262.11	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	10,986	0.12	34.94	0.89	0.40	1.66
							Climbout	3,524	37.41%	IRP	0.83	10,986	0.12	34.94	0.89	0.40	1.66
						Arrival	Straight In	735	7.80%	86% rpm	5.08	3,666	0.12	10.53	1.09	0.40	6.19
							Overhead In	2,789	29.61%	86% rpm	5.21	3,666	0.12	10.53	1.09	0.40	6.19
							Taxi In	3,524	37.41%	G Idle	5.00	749	54.20	3.29	88.85	0.40	12.75
							Refuel Taxi	0	0.00%	G Idle	2.50	749	54.20	3.29	88.85	0.40	12.75
							Hot Refuel	0	0.00%	G Idle	15.00	749	54.20	3.29	88.85	0.40	12.75
							Unstick	0	0.00%	F Idle	0.10	862	36.63	3.55	72.17	0.40	12.17
							Apron Taxi	0	0.00%	G Idle	2.50	749	54.20	3.29	88.85	0.40	12.75
							Shutdown	3,524	37.41%	G Idle	2.25	749	54.20	3.29	88.85	0.40	12.75
						Touch-and-Go	Approach	1,068	11.34%	86% rpm	1.08	3,666	0.12	10.53	1.09	0.40	6.19
							Climbout	1,068	11.34%	IRP	0.23	10,986	0.12	34.94	0.89	0.40	1.66
							Circle	1,068	11.34%	86% rpm	1.47	3,666	0.12	10.53	1.09	0.40	6.19
						FCLP	Approach	118	1.25%	86% rpm	1.08	3,666	0.12	10.53	1.09	0.40	6.19
							Climbout	118	1.25%	IRP	0.23	10,986	0.12	34.94	0.89	0.40	1.66
							Circle	118	1.25%	86% rpm	1.47	3,666	0.12	10.53	1.09	0.40	6.19

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
EA-6B	2	J52-P-408	J52-P-6B	none	1,210	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	335	27.69%	Idle	20.00	779	28.33	2.38	55.96	0.40	20.42
			Equation				Unstick	335	27.69%	Int 1	0.10	2,547	1.40	6.17	11.12	0.40	13.45
			Derived From				Taxi Out	335	27.69%	Idle	5.00	779	28.33	2.38	55.96	0.40	20.42
			Data in				Final Checks	335	27.69%	NR	0.40	8,078	0.61	10.29	1.95	0.40	6.67
			AESO 6-90)				Mil Takeoff	335	27.69%	Mil	0.50	9,479	0.57	12.32	1.47	0.40	5.73
							Climbout	335	27.69%	NR	1.24	8,078	0.61	10.29	1.95	0.40	6.67
						Arrival	Straight In	32	2.64%	Int 2	4.12	5,752	0.67	8.38	3.18	0.40	8.67
							Overhead In	303	25.04%	Int 2	6.37	5,752	0.67	8.38	3.18	0.40	8.67
							Taxi In	335	27.69%	Idle	5.00	779	28.33	2.38	55.96	0.40	20.42
							Refuel Taxi	0	0.00%	Idle	2.50	779	28.33	2.38	55.96	0.40	20.42
							Hot Refuel	0	0.00%	Idle	15.00	779	28.33	2.38	55.96	0.40	20.42
							Unstick	0	0.00%	Int 1	0.10	2,547	1.40	6.17	11.12	0.40	13.45
							Apron Taxi	0	0.00%	Idle	2.50	779	28.33	2.38	55.96	0.40	20.42
							Shutdown	335	27.69%	Idle	1.00	779	28.33	2.38	55.96	0.40	20.42
						Touch-and-Go	Approach	212	17.52%	Int 2	1.07	5,752	0.67	8.38	3.18	0.40	8.67
							Climbout	212	17.52%	NR	0.51	8,078	0.61	10.29	1.95	0.40	6.67
							Circle	212	17.52%	Int 2	1.12	5,752	0.67	8.38	3.18	0.40	8.67
						FCLP	Approach	58	4.79%	Int 2	1.07	5,752	0.67	8.38	3.18	0.40	8.67
							Climbout	58	4.79%	NR	0.51	8,078	0.61	10.29	1.95	0.40	6.67
							Circle	58	4.79%	Int 2	1.12	5,752	0.67	8.38	3.18	0.40	8.67
AV-8B	1	F402-RR-406A	F404-GE-400	GTC 36-200	1,722	Departure	APU Use	661	38.39%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9912)	(AESO	(AESO Fax)			Warm-Up	661	38.39%	Idle	20.00	1,137	19.66	1.80	106.30	0.40	11.10
			Regression				Unstick	661	38.39%	Idle	0.10	1,137	19.66	1.80	106.30	0.40	11.10
			Analysis in				Taxi Out	661	38.39%	Idle	5.00	1,137	19.66	1.80	106.30	0.40	11.10
			AESO 9912)				Final Checks	661	38.39%	85% rpm	0.40	6,811	0.50	9.20	6.80	0.40	3.60
							Mil Takeoff	661	38.39%	N Lift D	0.88	13,085	0.24	17.60	1.90	0.40	1.70
							Climbout	661	38.39%	Combat	1.51	12,258	0.26	16.50	2.20	0.40	1.90
						Arrival	Straight In	43	2.50%	85% rpm	4.38	6,811	0.50	9.20	6.80	0.40	3.60
							Overhead In	618	35.89%	85% rpm	5.71	6,811	0.50	9.20	6.80	0.40	3.60
							Taxi In	661	38.39%	Idle	5.00	1,137	19.66	1.80	106.30	0.40	11.10
							Refuel Taxi	0	0.00%	Idle	2.50	1,137	19.66	1.80	106.30	0.40	11.10
							Hot Refuel	0	0.00%	Idle	15.00	1,137	19.66	1.80	106.30	0.40	11.10
							Unstick	0	0.00%	Idle	0.10	1,137	19.66	1.80	106.30	0.40	11.10
							Apron Taxi	0	0.00%	Idle	2.50	1,137	19.66	1.80	106.30	0.40	11.10
							Shutdown	661	38.39%	Idle	1.00	1,137	19.66	1.80	106.30	0.40	11.10
						Touch-and-Go	Approach	200	11.61%	85% rpm	1.24	6,811	0.50	9.20	6.80	0.40	3.60
							Climbout	200	11.61%	Combat	1.06	12,258	0.26	16.50	2.20	0.40	1.90
							Circle	200	11.61%	85% rpm	0.20	6,811	0.50	9.20	6.80	0.40	3.60

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-3	2	F404-GE-400	F404-GE-400	GTC 36-200	164	Departure	APU Use	39	23.78%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)			Warm-Up	39	23.78%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	39	23.78%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Taxi Out	39	23.78%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Final Checks	39	23.78%	86% rpm	0.40	2,836	0.46	5.80	3.32	0.40	7.25
							AB Takeoff	39	23.78%	Max AB	0.76	28,397	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	8,587	0.31	25.16	1.05	0.40	2.81
							Climbout	39	23.78%	IRP	0.83	8,587	0.31	25.16	1.05	0.40	2.81
						Arrival	Straight In	39	23.78%	86% rpm	5.08	2,836	0.46	5.80	3.32	0.40	7.25
							Overhead In	0	0.00%	86% rpm	NA	2,836	0.46	5.80	3.32	0.40	7.25
							Taxi In	39	23.78%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Refuel Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Hot Refuel	0	0.00%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	0	0.00%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Apron Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Shutdown	39	23.78%	G Idle	1.00	624	58.18	1.16	137.34	0.40	13.50
						Touch-and-Go	Approach	43	26.22%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	43	26.22%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	43	26.22%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25
F-15	2	F100-PW-100	TF30-P-414	GTC 36-200	186	Departure	APU Use	45	24.19%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(AESO 6-90)	(AESO Fax)			Warm-Up	45	24.19%	Idle	15.00	1,060	2.26	3.96	19.34	0.40	8.96
							Unstick	45	24.19%	Idle	0.10	1,060	2.26	3.96	19.34	0.40	8.96
							Taxi Out	45	24.19%	Idle	5.00	1,060	2.26	3.96	19.34	0.40	8.96
							Final Checks	45	24.19%	95%	0.40	10,400	0.05	44.00	1.80	0.40	2.98
							AB Takeoff	45	24.19%	Max AB	0.72	44,200	0.10	16.50	55.10	0.40	no data
							Mil Takeoff	0	0.00%	95%	0.86	10,400	0.05	44.00	1.80	0.40	2.98
							Climbout	45	24.19%	95%	0.80	10,400	0.05	44.00	1.80	0.40	2.98
						Arrival	Straight In	45	24.19%	30%	4.95	3,000	0.60	11.00	3.00	0.40	7.98
							Overhead In	0	0.00%	30%	NA	3,000	0.60	11.00	3.00	0.40	7.98
							Taxi In	45	24.19%	Idle	5.00	1,060	2.26	3.96	19.34	0.40	8.96
							Refuel Taxi	0	0.00%	Idle	2.50	1,060	2.26	3.96	19.34	0.40	8.96
							Hot Refuel	0	0.00%	Idle	15.00	1,060	2.26	3.96	19.34	0.40	8.96
							Unstick	0	0.00%	Idle	0.10	1,060	2.26	3.96	19.34	0.40	8.96
							Apron Taxi	0	0.00%	Idle	2.50	1,060	2.26	3.96	19.34	0.40	8.96
							Shutdown	45	24.19%	Idle	1.00	1,060	2.26	3.96	19.34	0.40	8.96
						Touch-and-Go	Approach	48	25.81%	30%	1.08	3,000	0.60	11.00	3.00	0.40	7.98
							Climbout	48	25.81%	95%	0.23	10,400	0.05	44.00	1.80	0.40	2.98
							Circle	48	25.81%	30%	1.47	3,000	0.60	11.00	3.00	0.40	7.98

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-16	1	F110-GE-400	F404-GE-400	GTC 36-200	186	Departure	APU Use	45	24.19%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9821)	(Regression	(AESO Fax)			Warm-Up	45	24.19%	Idle	15.00	1,171	3.65	2.77	16.60	0.40	10.90
		F404-GE-400	Equation				Unstick	45	24.19%	77% rpm	0.10	1,793	2.33	4.26	7.73	0.40	9.14
		for Max AB	Presented in				Taxi Out	45	24.19%	Idle	5.00	1,171	3.65	2.77	16.60	0.40	10.90
		(AESO 9734A)	AESO 9734A)				Final Checks	45	24.19%	92% rpm	0.40	6,752	0.41	14.86	0.94	0.40	3.67
							AB Takeoff	45	24.19%	Max AB	0.72	56,703	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.86	11,719	0.40	28.63	0.84	0.40	1.39
							Climbout	45	24.19%	96% rpm	0.80	9,324	0.38	21.15	0.93	0.40	2.33
						Arrival	Straight In	45	24.19%	88% rpm	4.95	4,786	0.56	10.43	1.05	0.40	5.09
							Overhead In	0	0.00%	88% rpm	NA	4,786	0.56	10.43	1.05	0.40	5.09
							Taxi In	45	24.19%	Idle	5.00	1,171	3.65	2.77	16.60	0.40	10.90
							Refuel Taxi	0	0.00%	Idle	2.50	1,171	3.65	2.77	16.60	0.40	10.90
							Hot Refuel	0	0.00%	Idle	15.00	1,171	3.65	2.77	16.60	0.40	10.90
							Unstick	0	0.00%	77% rpm	0.10	1,793	2.33	4.26	7.73	0.40	9.14
							Apron Taxi	0	0.00%	Idle	2.50	1,171	3.65	2.77	16.60	0.40	10.90
							Shutdown	45	24.19%	Idle	1.00	1,171	3.65	2.77	16.60	0.40	10.90
						Touch-and-Go	Approach	48	25.81%	88% rpm	1.08	4,786	0.56	10.43	1.05	0.40	5.09
							Climbout	48	25.81%	96% rpm	0.23	9,324	0.38	21.15	0.93	0.40	2.33
							Circle	48	25.81%	88% rpm	1.47	4,786	0.56	10.43	1.05	0.40	5.09
F-86	1	J52-P-8B	J52-P-6B	none	1,168	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	279	23.89%	Idle	15.00	680	48.96	1.79	63.78	0.40	21.21
			Equation				Unstick	279	23.89%	37% T	0.10	2,300	1.99	6.34	10.54	0.40	14.05
			Derived From				Taxi Out	279	23.89%	Idle	5.00	680	48.96	1.79	63.78	0.40	21.21
			Data in				Final Checks	279	23.89%	NR	0.40	6,130	0.69	12.13	0.87	0.40	8.29
			AESO 6-90)				Mil Takeoff	279	23.89%	Mil	0.76	7,370	1.08	13.05	0.71	0.40	7.21
							Climbout	279	23.89%	NR	0.98	6,130	0.69	12.13	0.87	0.40	8.29
						Arrival	Straight In	279	23.89%	75% T	4.95	4,320	0.67	10.10	3.00	0.40	10.35
							Overhead In	0	0.00%	75% T	NA	4,320	0.67	10.10	3.00	0.40	10.35
							Taxi In	279	23.89%	Idle	5.00	680	48.96	1.79	63.78	0.40	21.21
							Refuel Taxi	0	0.00%	Idle	2.50	680	48.96	1.79	63.78	0.40	21.21
							Hot Refuel	0	0.00%	Idle	15.00	680	48.96	1.79	63.78	0.40	21.21
							Unstick	0	0.00%	37% T	0.10	2,300	1.99	6.34	10.54	0.40	14.05
							Apron Taxi	0	0.00%	Idle	2.50	680	48.96	1.79	63.78	0.40	21.21
							Shutdown	279	23.89%	Idle	1.00	680	48.96	1.79	63.78	0.40	21.21
						Touch-and-Go	Approach	305	26.11%	75% T	1.08	4,320	0.67	10.10	3.00	0.40	10.35
							Climbout	305	26.11%	NR	0.23	6,130	0.69	12.13	0.87	0.40	8.29
							Circle	305	26.11%	75% T	1.47	4,320	0.67	10.10	3.00	0.40	10.35

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
C-9B	2	JT8D-9	F404-GE-400	GTC85-72	116	Departure	APU Use	0	0.00%	On	3.50	210	0.13	3.88	14.83	0.40	0.22
		(EPA 1992)	(Regression	(EPA 1992)			Warm-Up	29	25.00%	Idle	16.00	1,048	10.00	2.90	34.50	0.40	11.36
			Equation	GTC 36-200			Unstick	29	25.00%	30%	0.10	2,365	1.73	5.64	9.43	0.40	8.00
			Presented in	for PM10			Taxi Out	29	25.00%	Idle	5.00	1,048	10.00	2.90	34.50	0.40	11.36
			AESO 9734A)	(AESO Fax)			Final Checks	29	25.00%	85%	0.40	6,715	0.47	14.21	1.66	0.40	3.69
							Mil Takeoff	29	25.00%	100%	1.01	8,254	0.47	17.92	1.24	0.40	2.84
							Climbout	29	25.00%	85%	1.46	6,715	0.47	14.21	1.66	0.40	3.69
						Arrival	Straight In	29	25.00%	30%	4.95	2,365	1.73	5.64	9.43	0.40	8.00
							Overhead In	0	0.00%	30%	NA	2,365	1.73	5.64	9.43	0.40	8.00
							Taxi In	29	25.00%	Idle	5.00	1,048	10.00	2.90	34.50	0.40	11.36
							Refuel Taxi	0	0.00%	Idle	2.50	1,048	10.00	2.90	34.50	0.40	11.36
							Hot Refuel	0	0.00%	Idle	15.00	1,048	10.00	2.90	34.50	0.40	11.36
							Unstick	0	0.00%	30%	0.10	2,365	1.73	5.64	9.43	0.40	8.00
							Apron Taxi	0	0.00%	Idle	2.50	1,048	10.00	2.90	34.50	0.40	11.36
							Shutdown	29	25.00%	Idle	1.00	1,048	10.00	2.90	34.50	0.40	11.36
						Touch-and-Go	Approach	29	25.00%	30%	1.08	2,365	1.73	5.64	9.43	0.40	8.00
							Climbout	29	25.00%	85%	0.23	6,715	0.47	14.21	1.66	0.40	3.69
							Circle	29	25.00%	30%	1.47	2,365	1.73	5.64	9.43	0.40	8.00
UC-8A	2	T64-GE-6B	T64-GE-6B/415	T62T-27	32	Departure	APU Use	14	43.75%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)	(EPA 1992)			Warm-Up	14	43.75%	Idle	15.00	321	15.36	2.75	57.27	0.40	2.21
				GTC 36-200			Unstick	14	43.75%	75% hp	0.10	1,063	0.48	7.80	4.27	0.40	2.21
				for PM10			Taxi Out	14	43.75%	Idle	5.00	321	15.36	2.75	57.27	0.40	2.21
				(AESO Fax)			Final Checks	14	43.75%	NR	0.40	1,262	0.56	8.97	2.66	0.40	2.21
							Mil Takeoff	14	43.75%	Max Cont	1.13	1,428	0.64	10.11	1.50	0.40	2.21
							Climbout	14	43.75%	Mil	1.80	1,370	0.59	9.80	1.87	0.40	2.21
						Arrival	Straight In	14	43.75%	75% hp	6.19	1,063	0.48	7.80	4.27	0.40	2.21
							Overhead In	0	0.00%	75% hp	NA	1,063	0.48	7.80	4.27	0.40	2.21
							Taxi In	14	43.75%	Idle	5.00	321	15.36	2.75	57.27	0.40	2.21
							Refuel Taxi	0	0.00%	Idle	2.50	321	15.36	2.75	57.27	0.40	2.21
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	75% hp	0.10	1,063	0.48	7.80	4.27	0.40	2.21
							Apron Taxi	0	0.00%	Idle	2.50	321	15.36	2.75	57.27	0.40	2.21
							Shutdown	14	43.75%	Idle	1.00	321	15.36	2.75	57.27	0.40	2.21
						Touch-and-Go	Approach	2	6.25%	75% hp	1.26	1,063	0.48	7.80	4.27	0.40	2.21
							Climbout	2	6.25%	Mil	0.26	1,370	0.59	9.80	1.87	0.40	2.21
							Circle	2	6.25%	75% hp	1.72	1,063	0.48	7.80	4.27	0.40	2.21

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UC-12B	2	PT6A-41	TPE331-3	none	560	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	242	43.21%	Idle	15.00	147	101.63	1.97	115.31	0.40	2.95
							Unstick	242	43.21%	30%	0.10	273	22.71	4.65	34.80	0.40	2.40
							Taxi Out	242	43.21%	Idle	5.00	147	101.63	1.97	115.31	0.40	2.95
							Final Checks	242	43.21%	90%	0.40	473	2.03	7.57	6.49	0.40	1.47
							Mil Takeoff	242	43.21%	100%	1.13	510	1.75	7.98	5.10	0.40	1.75
							Climbout	242	43.21%	90%	1.80	473	2.03	7.57	6.49	0.40	1.47
						Arrival	Straight In	242	43.21%	30%	6.19	273	22.71	4.65	34.80	0.40	2.40
							Overhead In	0	0.00%	30%	NA	273	22.71	4.65	34.80	0.40	2.40
							Taxi In	242	43.21%	Idle	5.00	147	101.63	1.97	115.31	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	147	101.63	1.97	115.31	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	273	22.71	4.65	34.80	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	147	101.63	1.97	115.31	0.40	2.95
							Shutdown	242	43.21%	Idle	1.00	147	101.63	1.97	115.31	0.40	2.95
						Touch-and-Go	Approach	38	6.79%	30%	1.26	273	22.71	4.65	34.80	0.40	2.40
							Climbout	38	6.79%	90%	0.26	473	2.03	7.57	6.49	0.40	1.47
							Circle	38	6.79%	30%	1.72	273	22.71	4.65	34.80	0.40	2.40
U-21	2	PT6A-27	TPE331-3	none	24	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	10	41.67%	Idle	15.00	115	50.17	2.43	64.00	0.40	2.95
							Unstick	10	41.67%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Taxi Out	10	41.67%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Final Checks	10	41.67%	90%	0.40	400	0.00	7.00	1.20	0.40	1.47
							Mil Takeoff	10	41.67%	100%	1.13	425	0.00	7.81	1.01	0.40	1.75
							Climbout	10	41.67%	90%	1.80	400	0.00	7.00	1.20	0.40	1.47
						Arrival	Straight In	10	41.67%	30%	6.19	215	2.19	8.37	23.02	0.40	2.40
							Overhead In	0	0.00%	30%	NA	215	2.19	8.37	23.02	0.40	2.40
							Taxi In	10	41.67%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Shutdown	10	41.67%	Idle	1.00	115	50.17	2.43	64.00	0.40	2.95
						Touch-and-Go	Approach	2	8.33%	30%	1.26	215	2.19	8.37	23.02	0.40	2.40
							Climbout	2	8.33%	90%	0.26	400	0.00	7.00	1.20	0.40	1.47
							Circle	2	8.33%	30%	1.72	215	2.19	8.37	23.02	0.40	2.40

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
MU-2	2	TPE331-3	TPE331-3	none	3,106	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	1,341	43.17%	Idle	15.00	112	79.11	2.86	61.52	0.40	2.95
							Unstick	1,341	43.17%	30%	0.10	250	0.64	9.92	6.96	0.40	2.40
							Taxi Out	1,341	43.17%	Idle	5.00	112	79.11	2.86	61.52	0.40	2.95
							Final Checks	1,341	43.17%	90%	0.40	409	0.15	11.86	0.98	0.40	1.47
							Mil Takeoff	1,341	43.17%	100%	1.13	458	0.11	12.36	0.76	0.40	1.75
							Climbout	1,341	43.17%	90%	1.80	409	0.15	11.86	0.98	0.40	1.47
						Arrival	Straight In	1,341	43.17%	30%	6.19	250	0.64	9.92	6.96	0.40	2.40
							Overhead In	0	0.00%	30%	NA	250	0.64	9.92	6.96	0.40	2.40
							Taxi In	1,341	43.17%	Idle	5.00	112	79.11	2.86	61.52	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	112	79.11	2.86	61.52	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	250	0.64	9.92	6.96	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	112	79.11	2.86	61.52	0.40	2.95
							Shutdown	1,341	43.17%	Idle	1.00	112	79.11	2.86	61.52	0.40	2.95
						Touch-and-Go	Approach	212	6.83%	30%	1.26	250	0.64	9.92	6.96	0.40	2.40
							Climbout	212	6.83%	90%	0.26	409	0.15	11.86	0.98	0.40	1.47
							Circle	212	6.83%	30%	1.72	250	0.64	9.92	6.96	0.40	2.40
OV-10	2	T76-G-12A	TPE331-3	none	64	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(EPA 1992)				Warm-Up	28	43.75%	G Start	15.00	180	11.85	4.30	28.29	0.40	2.95
							Unstick	28	43.75%	H Idle	0.10	212	7.12	4.50	24.59	0.40	2.40
							Taxi Out	28	43.75%	G Start	5.00	180	11.85	4.30	28.29	0.40	2.95
							Final Checks	28	43.75%	Mil	0.40	382	0.06	7.18	1.69	0.40	1.47
							Mil Takeoff	28	43.75%	Mil	1.13	382	0.06	7.18	1.69	0.40	1.47
							Climbout	28	43.75%	Mil	1.80	382	0.06	7.18	1.69	0.40	1.47
						Arrival	Straight In	28	43.75%	H Idle	6.19	212	7.12	4.50	24.59	0.40	2.40
							Overhead In	0	0.00%	H Idle	NA	212	7.12	4.50	24.59	0.40	2.40
							Taxi In	28	43.75%	G Start	5.00	180	11.85	4.30	28.29	0.40	2.95
							Refuel Taxi	0	0.00%	G Start	2.50	180	11.85	4.30	28.29	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	H Idle	0.10	212	7.12	4.50	24.59	0.40	2.40
							Apron Taxi	0	0.00%	G Start	2.50	180	11.85	4.30	28.29	0.40	2.95
							Shutdown	28	43.75%	G Start	1.00	180	11.85	4.30	28.29	0.40	2.95
						Touch-and-Go	Approach	4	6.25%	H Idle	1.26	212	7.12	4.50	24.59	0.40	2.40
							Climbout	4	6.25%	Mil	0.26	382	0.06	7.18	1.69	0.40	1.47
							Circle	4	6.25%	H Idle	1.72	212	7.12	4.50	24.59	0.40	2.40

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
OV-1	2	T53-L-11D	T58-GE-5/8F	none	94	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	41	43.62%	G Idle	15.00	145	67.41	1.58	31.51	0.40	4.20
							Unstick	41	43.62%	F Idle	0.10	222	15.75	2.53	37.79	0.40	4.20
							Taxi Out	41	43.62%	G Idle	5.00	145	67.41	1.58	31.51	0.40	4.20
							Final Checks	41	43.62%	NR	0.40	645	0.66	6.43	6.83	0.40	4.20
							Mil Takeoff	41	43.62%	100% hp	0.85	690	0.32	7.75	3.85	0.40	4.20
							Climbout	41	43.62%	Mil	1.80	685	0.30	6.34	3.34	0.40	4.20
						Arrival	Straight In	41	43.62%	NR	6.19	645	0.66	6.43	6.83	0.40	4.20
							Overhead In	0	0.00%	NR	NA	645	0.66	6.43	6.83	0.40	4.20
							Taxi In	41	43.62%	G Idle	5.00	145	67.41	1.58	31.51	0.40	4.20
							Refuel Taxi	0	0.00%	G Idle	2.50	145	67.41	1.58	31.51	0.40	4.20
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	222	15.75	2.53	37.79	0.40	4.20
							Apron Taxi	0	0.00%	G Idle	2.50	145	67.41	1.58	31.51	0.40	4.20
							Shutdown	41	43.62%	G Idle	1.00	145	67.41	1.58	31.51	0.40	4.20
						Touch-and-Go	Approach	6	6.38%	NR	1.26	645	0.66	6.43	6.83	0.40	4.20
							Climbout	6	6.38%	Mil	0.26	685	0.30	6.34	3.34	0.40	4.20
							Circle	6	6.38%	NR	1.72	645	0.66	6.43	6.83	0.40	4.20
P-3	4	T56-A-16	J79-GE-10B	GTC95-2	32	Departure	APU Use	14	43.75%	On	180.00	293	0.36	5.65	3.20	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)			Warm-Up	14	43.75%	G Idle L	15.00	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200			Unstick	14	43.75%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
			Analysis in	for PM10			Taxi Out	14	43.75%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
			AESO 9908A)	(AESO Fax)			Final Checks	14	43.75%	96% shp	0.40	2,150	0.16	10.30	0.73	0.40	11.70
							Mil Takeoff	14	43.75%	Mil	1.07	2,219	0.16	10.45	0.65	0.40	11.40
							Climbout	14	43.75%	96% shp	1.69	2,150	0.16	10.30	0.73	0.40	11.70
						Arrival	Straight In	14	43.75%	87% shp	5.94	2,000	0.18	10.12	0.81	0.40	12.10
							Overhead In	0	0.00%	87% shp	NA	2,000	0.18	10.12	0.81	0.40	12.10
							Taxi In	14	43.75%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
							Refuel Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
							Apron Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Shutdown	14	43.75%	G Idle L	1.00	599	22.32	3.53	30.11	0.40	17.10
							APU Use	14	43.75%	On	11.94	293	0.36	5.65	3.20	0.40	0.22
						Touch-and-Go	Approach	2	6.25%	87% shp	1.26	2,000	0.18	10.12	0.81	0.40	12.10
							Climbout	2	6.25%	96% shp	0.26	2,150	0.16	10.30	0.73	0.40	11.70
							Circle	2	6.25%	87% shp	1.72	2,000	0.18	10.12	0.81	0.40	12.10
							APU Use	2	6.25%	On	3.24	293	0.36	5.65	3.20	0.40	0.22

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
C-130	4	T56-A-16	J79-GE-10B	GTC85-72	160	Departure	APU Use	76	47.50%	On	180.00	210	0.13	3.88	14.83	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)			Warm-Up	76	47.50%	G Idle L	15.00	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200			Unstick	76	47.50%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
			Analysis in	for PM10			Taxi Out	76	47.50%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
			AESO 9908A)	(AESO Fax)			Final Checks	76	47.50%	96% shp	0.40	2,150	0.16	10.30	0.73	0.40	11.70
							Mil Takeoff	76	47.50%	Mil	1.13	2,219	0.16	10.45	0.65	0.40	11.40
							Climbout	76	47.50%	96% shp	2.40	2,150	0.16	10.30	0.73	0.40	11.70
						Arrival	Straight In	76	47.50%	87% shp	6.19	2,000	0.18	10.12	0.81	0.40	12.10
							Overhead In	0	0.00%	87% shp	NA	2,000	0.18	10.12	0.81	0.40	12.10
							Taxi In	76	47.50%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
							Refuel Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
							Apron Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Shutdown	76	47.50%	G Idle L	1.00	599	22.32	3.53	30.11	0.40	17.10
							APU Use	76	47.50%	On	15.00	210	0.13	3.88	14.83	0.40	0.22
						Touch-and-Go	Approach	4	2.50%	87% shp	1.26	2,000	0.18	10.12	0.81	0.40	12.10
							Climbout	4	2.50%	96% shp	0.26	2,150	0.16	10.30	0.73	0.40	11.70
							Circle	4	2.50%	87% shp	1.72	2,000	0.18	10.12	0.81	0.40	12.10
							APU Use	0	0.00%	Off	0.00	210	0.13	3.88	14.83	0.40	0.22
T-34	1	PT6A-27	TPE331-3	none	46	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	20	43.48%	Idle	15.00	115	50.17	2.43	64.00	0.40	2.95
							Unstick	20	43.48%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Taxi Out	20	43.48%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Final Checks	20	43.48%	90%	0.40	400	0.00	7.00	1.20	0.40	1.47
							Mil Takeoff	20	43.48%	100%	1.20	425	0.00	7.81	1.01	0.40	1.75
							Climbout	20	43.48%	90%	2.57	400	0.00	7.00	1.20	0.40	1.47
						Arrival	Straight In	20	43.48%	30%	6.19	215	2.19	8.37	23.02	0.40	2.40
							Overhead In	0	0.00%	30%	NA	215	2.19	8.37	23.02	0.40	2.40
							Taxi In	20	43.48%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Shutdown	20	43.48%	Idle	1.00	115	50.17	2.43	64.00	0.40	2.95
						Touch-and-Go	Approach	3	6.52%	30%	1.26	215	2.19	8.37	23.02	0.40	2.40
							Climbout	3	6.52%	90%	0.26	400	0.00	7.00	1.20	0.40	1.47
							Circle	3	6.52%	30%	1.72	215	2.19	8.37	23.02	0.40	2.40

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-38	2	J85-GE-2	J85-GE-5	none	118	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	28	23.73%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
		J85-GE-21	Equation				Unstick	28	23.73%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
		for Max AB	Derived From				Taxi Out	28	23.73%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
		(EPA 1992)	Data in				Final Checks	28	23.73%	NR	0.40	2,875	0.45	6.35	21.78	0.40	9.46
			AESO 9620)				AB Takeoff	28	23.73%	Max AB	0.54	10,650	0.10	5.60	36.50	0.40	no data
							Mil Takeoff	0	0.00%	Mil	0.65	2,890	0.45	6.40	21.56	0.40	9.43
							Climbout	28	23.73%	Mil	0.79	2,890	0.45	6.40	21.56	0.40	9.43
						Arrival	Straight In	28	23.73%	75% NR	4.95	2,155	0.64	5.67	28.38	0.40	11.28
							Overhead In	0	0.00%	75% NR	NA	2,155	0.64	5.67	28.38	0.40	11.28
							Taxi In	28	23.73%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
							Refuel Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Hot Refuel	0	0.00%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
							Unstick	0	0.00%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
							Apron Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Shutdown	28	23.73%	G Idle	1.00	560	11.86	3.68	111.86	0.40	22.03
						Touch-and-Go	Approach	31	26.27%	75% NR	1.08	2,155	0.64	5.67	28.38	0.40	11.28
							Climbout	31	26.27%	Mil	0.23	2,890	0.45	6.40	21.56	0.40	9.43
							Circle	31	26.27%	75% NR	1.47	2,155	0.64	5.67	28.38	0.40	11.28
T-39D	2	J85-GE-2	J85-GE-5	GTC 36-200	304	Departure	APU Use	51	16.78%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression	(AESO Fax)			Warm-Up	51	16.78%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
			Equation				Unstick	51	16.78%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
			Derived From				Taxi Out	51	16.78%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
			Data in				Final Checks	51	16.78%	NR	0.40	2,875	0.45	6.35	21.78	0.40	9.46
			AESO 9620)				Mil Takeoff	51	16.78%	Mil	0.57	2,890	0.45	6.40	21.56	0.40	9.43
							Climbout	51	16.78%	Mil	0.79	2,890	0.45	6.40	21.56	0.40	9.43
						Arrival	Straight In	51	16.78%	75% NR	4.95	2,155	0.64	5.67	28.38	0.40	11.28
							Overhead In	0	0.00%	75% NR	NA	2,155	0.64	5.67	28.38	0.40	11.28
							Taxi In	51	16.78%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
							Refuel Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Hot Refuel	0	0.00%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
							Unstick	0	0.00%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
							Apron Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Shutdown	51	16.78%	G Idle	1.00	560	11.86	3.68	111.86	0.40	22.03
						Touch-and-Go	Approach	101	33.22%	75% NR	1.08	2,155	0.64	5.67	28.38	0.40	11.28
							Climbout	101	33.22%	Mil	0.23	2,890	0.45	6.40	21.56	0.40	9.43
							Circle	101	33.22%	75% NR	1.47	2,155	0.64	5.67	28.38	0.40	11.28

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
AH-1W	2	T700-GE	T58-GE-5/8F	none	322	Departure	APU Use	0	0.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)				Warm-Up	65	20.19%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
							Taxi Out	65	20.19%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hover	65	20.19%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
							Climbout	65	20.19%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	65	20.19%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	65	20.19%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	65	20.19%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	65	20.19%	Idle	2.00	164	2.54	3.28	39.81	0.40	4.20
						Touch-and-Go	Approach	96	29.81%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	96	29.81%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	96	29.81%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20
AH-64	2	T700-GE	T58-GE-5/8F	T62T-27	64	Departure	APU Use	13	20.31%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)	(EPA 1992)			Warm-Up	13	20.31%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
				GTC 36-200			Taxi Out	13	20.31%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
				for PM10			Hover	13	20.31%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
				(AESO Fax)			Climbout	13	20.31%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	13	20.31%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	13	20.31%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	13	20.31%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	13	20.31%	Idle	2.00	164	2.54	3.28	39.81	0.40	4.20
						Touch-and-Go	Approach	19	29.69%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	19	29.69%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	19	29.69%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
CH-46E	2	T58-GE-16	T58-GE-5/8F	T62T-27	38	Departure	APU Use	8	21.05%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9820)	(AESO 6-90)	(EPA 1992)			Warm-Up	8	21.05%	20% Q	5.00	311	4.69	4.64	45.09	0.40	4.20
				GTC 36-200			Taxi Out	8	21.05%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
				for PM10			Hover	8	21.05%	45% Q	1.05	551	0.91	6.96	18.74	0.40	4.20
				(AESO Fax)			Climbout	8	21.05%	58% Q	6.00	666	0.81	8.07	14.08	0.40	4.20
						Arrival	Straight In	8	21.05%	40% Q	9.90	505	1.03	6.52	21.38	0.40	4.20
							Descent	8	21.05%	40% Q	1.00	505	1.03	6.52	21.38	0.40	4.20
							Taxi In	8	21.05%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Refuel Taxi	0	0.00%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Hot Refuel	0	0.00%	20% Q	8.00	311	4.69	4.64	45.09	0.40	4.20
							Apron Taxi	0	0.00%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Shutdown	8	21.05%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							APU Use	8	21.05%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	11	28.95%	40% Q	2.02	505	1.03	6.52	21.38	0.40	4.20
							Climbout	11	28.95%	58% Q	0.42	666	0.81	8.07	14.08	0.40	4.20
							Circle	11	28.95%	45% Q	2.74	551	0.91	6.96	18.74	0.40	4.20
CH-53E	3	T64-GE-415	T64-GE-6B/415	T62T-27	16	Departure	APU Use	3	18.75%	On	20.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9905)	(AESO 6-90)	(EPA 1992)			Warm-Up	3	18.75%	6% Q	13.00	360	20.12	2.56	42.42	0.40	2.21
				GTC 36-200			Taxi Out	3	18.75%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
				for PM10			Hover	3	18.75%	61% Q	1.05	1,329	0.38	7.44	2.93	0.40	2.21
				(AESO Fax)			Climbout	3	18.75%	83% Q	6.00	1,717	0.14	9.08	1.48	0.40	2.21
						Arrival	Straight In	3	18.75%	49% Q	9.90	1,118	1.22	6.54	4.57	0.40	2.21
							Descent	3	18.75%	49% Q	1.00	1,118	1.22	6.54	4.57	0.40	2.21
							Taxi In	3	18.75%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Refuel Taxi	0	0.00%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Hot Refuel	0	0.00%	15% Q	8.00	518	11.76	3.43	21.25	0.40	2.21
							Apron Taxi	0	0.00%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Shutdown	3	18.75%	12% Q	6.00	466	14.01	3.14	26.02	0.40	2.21
							APU Use	3	18.75%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	5	31.25%	49% Q	2.02	1,118	1.22	6.54	4.57	0.40	2.21
							Climbout	5	31.25%	83% Q	0.42	1,717	0.14	9.08	1.48	0.40	2.21
							Circle	5	31.25%	64% Q	2.74	1,382	0.28	7.65	2.63	0.40	2.21

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UH-1L	1	T53-L-11D	T58-GE-5/8F	none	244	Departure	APU Use	0	0.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	49	20.08%	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
							Taxi Out	49	20.08%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Hover	49	20.08%	95% rpm	1.05	645	0.66	6.43	6.83	0.40	4.20
							Climbout	49	20.08%	100% rpm	6.00	690	0.32	7.75	3.85	0.40	4.20
						Arrival	Straight In	49	20.08%	95% rpm	9.90	645	0.66	6.43	6.83	0.40	4.20
							Descent	49	20.08%	95% rpm	1.00	645	0.66	6.43	6.83	0.40	4.20
							Taxi In	49	20.08%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Refuel Taxi	0	0.00%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Hot Refuel	0	0.00%	G Idle	8.00	145	67.41	1.58	31.51	0.40	4.20
							Apron Taxi	0	0.00%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Shutdown	49	20.08%	G Idle	1.00	145	67.41	1.58	31.51	0.40	4.20
						Touch-and-Go	Approach	73	29.92%	95% rpm	2.02	645	0.66	6.43	6.83	0.40	4.20
							Climbout	73	29.92%	100% rpm	0.42	690	0.32	7.75	3.85	0.40	4.20
							Circle	73	29.92%	98% rpm	2.74	685	0.30	6.34	3.34	0.40	4.20
HH-1N	2	T400-CP-400	T58-GE-5/8F	none	730	Departure	APU Use	0	0.00%	On	0.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9809)	(AESO 6-90)				Warm-Up	148	20.27%	7% Q	15.00	148	6.21	3.13	28.36	0.40	4.20
							Taxi Out	148	20.27%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Hover	148	20.27%	54% Q	1.05	346	0.13	5.79	1.01	0.40	4.20
							Climbout	148	20.27%	56% Q	6.00	355	0.13	5.90	0.94	0.40	4.20
						Arrival	Straight In	148	20.27%	33% Q	9.90	258	0.20	4.54	4.22	0.40	4.20
							Descent	148	20.27%	29% Q	1.00	241	0.28	4.30	5.76	0.40	4.20
							Taxi In	148	20.27%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Refuel Taxi	0	0.00%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Hot Refuel	0	0.00%	7% Q	8.00	148	6.21	3.13	28.36	0.40	4.20
							Apron Taxi	0	0.00%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Shutdown	148	20.27%	7% Q	1.00	148	6.21	3.13	28.36	0.40	4.20
						Touch-and-Go	Approach	217	29.73%	33% Q	2.02	258	0.20	4.54	4.22	0.40	4.20
							Climbout	217	29.73%	56% Q	0.42	355	0.13	5.90	0.94	0.40	4.20
							Circle	217	29.73%	54% Q	2.74	346	0.13	5.79	1.01	0.40	4.20

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
OH-58	1	T63-A-5A	T58-GE-5/8F	none	102	Departure	APU Use	0	0.00%	On	0.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	21	20.59%	G Idle	10.00	61	20.30	1.42	79.15	0.40	4.20
							Taxi Out	21	20.59%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Hover	21	20.59%	60%	1.05	157	0.68	4.11	20.79	0.40	4.20
							Climbout	21	20.59%	75%	6.00	175	0.24	4.61	14.31	0.40	4.20
						Arrival	Straight In	21	20.59%	60%	9.90	157	0.68	4.11	20.79	0.40	4.20
							Descent	21	20.59%	60%	1.00	157	0.68	4.11	20.79	0.40	4.20
							Taxi In	21	20.59%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Refuel Taxi	0	0.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Hot Refuel	0	0.00%	G Idle	8.00	61	20.30	1.42	79.15	0.40	4.20
							Apron Taxi	0	0.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Shutdown	21	20.59%	30%	1.00	105	3.27	2.90	38.59	0.40	4.20
						Touch-and-Go	Approach	30	29.41%	60%	2.02	157	0.68	4.11	20.79	0.40	4.20
							Climbout	30	29.41%	75%	0.42	175	0.24	4.61	14.31	0.40	4.20
							Circle	30	29.41%	60%	2.74	157	0.68	4.11	20.79	0.40	4.20
UH-60	2	T700-GE	T58-GE-5/8F	T62T-27	82	Departure	APU Use	17	20.73%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)	(EPA 1992)			Warm-Up	17	20.73%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
				GTC 36-200			Taxi Out	17	20.73%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
				for PM10			Hover	17	20.73%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
				(AESO Fax)			Climbout	17	20.73%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	17	20.73%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	17	20.73%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	17	20.73%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	17	20.73%	Idle	1.00	164	2.54	3.28	39.81	0.40	4.20
							APU Use	17	20.73%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	24	29.27%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	24	29.27%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	24	29.27%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
Beechcraft	2	TSIO-360C	AP-42, 3.3	none	74	Departure	Warm-Up	22	29.73%	Idle	7.00	11	138.26	1.91	592.17	0.11	1.83
Dutches 76		(EPA 1992)					Taxi Out	22	29.73%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
							Takeoff	22	29.73%	100%	1.37	133	9.17	2.71	1081.95	0.11	1.83
							Climbout	22	29.73%	85%	4.09	100	9.55	4.32	960.80	0.11	1.83
						Arrival	Straight In	22	29.73%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Overhead In	0	0.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Taxi In	22	29.73%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
						Touch-and-Go	Approach	15	20.27%	40%	1.51	61	11.31	3.77	995.08	0.11	1.83
							Climbout	15	20.27%	85%	0.32	100	9.55	4.32	960.80	0.11	1.83
							Circle	15	20.27%	40%	2.06	61	11.31	3.77	995.08	0.11	1.83
Cessna 172	1	O-320	AP-42, 3.3	none	1,920	Departure	Warm-Up	577	30.05%	Idle	7.00	10	36.92	0.52	1077.00	0.11	1.83
		(EPA 1992)					Taxi Out	577	30.05%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
							Takeoff	577	30.05%	100%	1.37	89	11.78	2.19	1077.44	0.11	1.83
							Climbout	577	30.05%	85%	5.00	67	12.38	3.97	989.51	0.11	1.83
						Arrival	Straight In	577	30.05%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Overhead In	0	0.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Taxi In	577	30.05%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
						Touch-and-Go	Approach	383	19.95%	40%	1.68	47	19.25	0.95	1221.51	0.11	1.83
							Climbout	383	19.95%	85%	0.35	67	12.38	3.97	989.51	0.11	1.83
							Circle	383	19.95%	40%	2.29	47	19.25	0.95	1221.51	0.11	1.83
Mooney	1	TSIO-360C	AP-42, 3.3	none	16	Departure	Warm-Up	5	31.25%	Idle	7.00	11	138.26	1.91	592.17	0.11	1.83
Turbo 231		(EPA 1992)					Taxi Out	5	31.25%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
							Takeoff	5	31.25%	100%	1.37	133	9.17	2.71	1081.95	0.11	1.83
							Climbout	5	31.25%	85%	4.09	100	9.55	4.32	960.80	0.11	1.83
						Arrival	Straight In	5	31.25%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Overhead In	0	0.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Taxi In	5	31.25%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
						Touch-and-Go	Approach	3	18.75%	40%	1.51	61	11.31	3.77	995.08	0.11	1.83
							Climbout	3	18.75%	85%	0.32	100	9.55	4.32	960.80	0.11	1.83
							Circle	3	18.75%	40%	2.06	61	11.31	3.77	995.08	0.11	1.83

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
Gulfstream AA-5A	1	O-320 (EPA 1992)	AP-42, 3.3	none	16	Departure	Warm-Up	5	31.25%	Idle	7.00	10	36.92	0.52	1077.00	0.11	1.83
							Taxi Out	5	31.25%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
							Takeoff	5	31.25%	100%	1.37	89	11.78	2.19	1077.44	0.11	1.83
							Climbout	5	31.25%	85%	4.74	67	12.38	3.97	989.51	0.11	1.83
						Arrival	Straight In	5	31.25%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Overhead In	0	0.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Taxi In	5	31.25%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
						Touch-and-Go	Approach	3	18.75%	40%	1.68	47	19.25	0.95	1221.51	0.11	1.83
							Climbout	3	18.75%	85%	0.35	67	12.38	3.97	989.51	0.11	1.83
							Circle	3	18.75%	40%	2.29	47	19.25	0.95	1221.51	0.11	1.83

Armitage Airfield Flight Operations below 3,000 Feet AGL: 31,032

Notes:
- ROG = reactive organic compounds
- NOx = oxides of nitrogen
- CO = carbon monoxide
- PM10 = inhalable particulate matter
- APU = auxiliary power unit (provides electrical power and air conditioning prior to start of main engines; starts main engines; also provides continuous power for equipment on some aircraft
- FLCP = field carrier landing practice
- G Idle = ground idle; some aircraft have separate low speed (L) and high speed (H) ground idle settings
- F Idle = flight idle
- NR = normal rated power
- AB = afterburner
- IRP = intermediate rated power
- Mil = military power setting
- Int = intermediate power setting; some aircraft have more than one intermediate power setting
- Max Cont = maximum continuous power
- N Lift D = normal lift, dry
- % rpm = percent of rated core revolutions per minute (% N2)
- % T = percent of rated thrust
- % hp = percent of rated horsepower
- % shp = percent of rated shaft horsepower
- % Q = percent torque (for turboshaft engines)

TABLE D1-26. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10

Notes (Cont)
Annual flight operations based on analyses summarized in Table D1-4
Engines used for emission rate data are based on information presented in Table D1-23
Flight operation totals and subtotals are the sum of approach mode and climbout mode numbers
Departures and arrivals each represent a single flight operation; Touch-and-Go and FCLP pattern events each represent two flight operations (an approach and a climbout)
Engine power settings and associated fuel flow rates based on data in emission factor source documents and AESO LTO cycle evaluation documents
Time-in-mode estimates based on analysis of flight track profiles for from various airfields (Tables D1-6 through D1-22), AESO LTO cycle evaluation documents, draft AESO analysis of NAWS China Lake aircraft emissions for FY93, and estimates provided by AESO and NAWS China Lake personnel.
Hot refueling (refueling while engines are idling) does not occur at NAWS China Lake.
Sulfur oxide emission rates for turbine engines (jets, turboprops, and helicopters) are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90
PM10 emission factor for piston engines based on industrial gasoline engines (U.S. EPA 1996, Section 3.3), assuming a fuel density of 673 kilogram per cubic meter and an energy content of 40,282 BTU per kilogram (18,272 BTU per pound).
All values independently rounded for display after calculation.

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TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F/A-18A-D	Departure	APU Use	0.00	0.12	0.04	0.01	0.00	Departure	24.51	13.39	74.50	0.57	6.59
		Warm-Up	29.53	0.59	69.72	0.20	6.85						
		Unstick	0.20	0.02	0.55	0.00	0.05						
		Taxi Out	9.84	0.20	23.24	0.07	2.28						
		Final Checks	0.03	0.36	0.20	0.02	0.45						
		AB Takeoff	0.15	10.79	27.06	0.47	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.12	9.73	0.41	0.15	1.09						
	Arrival	Straight In	0.07	0.94	0.54	0.07	1.18	Arrival	9.00	3.02	22.34	0.26	5.59
		Overhead In	0.29	3.68	2.11	0.25	4.60						
		Taxi In	9.84	0.20	23.24	0.07	2.28						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	4.43	0.09	10.46	0.03	1.03						
	Touch-and-Go	Approach	0.02	0.29	0.17	0.02	0.37	Touch-and-Go	0.13	3.03	0.87	0.12	1.93
		Climbout	0.01	0.80	0.03	0.01	0.09						
		Circle	0.03	0.40	0.23	0.03	0.50						
	FCLP	Approach	0.00	0.03	0.02	0.00	0.04	FCLP	0.13	3.03	0.87	0.12	1.93
		Climbout	0.00	0.09	0.00	0.00	0.01						
		Circle	0.00	0.04	0.02	0.00	0.05						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F/A-18E/F	Departure	APU Use	0.01	0.13	0.04	0.01	0.00	Departure	31.48	21.40	281.34	0.71	7.21
		Warm-Up	35.77	2.17	58.64	0.26	8.41						
		Unstick	0.19	0.02	0.37	0.00	0.06						
		Taxi Out	11.92	0.72	19.55	0.09	2.80						
		Final Checks	0.01	0.91	0.09	0.03	0.53						
		AB Takeoff	7.50	15.05	416.56	0.64	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.06	18.71	0.48	0.21	0.89						
	Arrival	Straight In	0.03	2.40	0.25	0.09	1.41	Arrival	9.89	7.27	16.78	0.33	6.23
		Overhead In	0.11	9.35	0.97	0.36	5.50						
		Taxi In	11.92	0.72	19.55	0.09	2.80						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	5.37	0.33	8.80	0.04	1.26						
	Touch-and-Go	Approach	0.01	0.74	0.08	0.03	0.44	Touch-and-Go	0.05	6.19	0.41	0.16	2.07
		Climbout	0.01	1.55	0.04	0.02	0.07						
		Circle	0.01	1.01	0.10	0.04	0.59						
	FCLP	Approach	0.00	0.08	0.01	0.00	0.05	FCLP	0.05	6.19	0.41	0.16	2.07
		Climbout	0.00	0.17	0.00	0.00	0.01						
		Circle	0.00	0.11	0.01	0.00	0.07						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
EA-6B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	18.76	8.09	37.52	0.50	17.22
		Warm-Up	2.46	0.21	4.87	0.03	1.78						
		Unstick	0.00	0.01	0.02	0.00	0.02						
		Taxi Out	0.62	0.05	1.22	0.01	0.44						
		Final Checks	0.01	0.19	0.04	0.01	0.12						
		Mil Takeoff	0.02	0.33	0.04	0.01	0.15						
		Climbout	0.03	0.58	0.11	0.02	0.37						
	Arrival	Straight In	0.01	0.11	0.04	0.01	0.11	Arrival	5.20	10.26	12.47	0.53	13.41
		Overhead In	0.12	1.55	0.59	0.07	1.60						
		Taxi In	0.62	0.05	1.22	0.01	0.44						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.12	0.01	0.24	0.00	0.09						
	Touch-and-Go	Approach	0.01	0.18	0.07	0.01	0.19	Touch-and-Go	0.37	4.93	1.60	0.22	4.56
		Climbout	0.01	0.15	0.03	0.01	0.10						
		Circle	0.02	0.19	0.07	0.01	0.20						
	FCLP	Approach	0.00	0.05	0.02	0.00	0.05	FCLP	0.37	4.93	1.60	0.22	4.56
		Climbout	0.00	0.04	0.01	0.00	0.03						
		Circle	0.00	0.05	0.02	0.00	0.05						
AV-8B	Departure	APU Use	0.00	0.02	0.01	0.00	0.00	Departure	9.50	9.81	51.94	0.41	6.36
		Warm-Up	2.46	0.23	13.32	0.05	1.39						
		Unstick	0.01	0.00	0.07	0.00	0.01						
		Taxi Out	0.62	0.06	3.33	0.01	0.35						
		Final Checks	0.01	0.14	0.10	0.01	0.05						
		Mil Takeoff	0.02	1.12	0.12	0.03	0.11						
		Climbout	0.03	1.68	0.22	0.04	0.19						
	Arrival	Straight In	0.01	0.10	0.07	0.00	0.04	Arrival	2.55	6.08	16.43	0.30	3.56
		Overhead In	0.10	1.84	1.36	0.08	0.72						
		Taxi In	0.62	0.06	3.33	0.01	0.35						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.12	0.01	0.67	0.00	0.07						
	Touch-and-Go	Approach	0.01	0.13	0.10	0.01	0.05	Touch-and-Go	0.14	5.08	1.59	0.15	1.00
		Climbout	0.01	0.36	0.05	0.01	0.04						
		Circle	0.00	0.02	0.02	0.00	0.01						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F-3	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	24.51	13.39	74.50	0.57	6.59
		Warm-Up	0.35	0.01	0.84	0.00	0.08						
		Unstick	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.12	0.00	0.28	0.00	0.03						
		Final Checks	0.00	0.00	0.00	0.00	0.01						
		AB Takeoff	0.00	0.13	0.32	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.12	0.00	0.00	0.01						
	Arrival	Straight In	0.00	0.05	0.03	0.00	0.07	Arrival	7.48	2.93	18.73	0.24	5.17
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.12	0.00	0.28	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.02	0.00	0.06	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.02	Touch-and-Go	0.13	3.03	0.87	0.12	1.93
		Climbout	0.00	0.04	0.00	0.00	0.00						
		Circle	0.00	0.02	0.01	0.00	0.02						
F-15	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.74	38.69	72.96	0.88	7.61
		Warm-Up	0.03	0.05	0.23	0.00	0.11						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.02	0.08	0.00	0.04						
		Final Checks	0.00	0.14	0.01	0.00	0.01						
		AB Takeoff	0.00	0.39	1.32	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.27	0.01	0.00	0.02						
	Arrival	Straight In	0.01	0.12	0.03	0.00	0.09	Arrival	0.78	6.28	5.59	0.28	5.85
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.02	0.08	0.00	0.04						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.02	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.03	0.01	0.00	0.02	Touch-and-Go	0.16	6.27	0.91	0.13	2.27
		Climbout	0.00	0.08	0.00	0.00	0.01						
		Circle	0.00	0.04	0.01	0.00	0.03						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F-16	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.59	10.74	22.42	0.50	4.74
		Warm-Up	0.02	0.02	0.11	0.00	0.07						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.01	0.04	0.00	0.02						
		Final Checks	0.00	0.02	0.00	0.00	0.00						
		AB Takeoff	0.00	0.14	0.35	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.06	0.00	0.00	0.01						
	Arrival	Straight In	0.00	0.09	0.01	0.00	0.05	Arrival	0.65	4.44	2.36	0.20	3.29
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.01	0.04	0.00	0.02						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.02	0.00	0.00	0.01	Touch-and-Go	0.13	2.87	0.25	0.10	1.12
		Climbout	0.00	0.02	0.00	0.00	0.00						
		Circle	0.00	0.03	0.00	0.00	0.01						
F-86	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	11.30	3.36	14.69	0.19	6.70
		Warm-Up	1.16	0.04	1.51	0.01	0.50						
		Unstick	0.00	0.00	0.01	0.00	0.01						
		Taxi Out	0.39	0.01	0.50	0.00	0.17						
		Final Checks	0.00	0.07	0.00	0.00	0.05						
		Mil Takeoff	0.01	0.17	0.01	0.01	0.09						
		Climbout	0.01	0.17	0.01	0.01	0.12						
	Arrival	Straight In	0.03	0.50	0.15	0.02	0.51	Arrival	3.57	3.72	5.41	0.17	5.13
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.39	0.01	0.50	0.00	0.17						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.08	0.00	0.10	0.00	0.03						
	Touch-and-Go	Approach	0.01	0.12	0.04	0.00	0.12	Touch-and-Go	0.14	2.14	0.57	0.08	2.09
		Climbout	0.00	0.04	0.00	0.00	0.03						
		Circle	0.01	0.16	0.05	0.01	0.17						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
C-9B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	7.67	13.07	26.41	0.57	10.72
		Warm-Up	0.08	0.02	0.28	0.00	0.09						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.01	0.09	0.00	0.03						
		Final Checks	0.00	0.02	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.07	0.00	0.00	0.01						
		Climbout	0.00	0.07	0.01	0.00	0.02						
	Arrival	Straight In	0.01	0.03	0.05	0.00	0.05	Arrival	2.77	2.81	10.91	0.24	5.50
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.01	0.09	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.02	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.37	1.86	1.98	0.10	1.80
		Climbout	0.00	0.01	0.00	0.00	0.00						
		Circle	0.00	0.01	0.02	0.00	0.01						
UC-8A	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	3.43	2.14	12.80	0.15	0.82
		Warm-Up	0.02	0.00	0.06	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.00	0.02	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.01	0.00	0.00	Arrival	1.09	1.89	4.61	0.11	0.63
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.02	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.06	0.94	0.47	0.05	0.26
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
UC-12B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	10.08	0.61	11.66	0.06	0.38
		Warm-Up	0.90	0.02	1.03	0.00	0.03						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.30	0.01	0.34	0.00	0.01						
		Final Checks	0.00	0.01	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.02	0.01	0.00	0.00						
		Climbout	0.01	0.03	0.02	0.00	0.01						
	Arrival	Straight In	0.15	0.03	0.24	0.00	0.02	Arrival	4.27	0.32	5.35	0.03	0.22
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.30	0.01	0.34	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.06	0.00	0.07	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.01	0.00	0.00	Touch-and-Go	0.62	0.16	0.97	0.01	0.07
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.01	0.00	0.01	0.00	0.00						
U-21	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	3.85	0.52	4.98	0.05	0.30
		Warm-Up	0.01	0.00	0.02	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	1.25	0.43	2.49	0.03	0.17
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.05	0.20	0.49	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
MU-2	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	5.92	0.79	4.65	0.05	0.30
		Warm-Up	2.98	0.11	2.31	0.02	0.11						
		Unstick	0.00	0.01	0.00	0.00	0.00						
		Taxi Out	0.99	0.04	0.77	0.01	0.04						
		Final Checks	0.00	0.04	0.00	0.00	0.01						
		Mil Takeoff	0.00	0.14	0.01	0.00	0.02						
		Climbout	0.00	0.20	0.02	0.01	0.02						
	Arrival	Straight In	0.02	0.34	0.24	0.01	0.08	Arrival	1.81	0.58	1.74	0.03	0.19
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.99	0.04	0.77	0.01	0.04						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.20	0.01	0.15	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.00	Touch-and-Go	0.02	0.29	0.18	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.02	0.01	0.00	0.00						
OV-10	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.43	0.82	3.48	0.07	0.42
		Warm-Up	0.01	0.01	0.04	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.74	0.35	2.09	0.03	0.21
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.15	0.12	0.52	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
OV-1	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	6.55	0.62	3.35	0.07	0.70
		Warm-Up	0.10	0.00	0.05	0.00	0.01						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.00	0.02	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.02	0.02	0.00	0.01	Arrival	2.04	0.90	1.82	0.06	0.68
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.00	0.02	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.45	0.46	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
P-3	Departure	APU Use	0.00	0.03	0.02	0.00	0.00	Departure	18.22	12.56	27.21	0.86	19.25
		Warm-Up	0.09	0.01	0.13	0.00	0.07						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.00	0.04	0.00	0.02						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.01	0.00	0.00	0.01						
		Climbout	0.00	0.02	0.00	0.00	0.02						
	Arrival	Straight In	0.00	0.06	0.00	0.00	0.07	Arrival	5.51	9.19	8.04	0.44	13.69
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.00	0.04	0.00	0.02						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.08	4.49	0.40	0.18	5.25
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
C-130	Departure	APU Use	0.00	0.09	0.36	0.01	0.01	Departure	18.01	11.18	33.82	0.80	20.49
		Warm-Up	0.51	0.08	0.69	0.01	0.39						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.17	0.03	0.23	0.00	0.13						
		Final Checks	0.00	0.02	0.00	0.00	0.03						
		Mil Takeoff	0.00	0.07	0.00	0.00	0.07						
		Climbout	0.00	0.13	0.01	0.01	0.15						
	Arrival	Straight In	0.01	0.32	0.03	0.01	0.38	Arrival	5.50	9.40	8.66	0.45	14.10
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.17	0.03	0.23	0.00	0.13						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.03	0.01	0.05	0.00	0.03						
		APU Use	0.00	0.01	0.03	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.08	4.41	0.35	0.17	5.24
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.01						
		APU Use	0.00	0.00	0.00	0.00	0.00						
T-34	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.93	0.30	2.50	0.03	0.16
		Warm-Up	0.01	0.00	0.02	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.63	0.21	1.25	0.01	0.09
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.02	0.10	0.25	0.00	0.03
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
T-38	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	4.51	3.19	51.50	0.27	9.35
		Warm-Up	0.05	0.01	0.44	0.00	0.09						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.02	0.00	0.15	0.00	0.03						
		Final Checks	0.00	0.00	0.01	0.00	0.01						
		AB Takeoff	0.00	0.02	0.10	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.02	0.00	0.01						
	Arrival	Straight In	0.00	0.03	0.14	0.00	0.06	Arrival	1.55	2.43	22.62	0.19	6.48
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.02	0.00	0.15	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.03	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.03	0.00	0.01	Touch-and-Go	0.13	1.18	5.68	0.08	2.27
		Climbout	0.00	0.00	0.01	0.00	0.00						
		Circle	0.00	0.01	0.05	0.00	0.02						
T-39D	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	4.52	2.54	45.71	0.22	9.87
		Warm-Up	0.08	0.03	0.80	0.00	0.16						
		Unstick	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.03	0.01	0.27	0.00	0.05						
		Final Checks	0.00	0.01	0.02	0.00	0.01						
		Mil Takeoff	0.00	0.01	0.03	0.00	0.01						
		Climbout	0.00	0.01	0.04	0.00	0.02						
	Arrival	Straight In	0.01	0.05	0.26	0.00	0.10	Arrival	1.55	2.43	22.62	0.19	6.48
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.01	0.27	0.00	0.05						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.05	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.02	0.11	0.00	0.04	Touch-and-Go	0.13	1.18	5.68	0.08	2.27
		Climbout	0.00	0.01	0.02	0.00	0.01						
		Circle	0.00	0.03	0.15	0.00	0.06						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
AH-1W	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.16	1.12	3.30	0.09	0.92
		Warm-Up	0.00	0.01	0.06	0.00	0.01						
		Taxi Out	0.00	0.01	0.01	0.00	0.01						
		Hover	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.02	0.03	0.00	0.01						
	Arrival	Straight In	0.00	0.02	0.05	0.00	0.02	Arrival	0.13	0.88	2.64	0.07	0.73
		Descent	0.00	0.00	0.01	0.00	0.00						
		Taxi In	0.00	0.01	0.01	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.02	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.02	0.00	0.01						
AH-64	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.20	1.14	3.55	0.09	0.93
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.13	0.88	2.64	0.07	0.73
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
CH-46E	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.65	1.66	6.70	0.10	0.99
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.61	1.55	7.45	0.11	1.04
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.09	0.65	1.80	0.04	0.39
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.01	0.00	0.00						
CH-53E	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	5.66	6.48	13.51	0.39	2.07
		Warm-Up	0.01	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.00	0.00	0.00	Arrival	3.42	5.04	8.31	0.35	1.91
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.20	2.52	1.07	0.14	0.75
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
UH-1L	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.68	0.85	1.32	0.05	0.57
		Warm-Up	0.04	0.00	0.02	0.00	0.00						
		Taxi Out	0.00	0.01	0.01	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.01	0.00	0.01						
	Arrival	Straight In	0.00	0.02	0.02	0.00	0.01	Arrival	0.26	0.96	1.10	0.06	0.64
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.01	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.00	Touch-and-Go	0.03	0.38	0.27	0.02	0.24
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.00	0.00	0.00						
HH-1N	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.47	0.91	2.22	0.08	0.80
		Warm-Up	0.03	0.02	0.16	0.00	0.02						
		Taxi Out	0.00	0.01	0.00	0.00	0.01						
		Hover	0.00	0.01	0.00	0.00	0.00						
		Climbout	0.00	0.03	0.00	0.00	0.02						
	Arrival	Straight In	0.00	0.03	0.03	0.00	0.03	Arrival	0.05	0.63	0.58	0.05	0.55
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.01	0.00	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.01	0.29	0.11	0.02	0.23
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.02	0.00	0.00	0.01						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
OH-58	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.23	0.12	1.31	0.01	0.15
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.04	0.14	0.86	0.01	0.15
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.01	0.06	0.28	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
UH-60	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.20	1.14	3.55	0.09	0.93
		Warm-Up	0.00	0.00	0.02	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.24	0.92	3.15	0.07	0.71
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
Beechcraft Dutches 76	Departure	Warm-Up	0.00	0.00	0.02	0.00	0.00	Departure	0.82	0.08	22.33	0.00	0.04
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Takeoff	0.00	0.00	0.07	0.00	0.00						
		Climbout	0.00	0.00	0.14	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.17	0.00	0.00	Arrival	0.43	0.06	16.19	0.00	0.03
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.02	0.00	0.00	Touch-and-Go	0.09	0.03	8.26	0.00	0.02
		Climbout	0.00	0.00	0.01	0.00	0.00						
		Circle	0.00	0.00	0.03	0.00	0.00						
Cessna 172	Departure	Warm-Up	0.01	0.00	0.35	0.00	0.00	Departure	0.16	0.03	9.74	0.00	0.02
		Taxi Out	0.01	0.00	0.25	0.00	0.00						
		Takeoff	0.01	0.00	0.63	0.00	0.00						
		Climbout	0.02	0.01	1.58	0.00	0.00						
	Arrival	Straight In	0.04	0.00	2.27	0.00	0.00	Arrival	0.15	0.01	8.72	0.00	0.01
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.25	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.31	0.00	0.00	Touch-and-Go	0.06	0.00	4.17	0.00	0.01
		Climbout	0.00	0.00	0.07	0.00	0.00						
		Circle	0.01	0.00	0.42	0.00	0.00						
Mooney Turbo 231	Departure	Warm-Up	0.00	0.00	0.00	0.00	0.00	Departure	0.41	0.04	11.16	0.00	0.02
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Takeoff	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.00	0.02	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.22	0.03	8.09	0.00	0.02
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.05	0.02	4.13	0.00	0.01
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-27. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
Gulfstream	Departure	Warm-Up	0.00	0.00	0.00	0.00	0.00	Departure	0.16	0.03	9.46	0.00	0.02
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Takeoff	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.15	0.01	8.72	0.00	0.01
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.06	0.00	4.17	0.00	0.01
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
	Flight Operations Below 3,000 ft AGL		147.34	98.33	741.80	4.10	61.08						
	Kern County Emissions:		146.76	85.51	736.49	3.51	51.26						
	San Bernardino County Emissions:		0.58	12.82	5.31	0.60	9.82						

Notes:
F/A-18 aircraft approach flight tracks used to estimate the portion of approach segment emissions occurring over San Bernardino County: 44.4% of straight-ir approaches and 63.7% of overhead break approaches.

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18A-D	2	F404-GE-400	F404-GE-400	GTC 36-200	9,452	Departure	APU Use	3,537	37.42%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A	(AESO Fax)			Warm-Up	3,537	37.42%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	3,537	37.42%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Taxi Out	3,537	37.42%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Final Checks	3,537	37.42%	86% rpm	0.40	2,836	0.46	5.80	3.32	0.40	7.25
							AB Takeoff	3,537	37.42%	Max AB	0.76	28,397	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	8,587	0.31	25.16	1.05	0.40	2.81
							Climbout	3,537	37.42%	IRP	0.83	8,587	0.31	25.16	1.05	0.40	2.81
						Arrival	Straight In	737	7.80%	86% rpm	5.08	2,836	0.46	5.80	3.32	0.40	7.25
							Overhead In	2,800	29.62%	86% rpm	5.21	2,836	0.46	5.80	3.32	0.40	7.25
							Taxi In	3,537	37.42%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Refuel Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Hot Refuel	0	0.00%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	0	0.00%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Apron Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Shutdown	3,537	37.42%	G Idle	2.25	624	58.18	1.16	137.34	0.40	13.50
						Touch-and-Go	Approach	1,071	11.33%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	1,071	11.33%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	1,071	11.33%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25
						FCLP	Approach	118	1.25%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	118	1.25%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	118	1.25%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18E/F	2	F414-GE-400 (AESO 9725A)	F404-GE-400 (Regression Equation Presented in AESO 9734A)	GTC 36-200 (AESO Fax)	10,238	Departure	APU Use	3,830	37.41%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
							Warm-Up	3,830	37.41%	G Idle	15.00	749	54.20	3.29	88.85	0.40	12.75
							Unstick	3,830	37.41%	F Idle	0.10	862	36.63	3.55	72.17	0.40	12.17
							Taxi Out	3,830	37.41%	G Idle	5.00	749	54.20	3.29	88.85	0.40	12.75
							Final Checks	3,830	37.41%	86% rpm	0.40	3,666	0.12	10.53	1.09	0.40	6.19
							AB Takeoff	3,830	37.41%	Max AB	0.76	35,603	4.72	9.47	262.11	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	10,986	0.12	34.94	0.89	0.40	1.66
							Climbout	3,830	37.41%	IRP	0.83	10,986	0.12	34.94	0.89	0.40	1.66
						Arrival	Straight In	798	7.79%	86% rpm	5.08	3,666	0.12	10.53	1.09	0.40	6.19
							Overhead In	3,032	29.62%	86% rpm	5.21	3,666	0.12	10.53	1.09	0.40	6.19
							Taxi In	3,830	37.41%	G Idle	5.00	749	54.20	3.29	88.85	0.40	12.75
							Refuel Taxi	0	0.00%	G Idle	2.50	749	54.20	3.29	88.85	0.40	12.75
							Hot Refuel	0	0.00%	G Idle	15.00	749	54.20	3.29	88.85	0.40	12.75
							Unstick	0	0.00%	F Idle	0.10	862	36.63	3.55	72.17	0.40	12.17
							Apron Taxi	0	0.00%	G Idle	2.50	749	54.20	3.29	88.85	0.40	12.75
							Shutdown	3,830	37.41%	G Idle	2.25	749	54.20	3.29	88.85	0.40	12.75
						Touch-and-Go	Approach	1,161	11.34%	86% rpm	1.08	3,666	0.12	10.53	1.09	0.40	6.19
							Climbout	1,161	11.34%	IRP	0.23	10,986	0.12	34.94	0.89	0.40	1.66
							Circle	1,161	11.34%	86% rpm	1.47	3,666	0.12	10.53	1.09	0.40	6.19
						FCLP	Approach	128	1.25%	86% rpm	1.08	3,666	0.12	10.53	1.09	0.40	6.19
							Climbout	128	1.25%	IRP	0.23	10,986	0.12	34.94	0.89	0.40	1.66
							Circle	128	1.25%	86% rpm	1.47	3,666	0.12	10.53	1.09	0.40	6.19

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
EA-6B	2	J52-P-408	J52-P-6B	none	1,316	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	364	27.66%	Idle	20.00	779	28.33	2.38	55.96	0.40	20.42
			Equation				Unstick	364	27.66%	Int 1	0.10	2,547	1.40	6.17	11.12	0.40	13.45
			Derived From				Taxi Out	364	27.66%	Idle	5.00	779	28.33	2.38	55.96	0.40	20.42
			Data in				Final Checks	364	27.66%	NR	0.40	8,078	0.61	10.29	1.95	0.40	6.67
			AESO 6-90)				Mil Takeoff	364	27.66%	Mil	0.50	9,479	0.57	12.32	1.47	0.40	5.73
							Climbout	364	27.66%	NR	1.24	8,078	0.61	10.29	1.95	0.40	6.67
						Arrival	Straight In	35	2.66%	Int 2	4.12	5,752	0.67	8.38	3.18	0.40	8.67
							Overhead In	329	25.00%	Int 2	6.37	5,752	0.67	8.38	3.18	0.40	8.67
							Taxi In	364	27.66%	Idle	5.00	779	28.33	2.38	55.96	0.40	20.42
							Refuel Taxi	0	0.00%	Idle	2.50	779	28.33	2.38	55.96	0.40	20.42
							Hot Refuel	0	0.00%	Idle	15.00	779	28.33	2.38	55.96	0.40	20.42
							Unstick	0	0.00%	Int 1	0.10	2,547	1.40	6.17	11.12	0.40	13.45
							Apron Taxi	0	0.00%	Idle	2.50	779	28.33	2.38	55.96	0.40	20.42
							Shutdown	364	27.66%	Idle	1.00	779	28.33	2.38	55.96	0.40	20.42
						Touch-and-Go	Approach	230	17.48%	Int 2	1.07	5,752	0.67	8.38	3.18	0.40	8.67
							Climbout	230	17.48%	NR	0.51	8,078	0.61	10.29	1.95	0.40	6.67
							Circle	230	17.48%	Int 2	1.12	5,752	0.67	8.38	3.18	0.40	8.67
						FCLP	Approach	64	4.86%	Int 2	1.07	5,752	0.67	8.38	3.18	0.40	8.67
							Climbout	64	4.86%	NR	0.51	8,078	0.61	10.29	1.95	0.40	6.67
							Circle	64	4.86%	Int 2	1.12	5,752	0.67	8.38	3.18	0.40	8.67

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
AV-8B	1	F402-RR-406A	F404-GE-400	GTC 36-200	1,874	Departure	APU Use	719	38.37%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9912)	(AESO	(AESO Fax)			Warm-Up	719	38.37%	Idle	20.00	1,137	19.66	1.80	106.30	0.40	11.10
			Regression				Unstick	719	38.37%	Idle	0.10	1,137	19.66	1.80	106.30	0.40	11.10
			Analysis in				Taxi Out	719	38.37%	Idle	5.00	1,137	19.66	1.80	106.30	0.40	11.10
			AESO 9912)				Final Checks	719	38.37%	85% rpm	0.40	6,811	0.50	9.20	6.80	0.40	3.60
							Mil Takeoff	719	38.37%	N Lift D	0.88	13,085	0.24	17.60	1.90	0.40	1.70
							Climbout	719	38.37%	Combat	1.51	12,258	0.26	16.50	2.20	0.40	1.90
						Arrival	Straight In	47	2.51%	85% rpm	4.38	6,811	0.50	9.20	6.80	0.40	3.60
							Overhead In	672	35.86%	85% rpm	5.71	6,811	0.50	9.20	6.80	0.40	3.60
							Taxi In	719	38.37%	Idle	5.00	1,137	19.66	1.80	106.30	0.40	11.10
							Refuel Taxi	0	0.00%	Idle	2.50	1,137	19.66	1.80	106.30	0.40	11.10
							Hot Refuel	0	0.00%	Idle	15.00	1,137	19.66	1.80	106.30	0.40	11.10
							Unstick	0	0.00%	Idle	0.10	1,137	19.66	1.80	106.30	0.40	11.10
							Apron Taxi	0	0.00%	Idle	2.50	1,137	19.66	1.80	106.30	0.40	11.10
							Shutdown	719	38.37%	Idle	1.00	1,137	19.66	1.80	106.30	0.40	11.10
						Touch-and-Go	Approach	218	11.63%	85% rpm	1.24	6,811	0.50	9.20	6.80	0.40	3.60
							Climbout	218	11.63%	Combat	1.06	12,258	0.26	16.50	2.20	0.40	1.90
							Circle	218	11.63%	85% rpm	0.20	6,811	0.50	9.20	6.80	0.40	3.60
F-3	2	F404-GE-400	F404-GE-400	GTC 36-200	178	Departure	APU Use	43	24.16%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)			Warm-Up	43	24.16%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	43	24.16%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Taxi Out	43	24.16%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Final Checks	43	24.16%	86% rpm	0.40	2,836	0.46	5.80	3.32	0.40	7.25
							AB Takeoff	43	24.16%	Max AB	0.76	28,397	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.91	8,587	0.31	25.16	1.05	0.40	2.81
							Climbout	43	24.16%	IRP	0.83	8,587	0.31	25.16	1.05	0.40	2.81
						Arrival	Straight In	43	24.16%	86% rpm	5.08	2,836	0.46	5.80	3.32	0.40	7.25
							Overhead In	0	0.00%	86% rpm	NA	2,836	0.46	5.80	3.32	0.40	7.25
							Taxi In	43	24.16%	G Idle	5.00	624	58.18	1.16	137.34	0.40	13.50
							Refuel Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Hot Refuel	0	0.00%	G Idle	15.00	624	58.18	1.16	137.34	0.40	13.50
							Unstick	0	0.00%	F Idle	0.10	815	44.50	3.41	123.52	0.40	12.38
							Apron Taxi	0	0.00%	G Idle	2.50	624	58.18	1.16	137.34	0.40	13.50
							Shutdown	43	24.16%	G Idle	1.00	624	58.18	1.16	137.34	0.40	13.50
						Touch-and-Go	Approach	46	25.84%	86% rpm	1.08	2,836	0.46	5.80	3.32	0.40	7.25
							Climbout	46	25.84%	IRP	0.23	8,587	0.31	25.16	1.05	0.40	2.81
							Circle	46	25.84%	86% rpm	1.47	2,836	0.46	5.80	3.32	0.40	7.25

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-15	2	F100-PW-100	TF30-P-414	GTC 36-200	202	Departure	APU Use	49	24.26%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(AESO 6-90)	(AESO Fax)			Warm-Up	49	24.26%	Idle	15.00	1,060	2.26	3.96	19.34	0.40	8.96
							Unstick	49	24.26%	Idle	0.10	1,060	2.26	3.96	19.34	0.40	8.96
							Taxi Out	49	24.26%	Idle	5.00	1,060	2.26	3.96	19.34	0.40	8.96
							Final Checks	49	24.26%	95%	0.40	10,400	0.05	44.00	1.80	0.40	2.98
							AB Takeoff	49	24.26%	Max AB	0.72	44,200	0.10	16.50	55.10	0.40	no data
							Mil Takeoff	0	0.00%	95%	0.86	10,400	0.05	44.00	1.80	0.40	2.98
							Climbout	49	24.26%	95%	0.80	10,400	0.05	44.00	1.80	0.40	2.98
						Arrival	Straight In	49	24.26%	30%	4.95	3,000	0.60	11.00	3.00	0.40	7.98
							Overhead In	0	0.00%	30%	NA	3,000	0.60	11.00	3.00	0.40	7.98
							Taxi In	49	24.26%	Idle	5.00	1,060	2.26	3.96	19.34	0.40	8.96
							Refuel Taxi	0	0.00%	Idle	2.50	1,060	2.26	3.96	19.34	0.40	8.96
							Hot Refuel	0	0.00%	Idle	15.00	1,060	2.26	3.96	19.34	0.40	8.96
							Unstick	0	0.00%	Idle	0.10	1,060	2.26	3.96	19.34	0.40	8.96
							Apron Taxi	0	0.00%	Idle	2.50	1,060	2.26	3.96	19.34	0.40	8.96
							Shutdown	49	24.26%	Idle	1.00	1,060	2.26	3.96	19.34	0.40	8.96
						Touch-and-Go	Approach	52	25.74%	30%	1.08	3,000	0.60	11.00	3.00	0.40	7.98
							Climbout	52	25.74%	95%	0.23	10,400	0.05	44.00	1.80	0.40	2.98
							Circle	52	25.74%	30%	1.47	3,000	0.60	11.00	3.00	0.40	7.98
F-16	1	F110-GE-400	F404-GE-400	GTC 36-200	202	Departure	APU Use	49	24.26%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9821)	(Regression	(AESO Fax)			Warm-Up	49	24.26%	Idle	15.00	1,171	3.65	2.77	16.60	0.40	10.90
		F404-GE-400	Equation				Unstick	49	24.26%	77% rpm	0.10	1,793	2.33	4.26	7.73	0.40	9.14
		for Max AB	Presented in				Taxi Out	49	24.26%	Idle	5.00	1,171	3.65	2.77	16.60	0.40	10.90
		(AESO 9734A)	AESO 9734A)				Final Checks	49	24.26%	92% rpm	0.40	6,752	0.41	14.86	0.94	0.40	3.67
							AB Takeoff	49	24.26%	Max AB	0.72	56,703	0.13	9.22	23.12	0.40	no data
							Mil Takeoff	0	0.00%	IRP	0.86	11,719	0.40	28.63	0.84	0.40	1.39
							Climbout	49	24.26%	96% rpm	0.80	9,324	0.38	21.15	0.93	0.40	2.33
						Arrival	Straight In	49	24.26%	88% rpm	4.95	4,786	0.56	10.43	1.05	0.40	5.09
							Overhead In	0	0.00%	88% rpm	NA	4,786	0.56	10.43	1.05	0.40	5.09
							Taxi In	49	24.26%	Idle	5.00	1,171	3.65	2.77	16.60	0.40	10.90
							Refuel Taxi	0	0.00%	Idle	2.50	1,171	3.65	2.77	16.60	0.40	10.90
							Hot Refuel	0	0.00%	Idle	15.00	1,171	3.65	2.77	16.60	0.40	10.90
							Unstick	0	0.00%	77% rpm	0.10	1,793	2.33	4.26	7.73	0.40	9.14
							Apron Taxi	0	0.00%	Idle	2.50	1,171	3.65	2.77	16.60	0.40	10.90
							Shutdown	49	24.26%	Idle	1.00	1,171	3.65	2.77	16.60	0.40	10.90
						Touch-and-Go	Approach	52	25.74%	88% rpm	1.08	4,786	0.56	10.43	1.05	0.40	5.09
							Climbout	52	25.74%	96% rpm	0.23	9,324	0.38	21.15	0.93	0.40	2.33
							Circle	52	25.74%	88% rpm	1.47	4,786	0.56	10.43	1.05	0.40	5.09

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-86	1	J52-P-8B	J52-P-6B	none	1,270	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	304	23.94%	Idle	15.00	680	48.96	1.79	63.78	0.40	21.21
			Equation				Unstick	304	23.94%	37% T	0.10	2,300	1.99	6.34	10.54	0.40	14.05
			Derived From				Taxi Out	304	23.94%	Idle	5.00	680	48.96	1.79	63.78	0.40	21.21
			Data in				Final Checks	304	23.94%	NR	0.40	6,130	0.69	12.13	0.87	0.40	8.29
			AESO 6-90)				Mil Takeoff	304	23.94%	Mil	0.76	7,370	1.08	13.05	0.71	0.40	7.21
							Climbout	304	23.94%	NR	0.98	6,130	0.69	12.13	0.87	0.40	8.29
						Arrival	Straight In	304	23.94%	75% T	4.95	4,320	0.67	10.10	3.00	0.40	10.35
							Overhead In	0	0.00%	75% T	NA	4,320	0.67	10.10	3.00	0.40	10.35
							Taxi In	304	23.94%	Idle	5.00	680	48.96	1.79	63.78	0.40	21.21
							Refuel Taxi	0	0.00%	Idle	2.50	680	48.96	1.79	63.78	0.40	21.21
							Hot Refuel	0	0.00%	Idle	15.00	680	48.96	1.79	63.78	0.40	21.21
							Unstick	0	0.00%	37% T	0.10	2,300	1.99	6.34	10.54	0.40	14.05
							Apron Taxi	0	0.00%	Idle	2.50	680	48.96	1.79	63.78	0.40	21.21
							Shutdown	304	23.94%	Idle	1.00	680	48.96	1.79	63.78	0.40	21.21
						Touch-and-Go	Approach	331	26.06%	75% T	1.08	4,320	0.67	10.10	3.00	0.40	10.35
							Climbout	331	26.06%	NR	0.23	6,130	0.69	12.13	0.87	0.40	8.29
							Circle	331	26.06%	75% T	1.47	4,320	0.67	10.10	3.00	0.40	10.35
C-9B	2	JT8D-9	F404-GE-400	GTC85-72	126	Departure	APU Use	331	262.70%	On	3.50	210	0.13	3.88	14.83	0.40	0.22
		(EPA 1992)	(Regression	(EPA 1992)			Warm-Up	32	25.40%	Idle	16.00	1,048	10.00	2.90	34.50	0.40	11.36
			Equation	GTC 36-200			Unstick	32	25.40%	30%	0.10	2,365	1.73	5.64	9.43	0.40	8.00
			Presented in	for PM10			Taxi Out	32	25.40%	Idle	5.00	1,048	10.00	2.90	34.50	0.40	11.36
			AESO 9734A)	(AESO Fax)			Final Checks	32	25.40%	85%	0.40	6,715	0.47	14.21	1.66	0.40	3.69
							Mil Takeoff	32	25.40%	100%	1.01	8,254	0.47	17.92	1.24	0.40	2.84
							Climbout	32	25.40%	85%	1.46	6,715	0.47	14.21	1.66	0.40	3.69
						Arrival	Straight In	32	25.40%	30%	4.95	2,365	1.73	5.64	9.43	0.40	8.00
							Overhead In	0	0.00%	30%	NA	2,365	1.73	5.64	9.43	0.40	8.00
							Taxi In	32	25.40%	Idle	5.00	1,048	10.00	2.90	34.50	0.40	11.36
							Refuel Taxi	0	0.00%	Idle	2.50	1,048	10.00	2.90	34.50	0.40	11.36
							Hot Refuel	0	0.00%	Idle	15.00	1,048	10.00	2.90	34.50	0.40	11.36
							Unstick	0	0.00%	30%	0.10	2,365	1.73	5.64	9.43	0.40	8.00
							Apron Taxi	0	0.00%	Idle	2.50	1,048	10.00	2.90	34.50	0.40	11.36
							Shutdown	32	25.40%	Idle	1.00	1,048	10.00	2.90	34.50	0.40	11.36
						Touch-and-Go	Approach	31	24.60%	30%	1.08	2,365	1.73	5.64	9.43	0.40	8.00
							Climbout	31	24.60%	85%	0.23	6,715	0.47	14.21	1.66	0.40	3.69
							Circle	31	24.60%	30%	1.47	2,365	1.73	5.64	9.43	0.40	8.00

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UC-8A	2	T64-GE-6B	T64-GE-6B/41	T62T-27	36	Departure	APU Use	16	44.44%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)	(EPA 1992)			Warm-Up	16	44.44%	Idle	15.00	321	15.36	2.75	57.27	0.40	2.21
				GTC 36-200			Unstick	16	44.44%	75% hp	0.10	1,063	0.48	7.80	4.27	0.40	2.21
				for PM10			Taxi Out	16	44.44%	Idle	5.00	321	15.36	2.75	57.27	0.40	2.21
				(AESO Fax)			Final Checks	16	44.44%	NR	0.40	1,262	0.56	8.97	2.66	0.40	2.21
							Mil Takeoff	16	44.44%	Max Cont	1.13	1,428	0.64	10.11	1.50	0.40	2.21
							Climbout	16	44.44%	Mil	1.80	1,370	0.59	9.80	1.87	0.40	2.21
						Arrival	Straight In	16	44.44%	75% hp	6.19	1,063	0.48	7.80	4.27	0.40	2.21
							Overhead In	0	0.00%	75% hp	NA	1,063	0.48	7.80	4.27	0.40	2.21
							Taxi In	16	44.44%	Idle	5.00	321	15.36	2.75	57.27	0.40	2.21
							Refuel Taxi	0	0.00%	Idle	2.50	321	15.36	2.75	57.27	0.40	2.21
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	75% hp	0.10	1,063	0.48	7.80	4.27	0.40	2.21
							Apron Taxi	0	0.00%	Idle	2.50	321	15.36	2.75	57.27	0.40	2.21
							Shutdown	16	44.44%	Idle	1.00	321	15.36	2.75	57.27	0.40	2.21
						Touch-and-Go	Approach	2	5.56%	75% hp	1.26	1,063	0.48	7.80	4.27	0.40	2.21
							Climbout	2	5.56%	Mil	0.26	1,370	0.59	9.80	1.87	0.40	2.21
							Circle	2	5.56%	75% hp	1.72	1,063	0.48	7.80	4.27	0.40	2.21
UC-12B	2	PT6A-41	TPE331-3	none	608	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	262	43.09%	Idle	15.00	147	101.63	1.97	115.31	0.40	2.95
							Unstick	262	43.09%	30%	0.10	273	22.71	4.65	34.80	0.40	2.40
							Taxi Out	262	43.09%	Idle	5.00	147	101.63	1.97	115.31	0.40	2.95
							Final Checks	262	43.09%	90%	0.40	473	2.03	7.57	6.49	0.40	1.47
							Mil Takeoff	262	43.09%	100%	1.13	510	1.75	7.98	5.10	0.40	1.75
							Climbout	262	43.09%	90%	1.80	473	2.03	7.57	6.49	0.40	1.47
						Arrival	Straight In	262	43.09%	30%	6.19	273	22.71	4.65	34.80	0.40	2.40
							Overhead In	0	0.00%	30%	NA	273	22.71	4.65	34.80	0.40	2.40
							Taxi In	262	43.09%	Idle	5.00	147	101.63	1.97	115.31	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	147	101.63	1.97	115.31	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	273	22.71	4.65	34.80	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	147	101.63	1.97	115.31	0.40	2.95
							Shutdown	262	43.09%	Idle	1.00	147	101.63	1.97	115.31	0.40	2.95
						Touch-and-Go	Approach	42	6.91%	30%	1.26	273	22.71	4.65	34.80	0.40	2.40
							Climbout	42	6.91%	90%	0.26	473	2.03	7.57	6.49	0.40	1.47
							Circle	42	6.91%	30%	1.72	273	22.71	4.65	34.80	0.40	2.40

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
U-21	2	PT6A-27 (EPA 1992)	TPE331-3 (EPA 1992)	none	24	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
							Warm-Up	10	41.67%	Idle	15.00	115	50.17	2.43	64.00	0.40	2.95
							Unstick	10	41.67%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Taxi Out	10	41.67%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Final Checks	10	41.67%	90%	0.40	400	0.00	7.00	1.20	0.40	1.47
							Mil Takeoff	10	41.67%	100%	1.13	425	0.00	7.81	1.01	0.40	1.75
							Climbout	10	41.67%	90%	1.80	400	0.00	7.00	1.20	0.40	1.47
						Arrival	Straight In	10	41.67%	30%	6.19	215	2.19	8.37	23.02	0.40	2.40
							Overhead In	0	0.00%	30%	NA	215	2.19	8.37	23.02	0.40	2.40
							Taxi In	10	41.67%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Shutdown	10	41.67%	Idle	1.00	115	50.17	2.43	64.00	0.40	2.95
						Touch-and-Go	Approach	2	8.33%	30%	1.26	215	2.19	8.37	23.02	0.40	2.40
							Climbout	2	8.33%	90%	0.26	400	0.00	7.00	1.20	0.40	1.47
							Circle	2	8.33%	30%	1.72	215	2.19	8.37	23.02	0.40	2.40
MU-2	2	TPE331-3 (EPA 1992)	TPE331-3 (EPA 1992)	none	3,374	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
							Warm-Up	1,457	43.18%	Idle	15.00	112	79.11	2.86	61.52	0.40	2.95
							Unstick	1,457	43.18%	30%	0.10	250	0.64	9.92	6.96	0.40	2.40
							Taxi Out	1,457	43.18%	Idle	5.00	112	79.11	2.86	61.52	0.40	2.95
							Final Checks	1,457	43.18%	90%	0.40	409	0.15	11.86	0.98	0.40	1.47
							Mil Takeoff	1,457	43.18%	100%	1.13	458	0.11	12.36	0.76	0.40	1.75
							Climbout	1,457	43.18%	90%	1.80	409	0.15	11.86	0.98	0.40	1.47
						Arrival	Straight In	1,457	43.18%	30%	6.19	250	0.64	9.92	6.96	0.40	2.40
							Overhead In	0	0.00%	30%	NA	250	0.64	9.92	6.96	0.40	2.40
							Taxi In	1,457	43.18%	Idle	5.00	112	79.11	2.86	61.52	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	112	79.11	2.86	61.52	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	250	0.64	9.92	6.96	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	112	79.11	2.86	61.52	0.40	2.95
							Shutdown	1,457	43.18%	Idle	1.00	112	79.11	2.86	61.52	0.40	2.95
						Touch-and-Go	Approach	230	6.82%	30%	1.26	250	0.64	9.92	6.96	0.40	2.40
							Climbout	230	6.82%	90%	0.26	409	0.15	11.86	0.98	0.40	1.47
							Circle	230	6.82%	30%	1.72	250	0.64	9.92	6.96	0.40	2.40

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
OV-10	2	T76-G-12A	TPE331-3	none	70	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(EPA 1992)				Warm-Up	30	42.86%	G Start	15.00	180	11.85	4.30	28.29	0.40	2.95
							Unstick	30	42.86%	H Idle	0.10	212	7.12	4.50	24.59	0.40	2.40
							Taxi Out	30	42.86%	G Start	5.00	180	11.85	4.30	28.29	0.40	2.95
							Final Checks	30	42.86%	Mil	0.40	382	0.06	7.18	1.69	0.40	1.47
							Mil Takeoff	30	42.86%	Mil	1.13	382	0.06	7.18	1.69	0.40	1.47
							Climbout	30	42.86%	Mil	1.80	382	0.06	7.18	1.69	0.40	1.47
						Arrival	Straight In	30	42.86%	H Idle	6.19	212	7.12	4.50	24.59	0.40	2.40
							Overhead In	0	0.00%	H Idle	NA	212	7.12	4.50	24.59	0.40	2.40
							Taxi In	30	42.86%	G Start	5.00	180	11.85	4.30	28.29	0.40	2.95
							Refuel Taxi	0	0.00%	G Start	2.50	180	11.85	4.30	28.29	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	H Idle	0.10	212	7.12	4.50	24.59	0.40	2.40
							Apron Taxi	0	0.00%	G Start	2.50	180	11.85	4.30	28.29	0.40	2.95
							Shutdown	30	42.86%	G Start	1.00	180	11.85	4.30	28.29	0.40	2.95
						Touch-and-Go	Approach	5	7.14%	H Idle	1.26	212	7.12	4.50	24.59	0.40	2.40
							Climbout	5	7.14%	Mil	0.26	382	0.06	7.18	1.69	0.40	1.47
							Circle	5	7.14%	H Idle	1.72	212	7.12	4.50	24.59	0.40	2.40
OV-1	2	T53-L-11D	T58-GE-5/8F	none	102	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	44	43.14%	G Idle	15.00	145	67.41	1.58	31.51	0.40	4.20
							Unstick	44	43.14%	F Idle	0.10	222	15.75	2.53	37.79	0.40	4.20
							Taxi Out	44	43.14%	G Idle	5.00	145	67.41	1.58	31.51	0.40	4.20
							Final Checks	44	43.14%	NR	0.40	645	0.66	6.43	6.83	0.40	4.20
							Mil Takeoff	44	43.14%	100% hp	0.85	690	0.32	7.75	3.85	0.40	4.20
							Climbout	44	43.14%	Mil	1.80	685	0.30	6.34	3.34	0.40	4.20
						Arrival	Straight In	44	43.14%	NR	6.19	645	0.66	6.43	6.83	0.40	4.20
							Overhead In	0	0.00%	NR	NA	645	0.66	6.43	6.83	0.40	4.20
							Taxi In	44	43.14%	G Idle	5.00	145	67.41	1.58	31.51	0.40	4.20
							Refuel Taxi	0	0.00%	G Idle	2.50	145	67.41	1.58	31.51	0.40	4.20
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	222	15.75	2.53	37.79	0.40	4.20
							Apron Taxi	0	0.00%	G Idle	2.50	145	67.41	1.58	31.51	0.40	4.20
							Shutdown	44	43.14%	G Idle	1.00	145	67.41	1.58	31.51	0.40	4.20
						Touch-and-Go	Approach	7	6.86%	NR	1.26	645	0.66	6.43	6.83	0.40	4.20
							Climbout	7	6.86%	Mil	0.26	685	0.30	6.34	3.34	0.40	4.20
							Circle	7	6.86%	NR	1.72	645	0.66	6.43	6.83	0.40	4.20

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
P-3	4	T56-A-16	J79-GE-10B	GTC95-2	34	Departure	APU Use	15	44.12%	On	#####	293	0.36	5.65	3.20	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)			Warm-Up	15	44.12%	G Idle L	15.00	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200			Unstick	15	44.12%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
			Analysis in	for PM10			Taxi Out	15	44.12%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
			AESO 9908A)	(AESO Fax)			Final Checks	15	44.12%	96% shp	0.40	2,150	0.16	10.30	0.73	0.40	11.70
							Mil Takeoff	15	44.12%	Mil	1.07	2,219	0.16	10.45	0.65	0.40	11.40
							Climbout	15	44.12%	96% shp	1.69	2,150	0.16	10.30	0.73	0.40	11.70
						Arrival	Straight In	15	44.12%	87% shp	5.94	2,000	0.18	10.12	0.81	0.40	12.10
							Overhead In	0	0.00%	87% shp	NA	2,000	0.18	10.12	0.81	0.40	12.10
							Taxi In	15	44.12%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
							Refuel Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
							Apron Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Shutdown	15	44.12%	G Idle L	1.00	599	22.32	3.53	30.11	0.40	17.10
							APU Use	15	44.12%	On	11.94	293	0.36	5.65	3.20	0.40	0.22
						Touch-and-Go	Approach	2	5.88%	87% shp	1.26	2,000	0.18	10.12	0.81	0.40	12.10
							Climbout	2	5.88%	96% shp	0.26	2,150	0.16	10.30	0.73	0.40	11.70
							Circle	2	5.88%	87% shp	1.72	2,000	0.18	10.12	0.81	0.40	12.10
							APU Use	2	5.88%	On	3.24	293	0.36	5.65	3.20	0.40	0.22
C-130	4	T56-A-16	J79-GE-10B	GTC85-72	174	Departure	APU Use	83	47.70%	On	#####	210	0.13	3.88	14.83	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)			Warm-Up	83	47.70%	G Idle L	15.00	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200			Unstick	83	47.70%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
			Analysis in	for PM10			Taxi Out	83	47.70%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
			AESO 9908A)	(AESO Fax)			Final Checks	83	47.70%	96% shp	0.40	2,150	0.16	10.30	0.73	0.40	11.70
							Mil Takeoff	83	47.70%	Mil	1.13	2,219	0.16	10.45	0.65	0.40	11.40
							Climbout	83	47.70%	96% shp	2.40	2,150	0.16	10.30	0.73	0.40	11.70
						Arrival	Straight In	83	47.70%	87% shp	6.19	2,000	0.18	10.12	0.81	0.40	12.10
							Overhead In	0	0.00%	87% shp	NA	2,000	0.18	10.12	0.81	0.40	12.10
							Taxi In	83	47.70%	G Idle L	5.00	599	22.32	3.53	30.11	0.40	17.10
							Refuel Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	F Idle	0.10	836	1.10	6.52	4.54	0.40	15.80
							Apron Taxi	0	0.00%	G Idle L	2.50	599	22.32	3.53	30.11	0.40	17.10
							Shutdown	83	47.70%	G Idle L	1.00	599	22.32	3.53	30.11	0.40	17.10
							APU Use	83	47.70%	On	15.00	210	0.13	3.88	14.83	0.40	0.22
						Touch-and-Go	Approach	4	2.30%	87% shp	1.26	2,000	0.18	10.12	0.81	0.40	12.10
							Climbout	4	2.30%	96% shp	0.26	2,150	0.16	10.30	0.73	0.40	11.70
							Circle	4	2.30%	87% shp	1.72	2,000	0.18	10.12	0.81	0.40	12.10
							APU Use	0	0.00%	Off	0.00	210	0.13	3.88	14.83	0.40	0.22

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-34	1	PT6A-27	TPE331-3	none	50	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)				Warm-Up	22	44.00%	Idle	15.00	115	50.17	2.43	64.00	0.40	2.95
							Unstick	22	44.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Taxi Out	22	44.00%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Final Checks	22	44.00%	90%	0.40	400	0.00	7.00	1.20	0.40	1.47
							Mil Takeoff	22	44.00%	100%	1.20	425	0.00	7.81	1.01	0.40	1.75
							Climbout	22	44.00%	90%	2.57	400	0.00	7.00	1.20	0.40	1.47
						Arrival	Straight In	22	44.00%	30%	6.19	215	2.19	8.37	23.02	0.40	2.40
							Overhead In	0	0.00%	30%	NA	215	2.19	8.37	23.02	0.40	2.40
							Taxi In	22	44.00%	Idle	5.00	115	50.17	2.43	64.00	0.40	2.95
							Refuel Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Hot Refuel	0	0.00%	Off	NA	0	0.00	0.00	0.00	0.00	0.00
							Unstick	0	0.00%	30%	0.10	215	2.19	8.37	23.02	0.40	2.40
							Apron Taxi	0	0.00%	Idle	2.50	115	50.17	2.43	64.00	0.40	2.95
							Shutdown	22	44.00%	Idle	1.00	115	50.17	2.43	64.00	0.40	2.95
						Touch-and-Go	Approach	3	6.00%	30%	1.26	215	2.19	8.37	23.02	0.40	2.40
							Climbout	3	6.00%	90%	0.26	400	0.00	7.00	1.20	0.40	1.47
							Circle	3	6.00%	30%	1.72	215	2.19	8.37	23.02	0.40	2.40
T-38	2	J85-GE-2	J85-GE-5	none	128	Departure	APU Use	0	0.00%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression				Warm-Up	31	24.22%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
		J85-GE-21	Equation				Unstick	31	24.22%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
		for Max AB	Derived From				Taxi Out	31	24.22%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
		(EPA 1992)	Data in				Final Checks	31	24.22%	NR	0.40	2,875	0.45	6.35	21.78	0.40	9.46
			AESO 9620)				AB Takeoff	31	24.22%	Max AB	0.54	10,650	0.10	5.60	36.50	0.40	no data
							Mil Takeoff	0	0.00%	Mil	0.65	2,890	0.45	6.40	21.56	0.40	9.43
							Climbout	31	24.22%	Mil	0.79	2,890	0.45	6.40	21.56	0.40	9.43
						Arrival	Straight In	31	24.22%	75% NR	4.95	2,155	0.64	5.67	28.38	0.40	11.28
							Overhead In	0	0.00%	75% NR	NA	2,155	0.64	5.67	28.38	0.40	11.28
							Taxi In	31	24.22%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
							Refuel Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Hot Refuel	0	0.00%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
							Unstick	0	0.00%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
							Apron Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Shutdown	31	24.22%	G Idle	1.00	560	11.86	3.68	111.86	0.40	22.03
						Touch-and-Go	Approach	33	25.78%	75% NR	1.08	2,155	0.64	5.67	28.38	0.40	11.28
							Climbout	33	25.78%	Mil	0.23	2,890	0.45	6.40	21.56	0.40	9.43
							Circle	33	25.78%	75% NR	1.47	2,155	0.64	5.67	28.38	0.40	11.28

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-39D	2	J85-GE-2	J85-GE-5	GTC 36-200	330	Departure	APU Use	55	16.67%	On	3.50	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression	(AESO Fax)			Warm-Up	55	16.67%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
			Equation				Unstick	55	16.67%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
			Derived From				Taxi Out	55	16.67%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
			Data in				Final Checks	55	16.67%	NR	0.40	2,875	0.45	6.35	21.78	0.40	9.46
			AESO 9620)				Mil Takeoff	55	16.67%	Mil	0.57	2,890	0.45	6.40	21.56	0.40	9.43
							Climbout	55	16.67%	Mil	0.79	2,890	0.45	6.40	21.56	0.40	9.43
						Arrival	Straight In	55	16.67%	75% NR	4.95	2,155	0.64	5.67	28.38	0.40	11.28
							Overhead In	0	0.00%	75% NR	NA	2,155	0.64	5.67	28.38	0.40	11.28
							Taxi In	55	16.67%	G Idle	5.00	560	11.86	3.68	111.86	0.40	22.03
							Refuel Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Hot Refuel	0	0.00%	G Idle	15.00	560	11.86	3.68	111.86	0.40	22.03
							Unstick	0	0.00%	15% NR	0.10	785	5.72	3.43	102.79	0.40	18.93
							Apron Taxi	0	0.00%	G Idle	2.50	560	11.86	3.68	111.86	0.40	22.03
							Shutdown	55	16.67%	G Idle	1.00	560	11.86	3.68	111.86	0.40	22.03
						Touch-and-Go	Approach	110	33.33%	75% NR	1.08	2,155	0.64	5.67	28.38	0.40	11.28
							Climbout	110	33.33%	Mil	0.23	2,890	0.45	6.40	21.56	0.40	9.43
							Circle	110	33.33%	75% NR	1.47	2,155	0.64	5.67	28.38	0.40	11.28
AH-1W	2	T700-GE	T58-GE-5/8F	none	350	Departure	APU Use	0	0.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)				Warm-Up	71	20.29%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
							Taxi Out	71	20.29%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hover	71	20.29%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
							Climbout	71	20.29%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	71	20.29%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	71	20.29%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	71	20.29%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	71	20.29%	Idle	2.00	164	2.54	3.28	39.81	0.40	4.20
						Touch-and-Go	Approach	104	29.71%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	104	29.71%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	104	29.71%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
AH-64	2	T700-GE	T58-GE-5/8F	T62T-27	70	Departure	APU Use	14	20.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)	(EPA 1992)			Warm-Up	14	20.00%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
				GTC 36-200			Taxi Out	14	20.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
				for PM10			Hover	14	20.00%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
				(AESO Fax)			Climbout	14	20.00%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	14	20.00%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	14	20.00%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	14	20.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	14	20.00%	Idle	2.00	164	2.54	3.28	39.81	0.40	4.20
						Touch-and-Go	Approach	21	30.00%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	21	30.00%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	21	30.00%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20
CH-46E	2	T58-GE-16	T58-GE-5/8F	T62T-27	42	Departure	APU Use	8	19.05%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9820)	(AESO 6-90)	(EPA 1992)			Warm-Up	8	19.05%	20% Q	5.00	311	4.69	4.64	45.09	0.40	4.20
				GTC 36-200			Taxi Out	8	19.05%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
				for PM10			Hover	8	19.05%	45% Q	1.05	551	0.91	6.96	18.74	0.40	4.20
				(AESO Fax)			Climbout	8	19.05%	58% Q	6.00	666	0.81	8.07	14.08	0.40	4.20
						Arrival	Straight In	8	19.05%	40% Q	9.90	505	1.03	6.52	21.38	0.40	4.20
							Descent	8	19.05%	40% Q	1.00	505	1.03	6.52	21.38	0.40	4.20
							Taxi In	8	19.05%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Refuel Taxi	0	0.00%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Hot Refuel	0	0.00%	20% Q	8.00	311	4.69	4.64	45.09	0.40	4.20
							Apron Taxi	0	0.00%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							Shutdown	8	19.05%	20% Q	3.00	311	4.69	4.64	45.09	0.40	4.20
							APU Use	8	19.05%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	13	30.95%	40% Q	2.02	505	1.03	6.52	21.38	0.40	4.20
							Climbout	13	30.95%	58% Q	0.42	666	0.81	8.07	14.08	0.40	4.20
							Circle	13	30.95%	45% Q	2.74	551	0.91	6.96	18.74	0.40	4.20

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
CH-53E	3	T64-GE-415	T64-GE-6B/41	T62T-27	18	Departure	APU Use	4	22.22%	On	20.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9905)	(AESO 6-90)	(EPA 1992)			Warm-Up	4	22.22%	6% Q	13.00	360	20.12	2.56	42.42	0.40	2.21
				GTC 36-200			Taxi Out	4	22.22%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
				for PM10			Hover	4	22.22%	61% Q	1.05	1,329	0.38	7.44	2.93	0.40	2.21
				(AESO Fax)			Climbout	4	22.22%	83% Q	6.00	1,717	0.14	9.08	1.48	0.40	2.21
						Arrival	Straight In	4	22.22%	49% Q	9.90	1,118	1.22	6.54	4.57	0.40	2.21
							Descent	4	22.22%	49% Q	1.00	1,118	1.22	6.54	4.57	0.40	2.21
							Taxi In	4	22.22%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Refuel Taxi	0	0.00%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Hot Refuel	0	0.00%	15% Q	8.00	518	11.76	3.43	21.25	0.40	2.21
							Apron Taxi	0	0.00%	29% Q	3.00	765	5.13	4.81	10.17	0.40	2.21
							Shutdown	4	22.22%	12% Q	6.00	466	14.01	3.14	26.02	0.40	2.21
							APU Use	4	22.22%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	5	27.78%	49% Q	2.02	1,118	1.22	6.54	4.57	0.40	2.21
							Climbout	5	27.78%	83% Q	0.42	1,717	0.14	9.08	1.48	0.40	2.21
							Circle	5	27.78%	64% Q	2.74	1,382	0.28	7.65	2.63	0.40	2.21
UH-1L	1	T53-L-11D	T58-GE-5/8F	none	264	Departure	APU Use	0	0.00%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	53	20.08%	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
							Taxi Out	53	20.08%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Hover	53	20.08%	95% rpm	1.05	645	0.66	6.43	6.83	0.40	4.20
							Climbout	53	20.08%	100% rpm	6.00	690	0.32	7.75	3.85	0.40	4.20
						Arrival	Straight In	53	20.08%	95% rpm	9.90	645	0.66	6.43	6.83	0.40	4.20
							Descent	53	20.08%	95% rpm	1.00	645	0.66	6.43	6.83	0.40	4.20
							Taxi In	53	20.08%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Refuel Taxi	0	0.00%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Hot Refuel	0	0.00%	G Idle	8.00	145	67.41	1.58	31.51	0.40	4.20
							Apron Taxi	0	0.00%	95% rpm	3.00	645	0.66	6.43	6.83	0.40	4.20
							Shutdown	53	20.08%	G Idle	1.00	145	67.41	1.58	31.51	0.40	4.20
						Touch-and-Go	Approach	79	29.92%	95% rpm	2.02	645	0.66	6.43	6.83	0.40	4.20
							Climbout	79	29.92%	100% rpm	0.42	690	0.32	7.75	3.85	0.40	4.20
							Circle	79	29.92%	98% rpm	2.74	685	0.30	6.34	3.34	0.40	4.20

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
HH-1N	2	T400-CP-400	T58-GE-5/8F	none	794	Departure	APU Use	0	0.00%	On	0.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9809)	(AESO 6-90)				Warm-Up	161	20.28%	7% Q	15.00	148	6.21	3.13	28.36	0.40	4.20
							Taxi Out	161	20.28%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Hover	161	20.28%	54% Q	1.05	346	0.13	5.79	1.01	0.40	4.20
							Climbout	161	20.28%	56% Q	6.00	355	0.13	5.90	0.94	0.40	4.20
						Arrival	Straight In	161	20.28%	33% Q	9.90	258	0.20	4.54	4.22	0.40	4.20
							Descent	161	20.28%	29% Q	1.00	241	0.28	4.30	5.76	0.40	4.20
							Taxi In	161	20.28%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Refuel Taxi	0	0.00%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Hot Refuel	0	0.00%	7% Q	8.00	148	6.21	3.13	28.36	0.40	4.20
							Apron Taxi	0	0.00%	52% Q	3.00	338	0.13	5.67	1.11	0.40	4.20
							Shutdown	161	20.28%	7% Q	1.00	148	6.21	3.13	28.36	0.40	4.20
						Touch-and-Go	Approach	236	29.72%	33% Q	2.02	258	0.20	4.54	4.22	0.40	4.20
							Climbout	236	29.72%	56% Q	0.42	355	0.13	5.90	0.94	0.40	4.20
							Circle	236	29.72%	54% Q	2.74	346	0.13	5.79	1.01	0.40	4.20
OH-58	1	T63-A-5A	T58-GE-5/8F	none	112	Departure	APU Use	0	0.00%	On	0.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)				Warm-Up	23	20.54%	G Idle	10.00	61	20.30	1.42	79.15	0.40	4.20
							Taxi Out	23	20.54%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Hover	23	20.54%	60%	1.05	157	0.68	4.11	20.79	0.40	4.20
							Climbout	23	20.54%	75%	6.00	175	0.24	4.61	14.31	0.40	4.20
						Arrival	Straight In	23	20.54%	60%	9.90	157	0.68	4.11	20.79	0.40	4.20
							Descent	23	20.54%	60%	1.00	157	0.68	4.11	20.79	0.40	4.20
							Taxi In	23	20.54%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Refuel Taxi	0	0.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Hot Refuel	0	0.00%	G Idle	8.00	61	20.30	1.42	79.15	0.40	4.20
							Apron Taxi	0	0.00%	30%	3.00	105	3.27	2.90	38.59	0.40	4.20
							Shutdown	23	20.54%	30%	1.00	105	3.27	2.90	38.59	0.40	4.20
						Touch-and-Go	Approach	33	29.46%	60%	2.02	157	0.68	4.11	20.79	0.40	4.20
							Climbout	33	29.46%	75%	0.42	175	0.24	4.61	14.31	0.40	4.20
							Circle	33	29.46%	60%	2.74	157	0.68	4.11	20.79	0.40	4.20

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UH-60	2	T700-GE	T58-GE-5/8F	T62T-27	88	Departure	APU Use	18	20.45%	On	3.50	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)	(EPA 1992)			Warm-Up	18	20.45%	10% Q	10.00	239	0.98	4.29	22.49	0.40	4.20
				GTC 36-200			Taxi Out	18	20.45%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
				for PM10			Hover	18	20.45%	33% Q	1.05	393	0.57	5.37	11.70	0.40	4.20
				(AESO Fax)			Climbout	18	20.45%	40% Q	6.00	438	0.56	5.61	10.13	0.40	4.20
						Arrival	Straight In	18	20.45%	25% Q	9.90	341	0.61	5.07	14.04	0.40	4.20
							Descent	18	20.45%	25% Q	1.00	341	0.61	5.07	14.04	0.40	4.20
							Taxi In	18	20.45%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Refuel Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Hot Refuel	0	0.00%	10% Q	8.00	239	0.98	4.29	22.49	0.40	4.20
							Apron Taxi	0	0.00%	33% Q	3.00	393	0.57	5.37	11.70	0.40	4.20
							Shutdown	18	20.45%	Idle	1.00	164	2.54	3.28	39.81	0.40	4.20
							APU Use	18	20.45%	On	10.00	102	7.79	3.94	42.77	0.40	0.22
						Touch-and-Go	Approach	26	29.55%	25% Q	2.02	341	0.61	5.07	14.04	0.40	4.20
							Climbout	26	29.55%	40% Q	0.42	438	0.56	5.61	10.13	0.40	4.20
							Circle	26	29.55%	38% Q	2.74	425	0.56	5.55	10.54	0.40	4.20
Beechcraft Dutches 76	2	TSIO-360C (EPA 1992)	AP-42, 3.3	none	80	Departure	Warm-Up	24	30.00%	Idle	7.00	11	138.26	1.91	592.17	0.11	1.83
							Taxi Out	24	30.00%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
							Takeoff	24	30.00%	100%	1.37	133	9.17	2.71	1081.95	0.11	1.83
							Climbout	24	30.00%	85%	4.09	100	9.55	4.32	960.80	0.11	1.83
						Arrival	Straight In	24	30.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Overhead In	0	0.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Taxi In	24	30.00%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
						Touch-and-Go	Approach	16	20.00%	40%	1.51	61	11.31	3.77	995.08	0.11	1.83
							Climbout	16	20.00%	85%	0.32	100	9.55	4.32	960.80	0.11	1.83
Cessna 172	1	O-320 (EPA 1992)	AP-42, 3.3	none	2,088	Departure	Warm-Up	627	30.03%	Idle	7.00	10	36.92	0.52	1077.00	0.11	1.83
							Taxi Out	627	30.03%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
							Takeoff	627	30.03%	100%	1.37	89	11.78	2.19	1077.44	0.11	1.83
							Climbout	627	30.03%	85%	5.00	67	12.38	3.97	989.51	0.11	1.83
						Arrival	Straight In	627	30.03%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Overhead In	0	0.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Taxi In	627	30.03%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
						Touch-and-Go	Approach	417	19.97%	40%	1.68	47	19.25	0.95	1221.51	0.11	1.83
							Climbout	417	19.97%	85%	0.35	67	12.38	3.97	989.51	0.11	1.83
							Circle	417	19.97%	40%	2.29	47	19.25	0.95	1221.51	0.11	1.83

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
Mooney Turbo 231	1	TSIO-360C (EPA 1992)	AP-42, 3.3	none	18	Departure	Warm-Up	5	27.78%	Idle	7.00	11	138.26	1.91	592.17	0.11	1.83
							Taxi Out	5	27.78%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
							Takeoff	5	27.78%	100%	1.37	133	9.17	2.71	1081.95	0.11	1.83
							Climbout	5	27.78%	85%	4.09	100	9.55	4.32	960.80	0.11	1.83
						Arrival	Straight In	5	27.78%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Overhead In	0	0.00%	40%	7.42	61	11.31	3.77	995.08	0.11	1.83
							Taxi In	5	27.78%	Idle	5.00	11	138.26	1.91	592.17	0.11	1.83
						Touch-and-Go	Approach	4	22.22%	40%	1.51	61	11.31	3.77	995.08	0.11	1.83
							Climbout	4	22.22%	85%	0.32	100	9.55	4.32	960.80	0.11	1.83
							Circle	4	22.22%	40%	2.06	61	11.31	3.77	995.08	0.11	1.83
Gulfstream AA-5A	1	O-320 (EPA 1992)	AP-42, 3.3	none	18	Departure	Warm-Up	5	27.78%	Idle	7.00	10	36.92	0.52	1077.00	0.11	1.83
							Taxi Out	5	27.78%	Idle	5.00	10	36.92	0.52	1077.00	0.11	1.83
							Takeoff	5	27.78%	100%	1.37	89	11.78	2.19	1077.44	0.11	1.83
							Climbout	5	27.78%	85%	4.74	67	12.38	3.97	989.51	0.11	1.83
						Arrival	Straight In	5	27.78%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83
							Overhead In	0	0.00%	40%	8.25	47	19.25	0.95	1221.51	0.11	1.83

Armitage Airfield Flight Operations below 3,000 Feet AGL: 33,730

Notes:
ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
APU = auxiliary power unit (provides electrical power and air conditioning prior to start of main engines; starts main engines; also provides continuous power for equipment on some aircraft)
FLCP = field carrier landing practice
G Idle = ground idle; some aircraft have separate low speed (L) and high speed (H) ground idle settings
F Idle = flight idle
NR = normal rated power
AB = afterburner
IRP = intermediate rated power
Mil = military power setting
Int = intermediate power setting; some aircraft have more than one intermediate power setting
Max Cont = maximum continuous power
N Lift D = normal lift, dry
% rpm = percent of rated core revolutions per minute (% N2)
% T = percent of rated thrust
% hp = percent of rated horsepower
% shp = percent of rated shaft horsepower
% Q = percent torque (for turboshaft engines)

TABLE D1-28. DATA USED TO ESTIMATE EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

		Engine Models and Data Sources Used for Emission Rates											Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
Aircraft Type	Number of Engines	ROG, NOx, CO	PM10	APU	Annual Flight Operations	Flight Activity	Flight Mode	Annual Operations By Flight Mode	Fraction of Annual Flight Operations	Engine Power Setting	Time In Mode (min)	Fuel Flow Rate per Engine (lb/hr)	ROG	NOx	CO	SOx	PM10

Annual flight operations based on analyses summarized in Table D1-5.
Engines used for emission rate data are based on information presented in Table D1-23.
Flight operation totals and subtotals are the sum of approach mode and climbout mode numbers.
Departures and arrivals each represent a single flight operation; Touch-and-Go and FCLP pattern events each represent two flight operations (an approach and a climbout).
Engine power settings and associated fuel flow rates based on data in emission factor source documents and AESO LTO cycle evaluation documents.
Time-in-mode estimates based on analysis of flight track profiles for from various airfields (Tables D1-6 through D1-22), AESO LTO cycle evaluation documents, draft AESO analysis of NAWS China La aircraft emissions for FY93, and estimates provided by AESO and NAWS China Lake personnel.
Hot refueling (refueling while engines are idling) does not occur at NAWS China Lake.
Sulfur oxide emission rates for turbine engines (jets, turboprops, and helicopters) are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90.
PM10 emission factor for piston engines based on industrial gasoline engines (U.S. EPA 1996, Section 3.3), assuming a fuel density of 673 kilogram per cubic meter and an energy content of 40,282 B per kilogram (18,272 BTU per pound).
All values independently rounded for display after calculation.

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TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F/A-18A-D	Departure	APU Use	0.01	0.13	0.04	0.01	0.00	Departure	24.51	13.39	74.50	0.57	6.59
		Warm-Up	32.10	0.64	75.78	0.22	7.45						
		Unstick	0.21	0.02	0.59	0.00	0.06						
		Taxi Out	10.70	0.21	25.26	0.07	2.48						
		Final Checks	0.03	0.39	0.22	0.03	0.48						
		AB Takeoff	0.17	11.73	29.41	0.51	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.13	10.57	0.44	0.17	1.18						
	Arrival	Straight In	0.08	1.03	0.59	0.07	1.28	Arrival	9.00	3.02	22.34	0.26	5.59
		Overhead In	0.32	4.00	2.29	0.28	5.00						
		Taxi In	10.70	0.21	25.26	0.07	2.48						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	4.82	0.10	11.37	0.03	1.12						
	Touch-and-Go	Approach	0.03	0.32	0.18	0.02	0.40	Touch-and-Go	0.13	3.03	0.87	0.12	1.93
		Climbout	0.01	0.87	0.04	0.01	0.10						
		Circle	0.03	0.43	0.25	0.03	0.54						
	FCLP	Approach	0.00	0.03	0.02	0.00	0.04	FCLP	0.13	3.03	0.87	0.12	1.93
		Climbout	0.00	0.10	0.00	0.00	0.01						
		Circle	0.00	0.05	0.03	0.00	0.06						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F/A-18E/F	Departure	APU Use	0.01	0.14	0.04	0.01	0.00	Departure	31.48	21.40	281.34	0.71	7.21
		Warm-Up	38.88	2.36	63.73	0.29	9.15						
		Unstick	0.20	0.02	0.40	0.00	0.07						
		Taxi Out	12.96	0.79	21.24	0.10	3.05						
		Final Checks	0.01	0.99	0.10	0.04	0.58						
		AB Takeoff	8.15	16.36	452.73	0.69	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.07	20.34	0.52	0.23	0.97						
	Arrival	Straight In	0.03	2.61	0.27	0.10	1.53	Arrival	9.89	7.27	16.78	0.33	6.23
		Overhead In	0.12	10.16	1.05	0.39	5.98						
		Taxi In	12.96	0.79	21.24	0.10	3.05						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	5.83	0.35	9.56	0.04	1.37						
	Touch-and-Go	Approach	0.01	0.81	0.08	0.03	0.48	Touch-and-Go	0.05	6.19	0.41	0.16	2.07
		Climbout	0.01	1.68	0.04	0.02	0.08						
		Circle	0.01	1.10	0.11	0.04	0.65						
	FCLP	Approach	0.00	0.09	0.01	0.00	0.05	FCLP	0.05	6.19	0.41	0.16	2.07
		Climbout	0.00	0.19	0.00	0.00	0.01						
		Circle	0.00	0.12	0.01	0.00	0.07						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
EA-6B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	18.76	8.09	37.52	0.50	17.22
		Warm-Up	2.68	0.22	5.29	0.04	1.93						
		Unstick	0.00	0.01	0.02	0.00	0.02						
		Taxi Out	0.67	0.06	1.32	0.01	0.48						
		Final Checks	0.01	0.20	0.04	0.01	0.13						
		Mil Takeoff	0.02	0.35	0.04	0.01	0.16						
		Climbout	0.04	0.63	0.12	0.02	0.41						
	Arrival	Straight In	0.01	0.12	0.04	0.01	0.12	Arrival	5.20	10.26	12.47	0.53	13.41
		Overhead In	0.13	1.68	0.64	0.08	1.74						
		Taxi In	0.67	0.06	1.32	0.01	0.48						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.13	0.01	0.26	0.00	0.10						
	Touch-and-Go	Approach	0.02	0.20	0.07	0.01	0.20	Touch-and-Go	0.37	4.93	1.60	0.22	4.56
		Climbout	0.01	0.16	0.03	0.01	0.11						
		Circle	0.02	0.21	0.08	0.01	0.21						
	FCLP	Approach	0.00	0.05	0.02	0.00	0.06	FCLP	0.37	4.93	1.60	0.22	4.56
		Climbout	0.00	0.05	0.01	0.00	0.03						
		Circle	0.00	0.06	0.02	0.00	0.06						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
AV-8B	Departure	APU Use	0.00	0.03	0.01	0.00	0.00	Departure	9.50	9.81	51.94	0.41	6.36
		Warm-Up	2.68	0.25	14.48	0.05	1.51						
		Unstick	0.01	0.00	0.07	0.00	0.01						
		Taxi Out	0.67	0.06	3.62	0.01	0.38						
		Final Checks	0.01	0.15	0.11	0.01	0.06						
		Mil Takeoff	0.02	1.21	0.13	0.03	0.12						
		Climbout	0.03	1.83	0.24	0.04	0.21						
	Arrival	Straight In	0.01	0.11	0.08	0.00	0.04	Arrival	2.55	6.08	16.43	0.30	3.56
		Overhead In	0.11	2.00	1.48	0.09	0.78						
		Taxi In	0.67	0.06	3.62	0.01	0.38						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.13	0.01	0.72	0.00	0.08						
	Touch-and-Go	Approach	0.01	0.14	0.10	0.01	0.06	Touch-and-Go	0.14	5.08	1.59	0.15	1.00
		Climbout	0.01	0.39	0.05	0.01	0.04						
		Circle	0.00	0.02	0.02	0.00	0.01						
F-3	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	24.51	13.39	74.50	0.57	6.59
		Warm-Up	0.39	0.01	0.92	0.00	0.09						
		Unstick	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.13	0.00	0.31	0.00	0.03						
		Final Checks	0.00	0.00	0.00	0.00	0.01						
		AB Takeoff	0.00	0.14	0.36	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.13	0.01	0.00	0.01						
	Arrival	Straight In	0.00	0.06	0.03	0.00	0.07	Arrival	7.48	2.93	18.73	0.24	5.17
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.13	0.00	0.31	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.03	0.00	0.06	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.02	Touch-and-Go	0.13	3.03	0.87	0.12	1.93
		Climbout	0.00	0.04	0.00	0.00	0.00						
		Circle	0.00	0.02	0.01	0.00	0.02						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
F-15	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.74	38.69	72.96	0.88	7.61
		Warm-Up	0.03	0.05	0.25	0.01	0.12						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.02	0.08	0.00	0.04						
		Final Checks	0.00	0.15	0.01	0.00	0.01						
		AB Takeoff	0.00	0.43	1.43	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.30	0.01	0.00	0.02						
	Arrival	Straight In	0.01	0.13	0.04	0.00	0.10	Arrival	0.78	6.28	5.59	0.28	5.85
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.02	0.08	0.00	0.04						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.02	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.03	0.01	0.00	0.02	Touch-and-Go	0.16	6.27	0.91	0.13	2.27
		Climbout	0.00	0.09	0.00	0.00	0.01						
		Circle	0.00	0.04	0.01	0.00	0.03						
F-16	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.59	10.74	22.42	0.50	4.74
		Warm-Up	0.03	0.02	0.12	0.00	0.08						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.01	0.04	0.00	0.03						
		Final Checks	0.00	0.02	0.00	0.00	0.00						
		AB Takeoff	0.00	0.15	0.39	0.01	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.06	0.00	0.00	0.01						
	Arrival	Straight In	0.01	0.10	0.01	0.00	0.05	Arrival	0.65	4.44	2.36	0.20	3.29
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.01	0.04	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.02	0.00	0.00	0.01	Touch-and-Go	0.13	2.87	0.25	0.10	1.12
		Climbout	0.00	0.02	0.00	0.00	0.00						
		Circle	0.00	0.03	0.00	0.00	0.02						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
F-86	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	11.30	3.36	14.69	0.19	6.70
		Warm-Up	1.27	0.05	1.65	0.01	0.55						
		Unstick	0.00	0.00	0.01	0.00	0.01						
		Taxi Out	0.42	0.02	0.55	0.00	0.18						
		Final Checks	0.00	0.08	0.01	0.00	0.05						
		Mil Takeoff	0.02	0.19	0.01	0.01	0.10						
		Climbout	0.01	0.18	0.01	0.01	0.13						
	Arrival	Straight In	0.04	0.55	0.16	0.02	0.56	Arrival	3.57	3.72	5.41	0.17	5.13
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.42	0.02	0.55	0.00	0.18						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.08	0.00	0.11	0.00	0.04						
	Touch-and-Go	Approach	0.01	0.13	0.04	0.01	0.13	Touch-and-Go	0.14	2.14	0.57	0.08	2.09
		Climbout	0.00	0.05	0.00	0.00	0.03						
		Circle	0.01	0.18	0.05	0.01	0.18						
C-9B	Departure	APU Use	0.00	0.01	0.03	0.00	0.00	Departure	0.74	1.31	2.73	0.06	1.04
		Warm-Up	0.09	0.03	0.31	0.00	0.10						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.01	0.10	0.00	0.03						
		Final Checks	0.00	0.02	0.00	0.00	0.01						
		Mil Takeoff	0.00	0.08	0.01	0.00	0.01						
		Climbout	0.00	0.07	0.01	0.00	0.02						
	Arrival	Straight In	0.01	0.04	0.06	0.00	0.05	Arrival	2.77	2.81	10.91	0.24	5.50
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.01	0.10	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.02	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.37	1.86	1.98	0.10	1.80
		Climbout	0.00	0.01	0.00	0.00	0.00						
		Circle	0.00	0.01	0.02	0.00	0.01						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
UC-8A	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	3.43	2.14	12.80	0.15	0.82
		Warm-Up	0.02	0.00	0.07	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.00	0.02	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.01	0.00	0.00	Arrival	1.09	1.89	4.61	0.11	0.63
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.02	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.06	0.94	0.47	0.05	0.26
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
UC-12B	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	10.08	0.61	11.66	0.06	0.38
		Warm-Up	0.98	0.02	1.11	0.00	0.03						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.33	0.01	0.37	0.00	0.01						
		Final Checks	0.00	0.01	0.01	0.00	0.00						
		Mil Takeoff	0.00	0.02	0.01	0.00	0.00						
		Climbout	0.01	0.03	0.02	0.00	0.01						
	Arrival	Straight In	0.17	0.03	0.26	0.00	0.02	Arrival	4.27	0.32	5.35	0.03	0.22
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.33	0.01	0.37	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.07	0.00	0.07	0.00	0.00						
	Touch-and-Go	Approach	0.01	0.00	0.01	0.00	0.00	Touch-and-Go	0.62	0.16	0.97	0.01	0.07
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.01	0.00	0.01	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
U-21	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	3.85	0.52	4.98	0.05	0.30
		Warm-Up	0.01	0.00	0.02	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	1.25	0.43	2.49	0.03	0.17
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.05	0.20	0.49	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
MU-2	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	5.92	0.79	4.65	0.05	0.30
		Warm-Up	3.23	0.12	2.51	0.02	0.12						
		Unstick	0.00	0.01	0.00	0.00	0.00						
		Taxi Out	1.08	0.04	0.84	0.01	0.04						
		Final Checks	0.00	0.05	0.00	0.00	0.01						
		Mil Takeoff	0.00	0.16	0.01	0.01	0.02						
		Climbout	0.00	0.21	0.02	0.01	0.03						
	Arrival	Straight In	0.02	0.37	0.26	0.02	0.09	Arrival	1.81	0.58	1.74	0.03	0.19
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	1.08	0.04	0.84	0.01	0.04						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.22	0.01	0.17	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.00	Touch-and-Go	0.02	0.29	0.18	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.02	0.01	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
OV-10	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.43	0.82	3.48	0.07	0.42
		Warm-Up	0.02	0.01	0.04	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.74	0.35	2.09	0.03	0.21
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.15	0.12	0.52	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
OV-1	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	6.55	0.62	3.35	0.07	0.70
		Warm-Up	0.11	0.00	0.05	0.00	0.01						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.04	0.00	0.02	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.02	0.02	0.00	0.01	Arrival	2.04	0.90	1.82	0.06	0.68
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.04	0.00	0.02	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.45	0.46	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
P-3	Departure	APU Use	0.00	0.04	0.02	0.00	0.00	Departure	18.22	12.56	27.21	0.86	19.25
		Warm-Up	0.10	0.02	0.14	0.00	0.08						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.03	0.01	0.05	0.00	0.03						
		Final Checks	0.00	0.00	0.00	0.00	0.01						
		Mil Takeoff	0.00	0.01	0.00	0.00	0.01						
		Climbout	0.00	0.02	0.00	0.00	0.02						
	Arrival	Straight In	0.00	0.06	0.00	0.00	0.07	Arrival	5.51	9.19	8.04	0.44	13.69
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.01	0.05	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.01	0.00	0.01						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.08	4.49	0.40	0.18	5.25
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
C-130	Departure	APU Use	0.00	0.10	0.39	0.01	0.01	Departure	18.01	11.18	33.82	0.80	20.49
		Warm-Up	0.55	0.09	0.75	0.01	0.43						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.18	0.03	0.25	0.00	0.14						
		Final Checks	0.00	0.02	0.00	0.00	0.03						
		Mil Takeoff	0.00	0.07	0.00	0.00	0.08						
		Climbout	0.00	0.15	0.01	0.01	0.17						
	Arrival	Straight In	0.01	0.35	0.03	0.01	0.41	Arrival	5.50	9.40	8.66	0.45	14.10
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.18	0.03	0.25	0.00	0.14						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.04	0.01	0.05	0.00	0.03						
		APU Use	0.00	0.01	0.03	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.08	4.41	0.35	0.17	5.24
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.01						
		APU Use	0.00	0.00	0.00	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
T-34	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.93	0.30	2.50	0.03	0.16
		Warm-Up	0.02	0.00	0.02	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.01	0.00	0.01	0.00	0.00						
		Final Checks	0.00	0.00	0.00	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.63	0.21	1.25	0.01	0.09
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.02	0.10	0.25	0.00	0.03
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
T-38	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	4.51	3.19	51.50	0.27	9.35
		Warm-Up	0.05	0.02	0.49	0.00	0.10						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Taxi Out	0.02	0.01	0.16	0.00	0.03						
		Final Checks	0.00	0.00	0.01	0.00	0.01						
		AB Takeoff	0.00	0.02	0.11	0.00	0.00						
		Mil Takeoff	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.03	0.00	0.01						
	Arrival	Straight In	0.00	0.03	0.16	0.00	0.06	Arrival	1.55	2.43	22.62	0.19	6.48
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.02	0.01	0.16	0.00	0.03						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.03	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.01	0.04	0.00	0.01	Touch-and-Go	0.13	1.18	5.68	0.08	2.27
		Climbout	0.00	0.00	0.01	0.00	0.00						
		Circle	0.00	0.01	0.05	0.00	0.02						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
T-39D	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	4.52	2.54	45.71	0.22	9.87
		Warm-Up	0.09	0.03	0.86	0.00	0.17						
		Unstick	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.03	0.01	0.29	0.00	0.06						
		Final Checks	0.00	0.01	0.02	0.00	0.01						
		Mil Takeoff	0.00	0.01	0.03	0.00	0.01						
		Climbout	0.00	0.01	0.05	0.00	0.02						
	Arrival	Straight In	0.01	0.06	0.28	0.00	0.11	Arrival	1.55	2.43	22.62	0.19	6.48
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.03	0.01	0.29	0.00	0.06						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Unstick	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.01	0.00	0.06	0.00	0.01						
	Touch-and-Go	Approach	0.00	0.02	0.12	0.00	0.05	Touch-and-Go	0.13	1.18	5.68	0.08	2.27
		Climbout	0.00	0.01	0.03	0.00	0.01						
		Circle	0.00	0.03	0.17	0.00	0.07						
AH-1W	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.16	1.12	3.30	0.09	0.92
		Warm-Up	0.00	0.01	0.06	0.00	0.01						
		Taxi Out	0.00	0.01	0.02	0.00	0.01						
		Hover	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.02	0.03	0.00	0.01						
	Arrival	Straight In	0.00	0.02	0.06	0.00	0.02	Arrival	0.13	0.88	2.64	0.07	0.73
		Descent	0.00	0.00	0.01	0.00	0.00						
		Taxi In	0.00	0.01	0.02	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.02	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.02	0.00	0.01	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.02	0.00	0.01						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
AH-64	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.20	1.14	3.55	0.09	0.93
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.13	0.88	2.64	0.07	0.73
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
CH-46E	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.65	1.66	6.70	0.10	0.99
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.61	1.55	7.45	0.11	1.04
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.09	0.65	1.80	0.04	0.39
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.01	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

			Total Emissions from Annual Flight Operations (tons/year)						Weighted Average Emissions per Type of Flight Event (pounds/event)				
Aircraft Type	Flight Activity	Flight Mode	ROG	NOx	CO	SOx	PM	Flight Activity	ROG	NOx	CO	SOx	PM10
CH-53E	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	5.66	6.48	13.51	0.39	2.07
		Warm-Up	0.01	0.00	0.02	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.01	0.00	0.00	Arrival	3.42	5.04	8.31	0.35	1.91
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
		APU Use	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.20	2.52	1.07	0.14	0.75
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
UH-1L	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	1.68	0.85	1.32	0.05	0.57
		Warm-Up	0.04	0.00	0.02	0.00	0.00						
		Taxi Out	0.00	0.01	0.01	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.01	0.01	0.00	0.01						
	Arrival	Straight In	0.00	0.02	0.02	0.00	0.01	Arrival	0.26	0.96	1.10	0.06	0.64
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.01	0.01	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.00	Touch-and-Go	0.03	0.38	0.27	0.02	0.24
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.01	0.00	0.00	0.01						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
HH-1N	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.47	0.91	2.22	0.08	0.80
		Warm-Up	0.04	0.02	0.17	0.00	0.03						
		Taxi Out	0.00	0.02	0.00	0.00	0.01						
		Hover	0.00	0.01	0.00	0.00	0.00						
		Climbout	0.00	0.03	0.01	0.00	0.02						
	Arrival	Straight In	0.00	0.03	0.03	0.00	0.03	Arrival	0.05	0.63	0.58	0.05	0.55
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.02	0.00	0.00	0.01						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.01	0.01	0.00	0.01	Touch-and-Go	0.01	0.29	0.11	0.02	0.23
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.02	0.00	0.00	0.02						
OH-58	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.23	0.12	1.31	0.01	0.15
		Warm-Up	0.00	0.00	0.01	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.00	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.01	0.00	0.00	Arrival	0.04	0.14	0.86	0.01	0.15
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.01	0.06	0.28	0.01	0.06
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
UH-60	Departure	APU Use	0.00	0.00	0.00	0.00	0.00	Departure	0.20	1.14	3.55	0.09	0.93
		Warm-Up	0.00	0.00	0.02	0.00	0.00						
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Hover	0.00	0.00	0.00	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.01	0.01	0.00	0.00	Arrival	0.24	0.92	3.15	0.07	0.71
		Descent	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
		Refuel Taxi	0.00	0.00	0.00	0.00	0.00						
		Hot Refuel	0.00	0.00	0.00	0.00	0.00						
		Apron Taxi	0.00	0.00	0.00	0.00	0.00						
		Shutdown	0.00	0.00	0.00	0.00	0.00						
		APU Use	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.04	0.37	0.79	0.03	0.29
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.01	0.00	0.00						
Beechcraft Dutches 76	Departure	Warm-Up	0.00	0.00	0.02	0.00	0.00	Departure	0.82	0.08	22.33	0.00	0.04
		Taxi Out	0.00	0.00	0.01	0.00	0.00						
		Takeoff	0.00	0.00	0.08	0.00	0.00						
		Climbout	0.00	0.00	0.16	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.18	0.00	0.00	Arrival	0.43	0.06	16.19	0.00	0.03
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.01	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.02	0.00	0.00	Touch-and-Go	0.04	0.02	4.08	0.00	0.01
		Climbout	0.00	0.00	0.01	0.00	0.00						
Cessna 172	Departure	Warm-Up	0.01	0.00	0.38	0.00	0.00	Departure	0.16	0.03	9.74	0.00	0.02
		Taxi Out	0.01	0.00	0.27	0.00	0.00						
		Takeoff	0.01	0.00	0.68	0.00	0.00						
		Climbout	0.02	0.01	1.72	0.00	0.00						
	Arrival	Straight In	0.04	0.00	2.46	0.00	0.00	Arrival	0.15	0.01	8.72	0.00	0.01
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.01	0.00	0.27	0.00	0.00						
	Touch-and-Go	Approach	0.01	0.00	0.33	0.00	0.00	Touch-and-Go	0.06	0.00	4.17	0.00	0.01
		Climbout	0.00	0.00	0.08	0.00	0.00						
		Circle	0.01	0.00	0.45	0.00	0.00						

TABLE D1-29. ESTIMATED EMISSIONS FROM AIR OPERATIONS AT ARMITAGE AIRFIELD UNDER THE MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Flight Activity	Flight Mode	Total Emissions from Annual Flight Operations (tons/year) ROG	NOx	CO	SOx	PM	Flight Activity	Weighted Average Emissions per Type of Flight Event (pounds/event) ROG	NOx	CO	SOx	PM10
Mooney Turbo 231	Departure	Warm-Up	0.00	0.00	0.00	0.00	0.00	Departure	0.41	0.04	11.16	0.00	0.02
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Takeoff	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.00	0.02	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.22	0.03	8.09	0.00	0.02
		Overhead In	0.00	0.00	0.00	0.00	0.00						
		Taxi In	0.00	0.00	0.00	0.00	0.00						
	Touch-and-Go	Approach	0.00	0.00	0.00	0.00	0.00	Touch-and-Go	0.05	0.02	4.13	0.00	0.01
		Climbout	0.00	0.00	0.00	0.00	0.00						
		Circle	0.00	0.00	0.00	0.00	0.00						
Gulfstream	Departure	Warm-Up	0.00	0.00	0.00	0.00	0.00	Departure	0.16	0.03	9.46	0.00	0.02
		Taxi Out	0.00	0.00	0.00	0.00	0.00						
		Takeoff	0.00	0.00	0.01	0.00	0.00						
		Climbout	0.00	0.00	0.01	0.00	0.00						
	Arrival	Straight In	0.00	0.00	0.02	0.00	0.00	Arrival	0.15	0.01	8.72	0.00	0.01
		Overhead In	0.00	0.00	0.00	0.00	0.00						
Flight Operations Below 3,000 ft AGL			160.16	106.90	806.30	4.46	66.41						
Kern County Emissions:			159.52	92.96	800.53	3.81	55.73						
San Bernardino County Emissions:			0.63	13.94	5.77	0.65	10.68						

Notes:
F/A-18 aircraft approach flight track
approaches and 63.7% of overhead break approach

TABLE D1-30. SUMMARY OF EMISSIONS FROM ARMITAGE AIRFIELD FLIGHT OPERATIONS

SCENARIO	TONS PER YEAR				
	ROG	NOx	CO	SOx	PM10
No Action Emissions Below 3,000 ft AGL	128.11	85.50	644.98	3.57	53.12
Kern County Emissions:	127.60	74.35	640.36	3.05	44.58
San Bernardino County Emissions:	0.51	11.15	4.61	0.52	8.54
Limited Expansion, Below 3,000 ft AGL	147.34	98.33	741.81	4.10	61.08
Kern County Emissions:	146.76	85.51	736.50	3.51	51.26
San Bernardino County Emissions:	0.58	12.82	5.31	0.60	9.82
Moderate Expansion, Below 3,000 ft AGL	160.15	106.89	806.31	4.46	66.41
Kern County Emissions:	159.52	92.95	800.54	3.81	55.73
San Bernardino County Emissions:	0.63	13.94	5.77	0.65	10.68

Notes: ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

No Action Alternative:
26,984 annual flight operations: 9,570 annual sorties, 3,922 pattern cycles
Limited Expansion Alternative:
31,032 annual flight operations: 11,009 annual sorties, 4,507 pattern cycles
Moderate Expansion Alternative:
33,730 annual flight operations: 11,965 annual sorties, 4,900 pattern cycles

One sortie = 1 takeoff and 1 landing
One pattern cycle = 1 takeoff and 1 landing

TABLE D1-31. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UP TESTS: NO ACTION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
F/A-18A-D	SORTIES	2,829			141
	PATTERN CYCLES	952			48
	TOTAL OPERATIONS	7,562	12	20	378
F/A-18E/F	SORTIES	3,064			146
	PATTERN CYCLES	1,031			49
	TOTAL OPERATIONS	8,190	13	21	390
EA-6B	SORTIES	291			146
	PATTERN CYCLES	235			118
	TOTAL OPERATIONS	1,052	2	2	526
AV-8B	SORTIES	575			144
	PATTERN CYCLES	174			44
	TOTAL OPERATIONS	1,498	6	4	375
F-3	SORTIES	34			
(Panavia	PATTERN CYCLES	37			
Tornado)	TOTAL OPERATIONS	142			
F-15	SORTIES	39			
	PATTERN CYCLES	42			
	TOTAL OPERATIONS	162			
F-16	SORTIES	39			
	PATTERN CYCLES	42			
	TOTAL OPERATIONS	162			
F-86	SORTIES	243			122
	PATTERN CYCLES	265			133
	TOTAL OPERATIONS	1,016		2	508
C-9B	SORTIES	25			
(DC-9)	PATTERN CYCLES	25			
	TOTAL OPERATIONS	100			
UC-8A	SORTIES	12			
(DHC-5)	PATTERN CYCLES	2			
	TOTAL OPERATIONS	28			
UC-12B	SORTIES	210			105
King Air 200	PATTERN CYCLES	33			17
	TOTAL OPERATIONS	486		2	243
U-21	SORTIES	9			
King Air A100	PATTERN CYCLES	1			
	TOTAL OPERATIONS	20			
MU-2	SORTIES	1,166			97
	PATTERN CYCLES	184			15
	TOTAL OPERATIONS	2,700		12	225

TABLE D1-31. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UP TESTS: NO ACTION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
OV-10	SORTIES	24			
	PATTERN CYCLES	4			
	TOTAL OPERATIONS	56			
OV-1	SORTIES	35			
	PATTERN CYCLES	6			
	TOTAL OPERATIONS	82			
P-3	SORTIES	12			
	PATTERN CYCLES	2			
	TOTAL OPERATIONS	28			
C-130	SORTIES	67			67
	PATTERN CYCLES	3			3
	TOTAL OPERATIONS	140		1	140
T-34	SORTIES	17			
Beechcraft 45	PATTERN CYCLES	3			
	TOTAL OPERATIONS	40			
T-38	SORTIES	25			
	PATTERN CYCLES	26			
	TOTAL OPERATIONS	102			
T-39D	SORTIES	44			44
	PATTERN CYCLES	88			88
	TOTAL OPERATIONS	264	1	1	264
AH-1W	SORTIES	57			57
	PATTERN CYCLES	83			83
	TOTAL OPERATIONS	280	4	1	280
AH-64	SORTIES	11			
	PATTERN CYCLES	17			
	TOTAL OPERATIONS	56			
CH-46E	SORTIES	7			
	PATTERN CYCLES	10			
	TOTAL OPERATIONS	34			
CH-53E	SORTIES	3			
	PATTERN CYCLES	4			
	TOTAL OPERATIONS	14			
UH-1L	SORTIES	43			43
	PATTERN CYCLES	63			63
	TOTAL OPERATIONS	212		1	212
HH-1N	SORTIES	129			129
	PATTERN CYCLES	189			189
	TOTAL OPERATIONS	636	3	1	636

TABLE D1-31. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UP TESTS: NO ACTION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
OH-58	SORTIES	18			
	PATTERN CYCLES	27			
	TOTAL OPERATIONS	90			
UH-60	SORTIES	14			
	PATTERN CYCLES	21			
	TOTAL OPERATIONS	70			
BEECHCRAFT	SORTIES	19			
	PATTERN CYCLES	13			
	TOTAL OPERATIONS	64			
CESSNA	SORTIES	501			100
	PATTERN CYCLES	334			67
	TOTAL OPERATIONS	1,670		5	334
MOONEY	SORTIES	4			
	PATTERN CYCLES	3			
	TOTAL OPERATIONS	14			
GULFSTREAM AA-5	SORTIES	4			
	PATTERN CYCLES	3			
	TOTAL OPERATIONS	14			
TOTALS	SORTIES	9,570			
	PATTERN CYCLES	3,922			
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	TOTAL OPERATIONS	26,984			
	AIRCRAFT NUMBERS		41	73	

Total flight operations include aircraft based at NAWS China Lake, transient aircraft, and aircraft temporarily detached to NAWS China Lake.
Transient or detached aircraft with low annual sortie totals will seldom require maintenance by NAWS China Lake.
Based aircraft and detached or transient aircraft with high sortie totals at NAWS China Lake may require in-frame engine maintenance at NAWS China Lake.
Because flight activity patterns at NAWS China Lake differ from those at training bases, equivalent aircraft numbers have been estimated on the basis of 145 sorties per year for jet aircraft and 100 sorties per year for helicopters, turboprop aircraft, and piston engine aircraft.
If any aircraft of a given type are based at NAWS China Lake or if China Lake supports over 4 total flight operations per week (over 208 total operations per year) by the aircraft type, the minimum number of equivalent aircraft is 1; otherwise, the minimum number of equivalent aircraft is 0.

TABLE D1-32. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UPS: LIMITED EXPANSION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
F/A-18A-D	SORTIES	3,254			148
	PATTERN CYCLES	1,094			50
	TOTAL OPERATIONS	8,696	14	22	395
F/A-18E/F	SORTIES	3,524			147
	PATTERN CYCLES	1,186			49
	TOTAL OPERATIONS	9,420	15	24	393
EA-6B	SORTIES	335			168
	PATTERN CYCLES	270			135
	TOTAL OPERATIONS	1,210	2	2	605
AV-8B	SORTIES	661			132
	PATTERN CYCLES	200			40
	TOTAL OPERATIONS	1,722	7	5	344
F-3	SORTIES	39			
(Panavia	PATTERN CYCLES	43			
Tornado)	TOTAL OPERATIONS	164			
F-15	SORTIES	45			
	PATTERN CYCLES	48			
	TOTAL OPERATIONS	186			
F-16	SORTIES	45			
	PATTERN CYCLES	48			
	TOTAL OPERATIONS	186			
F-86	SORTIES	279			140
	PATTERN CYCLES	305			153
	TOTAL OPERATIONS	1,168		2	584
C-9B	SORTIES	29			
(DC-9)	PATTERN CYCLES	29			
	TOTAL OPERATIONS	116			
UC-8A	SORTIES	14			
(DHC-5)	PATTERN CYCLES	2			
	TOTAL OPERATIONS	32			
UC-12B	SORTIES	242			121
King Air 200	PATTERN CYCLES	38			19
	TOTAL OPERATIONS	560		2	280
U-21	SORTIES	10			
King Air A100	PATTERN CYCLES	2			
	TOTAL OPERATIONS	24			
MU-2	SORTIES	1,341			103
	PATTERN CYCLES	212			16
	TOTAL OPERATIONS	3,106		13	239

TABLE D1-32. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UPS: LIMITED EXPANSION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
OV-10	SORTIES	28			
	PATTERN CYCLES	4			
	TOTAL OPERATIONS	64			
OV-1	SORTIES	41			
	PATTERN CYCLES	6			
	TOTAL OPERATIONS	94			
P-3	SORTIES	14			
	PATTERN CYCLES	2			
	TOTAL OPERATIONS	32			
C-130	SORTIES	76			76
	PATTERN CYCLES	4			4
	TOTAL OPERATIONS	160		1	160
T-34	SORTIES	20			
Beechcraft 45	PATTERN CYCLES	3			
	TOTAL OPERATIONS	46			
T-38	SORTIES	28			
	PATTERN CYCLES	31			
	TOTAL OPERATIONS	118			
T-39D	SORTIES	51			51
	PATTERN CYCLES	101			101
	TOTAL OPERATIONS	304	1	1	304
AH-1W	SORTIES	65			65
	PATTERN CYCLES	96			96
	TOTAL OPERATIONS	322	5	1	322
AH-64	SORTIES	13			
	PATTERN CYCLES	19			
	TOTAL OPERATIONS	64			
CH-46E	SORTIES	8			
	PATTERN CYCLES	11			
	TOTAL OPERATIONS	38			
CH-53E	SORTIES	3			
	PATTERN CYCLES	5			
	TOTAL OPERATIONS	16			
UH-1L	SORTIES	49			49
	PATTERN CYCLES	73			73
	TOTAL OPERATIONS	244		1	244
HH-1N	SORTIES	148			148
	PATTERN CYCLES	217			217
	TOTAL OPERATIONS	730	3	1	730

TABLE D1-32. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UPS: LIMITED EXPANSION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
OH-58	SORTIES	21			
	PATTERN CYCLES	30			
	TOTAL OPERATIONS	102			
UH-60	SORTIES	17			
	PATTERN CYCLES	24			
	TOTAL OPERATIONS	82			
BEECHCRAFT	SORTIES	22			
	PATTERN CYCLES	15			
	TOTAL OPERATIONS	74			
CESSNA	SORTIES	577			96
	PATTERN CYCLES	383			64
	TOTAL OPERATIONS	1,920		6	320
MOONEY	SORTIES	5			
	PATTERN CYCLES	3			
	TOTAL OPERATIONS	16			
GULFSTREAM AA-5	SORTIES	5			
	PATTERN CYCLES	3			
	TOTAL OPERATIONS	16			
TOTALS	SORTIES	11,009			
	PATTERN CYCLES	4,507			
	TOTAL OPERATIONS	31,032			
	AIRCRAFT NUMBERS		47	81	

Total flight operations include aircraft based at NAWS China Lake, transient aircraft, and aircraft temporarily detached to NAWS China Lake.
Transient or detached aircraft with low annual sortie totals will seldom require maintenance by NAWS China Lake.
Based aircraft and detached or transient aircraft with high sortie totals at NAWS China Lake may require in-frame engine maintenance at NAWS China Lake.
The number of based aircraft represents a 15% increase (rounded to whole numbers) over 1996 baseline conditions.
Because flight activity patterns at NAWS China Lake differ from those at training bases, equivalent aircraft numbers have been estimated on the basis of 145 sorties per year for jet aircraft and 100 sorties per year for helicopters, turboprop aircraft, and piston engine aircraft.
If any aircraft of a given type are based at NAWS China Lake or if China Lake supports over 4 total flight operations per week (over 208 total operations per year) by the aircraft type, the minimum number of equivalent aircraft is 1; otherwise, the minimum number of equivalent aircraft is 0.

TABLE D1-33. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UPS: MODERATE EXPANSION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
F/A-18A-D	SORTIES	3,537			147
	PATTERN CYCLES	1,189			50
	TOTAL OPERATIONS	9,452	15	24	394
F/A-18E/F	SORTIES	3,830			147
	PATTERN CYCLES	1,289			50
	TOTAL OPERATIONS	10,238	16	26	394
EA-6B	SORTIES	364			121
	PATTERN CYCLES	294			98
	TOTAL OPERATIONS	1,316	3	3	439
AV-8B	SORTIES	719			144
	PATTERN CYCLES	218			44
	TOTAL OPERATIONS	1,874	8	5	375
F-3	SORTIES	43			
(Panavia	PATTERN CYCLES	46			
Tornado)	TOTAL OPERATIONS	178			
F-15	SORTIES	49			
	PATTERN CYCLES	52			
	TOTAL OPERATIONS	202			
F-16	SORTIES	49			
	PATTERN CYCLES	52			
	TOTAL OPERATIONS	202			
F-86	SORTIES	304			152
	PATTERN CYCLES	331			166
	TOTAL OPERATIONS	1,270		2	635
C-9B	SORTIES	32			
(DC-9)	PATTERN CYCLES	31			
	TOTAL OPERATIONS	126			
UC-8A	SORTIES	16			
(DHC-5)	PATTERN CYCLES	2			
	TOTAL OPERATIONS	36			
UC-12B	SORTIES	262			87
King Air 200	PATTERN CYCLES	42			14
	TOTAL OPERATIONS	608		3	203
U-21	SORTIES	10			
King Air A100	PATTERN CYCLES	2			
	TOTAL OPERATIONS	24			
MU-2	SORTIES	1,457			97
	PATTERN CYCLES	230			15
	TOTAL OPERATIONS	3,374		15	225

TABLE D1-33. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UPS: MODERATE EXPANSION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
OV-10	SORTIES	30			
	PATTERN CYCLES	5			
	TOTAL OPERATIONS	70			
OV-1	SORTIES	44			
	PATTERN CYCLES	7			
	TOTAL OPERATIONS	102			
P-3	SORTIES	15			
	PATTERN CYCLES	2			
	TOTAL OPERATIONS	34			
C-130	SORTIES	83			83
	PATTERN CYCLES	4			4
	TOTAL OPERATIONS	174		1	174
T-34	SORTIES	22			
Beechcraft 45	PATTERN CYCLES	3			
	TOTAL OPERATIONS	50			
T-38	SORTIES	31			
	PATTERN CYCLES	33			
	TOTAL OPERATIONS	128			
T-39D	SORTIES	55			55
	PATTERN CYCLES	110			110
	TOTAL OPERATIONS	330	1	1	330
AH-1W	SORTIES	71			71
	PATTERN CYCLES	104			104
	TOTAL OPERATIONS	350	5	1	350
AH-64	SORTIES	14			
	PATTERN CYCLES	21			
	TOTAL OPERATIONS	70			
CH-46E	SORTIES	8			
	PATTERN CYCLES	13			
	TOTAL OPERATIONS	42			
CH-53E	SORTIES	4			
	PATTERN CYCLES	5			
	TOTAL OPERATIONS	18			
UH-1L	SORTIES	53			53
	PATTERN CYCLES	79			79
	TOTAL OPERATIONS	264		1	264

TABLE D1-33. EQUIVALENT AIRCRAFT NUMBERS FOR ENGINE RUN-UPS: MODERATE EXPANSION

AIRCRAFT TYPE	FLIGHT COMPONENT	PARTITIONED OPERATIONS	BASED AIRCRAFT	EQUIVALENT AIRCRAFT	OPS PER EQUIV ACFT
HH-1N	SORTIES	161			81
	PATTERN CYCLES	236			118
	TOTAL OPERATIONS	794	4	2	397
OH-58	SORTIES	23			
	PATTERN CYCLES	33			
	TOTAL OPERATIONS	112			
UH-60	SORTIES	18			
	PATTERN CYCLES	26			
	TOTAL OPERATIONS	88			
BEECHCRAFT	SORTIES	24			
	PATTERN CYCLES	16			
	TOTAL OPERATIONS	80			
CESSNA	SORTIES	627			105
	PATTERN CYCLES	417			70
	TOTAL OPERATIONS	2,088		6	348
MOONEY	SORTIES	5			
	PATTERN CYCLES	4			
	TOTAL OPERATIONS	18			
GULFSTREAM	SORTIES	5			
AA-5	PATTERN CYCLES	4			
	TOTAL OPERATIONS	18			
TOTALS	SORTIES	11,965			
	PATTERN CYCLES	4,900			
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	TOTAL OPERATIONS	33,730			
	AIRCRAFT NUMBERS		52	90	

Total flight operations include aircraft based at NAWS China Lake, transient aircraft, and aircraft temporarily detached to NAWS China Lake.
Transient or detached aircraft with low annual sortie totals will seldom require maintenance by NAWS China Lake.
Based aircraft and detached or transient aircraft with high sortie totals at NAWS China Lake may require in-frame engine maintenance at NAWS China Lake.
The number of based aircraft represents a 25% increase (rounded to whole numbers) over 1996 baseline conditions.
Because flight activity patterns at NAWS China Lake differ from those at training bases, equivalent aircraft numbers have been estimated on the basis of 145 sorties per year for jet aircraft and 100 sorties per year for helicopters, turboprop aircraft, and piston engine aircraft.
If any aircraft of a given type are based at NAWS China Lake or if China Lake supports over 4 total flight operations per week (over 208 total operations per year) by the aircraft type, the minimum number of equivalent aircraft is 1; otherwise, the minimum number of equivalent aircraft is 0.

TABLE D1-34. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18A-D	2	F404-GE-400	F404-GE-400	GTC 36-200	2,829	20	5	High Power	100	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)				Test	100	Idle	G Idle	21.66	624	58.18	1.16	137.34	0.40	13.50
									100	Intermediate	80% rpm	5.75	1,626	3.08	4.23	26.84	0.40	9.55
									100	Full Power	IRP	5.00	8,587	0.31	25.16	1.05	0.40	2.81
									100	AB Test	Max AB	2.86	28,397	0.13	9.22	23.12	0.40	no data
							48	Low Power 2-	960	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	960	Idle	G Idle	31.09	624	58.18	1.16	137.34	0.40	13.50
							22	Low Power 1-	440	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	440	Idle	G Idle	31.09	624	58.18	1.16	137.34	0.40	13.50
							2	APU Test	40	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
F/A-18E/F	2	F414-GE-400	F404-GE-400	GTC 36-200	3,064	21	5	High Power	105	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9725A)	(Regression	(AESO Fax)				Test	105	Idle	G Idle	21.66	749	54.20	3.29	88.85	0.40	12.75
			Equation						105	Intermediate	80% rpm	5.75	2,109	0.60	6.52	7.79	0.40	8.47
			Presented in						105	Full Power	IRP	5.00	10,986	0.12	34.94	0.89	0.40	1.66
			AESO 9734A)						105	AB Test	Max AB	2.86	35,603	4.72	9.47	262.12	0.40	no data
							48	Low Power 2-	1,008	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	1,008	Idle	G Idle	31.09	749	54.20	3.29	88.85	0.40	12.75
							22	Low Power 1-	462	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	462	Idle	G Idle	31.09	749	54.20	3.29	88.85	0.40	12.75
							2	APU Test	42	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
EA-6B	2	J52-P-408	J52-P-6B	none	291	2	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression					Test	10	Idle	Idle	21.66	779	28.33	2.38	55.96	0.40	20.42
			Equation						10	Intermediate	Int 2	5.75	5,752	0.67	8.38	3.18	0.40	8.67
			Derived From						10	Full Power	Mil	5.00	9,479	0.57	12.32	1.47	0.40	5.73
			Data in															
			AESO 6-90)				48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	96	Idle	Idle	31.09	779	28.33	2.38	55.96	0.40	20.42
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	44	Idle	Idle	31.09	779	28.33	2.38	55.96	0.40	20.42
AV-8B	1	F402-RR-406A	F404-GE-400	GTC 36-200	575	4	5	High Power	20	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9912)	(AESO	(AESO Fax)				Test	20	Idle	Idle	21.66	1,137	19.66	1.80	106.30	0.40	11.10
			Regression						20	Intermediate	85% rpm	5.75	6,811	0.50	9.20	6.80	0.40	3.60
			Analysis in						20	Full Power	Combat	5.00	12,258	0.26	16.50	2.20	0.40	1.90
			AESO 9912)															
							48	Low Power	192	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Test	192	Idle	Idle	31.09	1,137	19.66	1.80	106.30	0.40	11.10
							2	APU Test	8	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22

TABLE D1-34. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-86	1	J52-P-8B	J52-P-6B	none	243	2	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression					Test	10	Idle	Idle	21.66	680	48.96	1.79	63.78	0.40	21.21
			Equation						10	Intermediate	75% T	5.75	4,320	0.67	10.10	3.00	0.40	10.35
			Derived From						10	Full Power	Mil	5.00	7,370	1.08	13.05	0.71	0.40	7.21
			Data in															
			AESO 6-90)				48	Low Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Test	96	Idle	Idle	31.09	680	48.96	1.79	63.78	0.40	21.21
UC-12B	2	PT6A-41	TPE331-3	none	210	2	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)					Test	10	Idle	Idle	21.66	147	101.63	1.97	115.31	0.40	2.95
									10	Intermediate	90%	5.75	473	2.03	7.57	6.49	0.40	1.47
									10	Full Power	100%	5.00	510	1.75	7.98	5.10	0.40	1.75
							48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	96	Idle	Idle	31.09	147	101.63	1.97	115.31	0.40	2.95
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	44	Idle	Idle	31.09	147	101.63	1.97	115.31	0.40	2.95
MU-2	2	TPE331-3	TPE331-3	none	1,166	12	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)					Test	60	Idle	Idle	21.66	112	79.11	2.86	61.52	0.40	2.95
									60	Intermediate	90%	5.75	409	0.15	11.86	0.98	0.40	1.47
									60	Full Power	100%	5.00	458	0.11	12.36	0.76	0.40	1.75
							48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	576	Idle	Idle	31.09	112	79.11	2.86	61.52	0.40	2.95
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	264	Idle	Idle	31.09	112	79.11	2.86	61.52	0.40	2.95
C-130	4	T56-A-16	J79-GE-10B	GTC85-72	67	1	5	High Power	5	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)				Test (all	5	Idle	G Idle L	21.66	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200				engines)	5	Intermediate	74% shp	5.75	1,800	0.21	9.83	0.94	0.40	12.60
			Analysis in	for PM10					5	Full Power	Mil	5.00	2,219	0.16	10.45	0.65	0.40	11.40
			AESO 9908A)	(AESO Fax)														
							48	Low Power 2-	48	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
								Engine Test	48	Idle	Idle	31.09	599	22.32	3.53	30.11	0.40	17.10
							22	Low Power 1-	22	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
								Engine Test	22	Idle	Idle	31.09	599	22.32	3.53	30.11	0.40	17.10
							2	APU Test	2	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22

TABLE D1-34. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-39D	2	J85-GE-2	J85-GE-5	GTC 36-200	44	1	5	High Power	5	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression	(AESO Fax)				Test	5	Idle	Idle	21.66	560	11.86	3.68	111.86	0.40	22.03
			Equation						5	Intermediate	60% NR	5.75	1,700	0.96	5.13	35.78	0.40	12.89
			Derived From						5	Full Power	Mil	5.00	2,890	0.45	6.40	21.56	0.40	9.43
			Data in															
			AESO 9620)				48	Low Power 2-Engine Test	48	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									48	Idle	Idle	31.09	560	11.86	3.68	111.86	0.40	22.03
							22	Low Power 1-Engine Test	22	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									22	Idle	Idle	31.09	560	11.86	3.68	111.86	0.40	22.03
							2	APU Test	2	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
AH-1W	2	T700-GE	T58-GE-5/8F	none	57	1	2.8	High Power	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9709A)	(AESO 6-90)					Test	2.8	Idle	Idle	60.00	164	2.54	3.28	39.81	0.40	4.20
									2.8	Intermediate	27% Q	60.00	355	0.59	5.15	13.38	0.40	4.20
							5.4	B&B Wash	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									5.4	Idle	Idle	5.00	164	2.54	3.28	39.81	0.40	4.20
									5.4	Intermediate	25% Q	5.00	341	0.61	5.07	14.04	0.40	4.20
							0.3	Engine	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.3	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.3	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20
							0.3	Main Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.3	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.3	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20
							0.2	Tail Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.2	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.2	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20

TABLE D1-34. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UH-1L	1	T53-L-11D (AESO 6-90)	T58-GE-5/8F (AESO 6-90)	none	43	1	0.5	High Power/ Engine Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.5	Idle	G Idle	40.00	145	67.41	1.58	31.51	0.40	4.20
									0.5	Intermediate	NR	80.00	645	0.66	6.43	6.83	0.40	4.20
							15	Low Power Test	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									15	Idle	G Idle	25.00	145	67.41	1.58	31.51	0.40	4.20
							7	B&B Wash	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									7	Idle	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
									7	Intermediate	Mil	15.00	685	0.30	6.34	3.34	0.40	4.20
							2	Vibration Analysis	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									2	Idle	G Idle	40.00	145	67.41	1.58	31.51	0.40	4.20
									2	Intermediate	NR	80.00	645	0.66	6.43	6.83	0.40	4.20
							6.1	Rotor Tracking	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									6.1	Idle	F Idle	30.00	222	15.75	2.53	37.79	0.40	4.20
							0.9	Main Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.9	Idle	G Idle	15.00	145	67.41	1.58	31.51	0.40	4.20
									0.9	Intermediate	NR	5.00	645	0.66	6.43	6.83	0.40	4.20
							0.4	Tail Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.4	Idle	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
									0.4	Intermediate	NR	5.00	645	0.66	6.43	6.83	0.40	4.20

TABLE D1-34. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
HH-1N	2	T400-CP-400	T58-GE-5/8F	none	129	1	0.5	High Power/	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9809)	(AESO 6-90)					Engine	0.5	Idle	F Idle	40.00	143	7.46	3.08	30.71	0.40	4.20
								Change	0.5	Intermediate	27% Q	80.00	232	0.35	4.18	6.72	0.40	4.20
							15	Low Power	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Test	15	Idle	F Idle	25.00	143	7.46	3.08	30.71	0.40	4.20
							7	B&B Wash	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									7	Idle	F Idle	10.00	143	7.46	3.08	30.71	0.40	4.20
									7	Intermediate	60% Q	15.00	372	0.12	6.13	0.83	0.40	4.20
							2	Vibration	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Analysis	2	Idle	F Idle	6.00	143	7.46	3.08	30.71	0.40	4.20
									2	Intermediate	27% Q	15.00	232	0.35	4.18	6.72	0.40	4.20
							6.1	Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Tracking	6.1	Idle	10% Q	30.00	161	3.92	3.26	23.12	0.40	4.20
							0.9	Main Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.9	Idle	F Idle	15.00	143	7.46	3.08	30.71	0.40	4.20
									0.9	Intermediate	27% Q	5.00	232	0.35	4.18	6.72	0.40	4.20
							0.4	Tail Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.4	Idle	F Idle	10.00	143	7.46	3.08	30.71	0.40	4.20
									0.4	Intermediate	27% Q	5.00	232	0.35	4.18	6.72	0.40	4.20
Cessna 172	1	O-320	AP-42, 3.3	none	501	5	5	High Power	25	Idle	Idle	20.00	10	36.92	0.52	1077.00	0.11	1.83
		(EPA 1992)						Test	25	Intermediate	85%	5.00	67	12.38	3.97	989.51	0.11	1.83
									25	Full Power	100%	5.00	89	11.78	2.19	1077.44	0.11	1.83
							48	Low Power	240	Idle	Idle	20.00	10	36.92	0.52	1077.00	0.11	1.83
								Test	240	Intermediate	40%	5.00	47	19.25	0.95	1221.51	0.11	1.83
TOTALS					9,219	73			5,175									

Notes:
ROG = reactive organic compounds NOx = oxides of nitrogen CO = carbon monoxide PM10 = inhalable particulate matter
APU = auxiliary power unit (provides electrical power and air conditioning prior to start of main engines; starts main engines; also provides continuous power for equipment on some aircraft
G Idle = ground idle
F Idle = flight idle
NR = normal rated power
AB = afterburner
IRP = intermediate rated power
Mil = military power setting
int = intermediate power setting; some aircraft have more than one intermediate power setting
% rpm = percent of rated core revolutions per minute (% N2) % shp = percent of rated shaft horsepower
% T = percent or rated thrust % Q = percent torque (for turboshaft engines)

TABLE D1-34. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

		Engine Models and Data Sources Used for Emission Rates												Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
Aircraft Type	Number of Engines	ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	ROG	NOx	CO	SOx	PM10

Only aircraft based at NAWS China Lake plus detached or transient aircraft with frequent flight activity are likely to require maintenance at NAWS China Lake.
Transient or detached aircraft with low annual sortie totals at Armitage Airfield are unlikely to require maintenance at NAWS China Lake.
Equivalent aircraft numbers are from Table D1-31, and represent a combination of aircraft based at NAWS China Lake plus an allowance for detached or transient aircraft that may occasionally require ligh maintenance.
Engines used for emission rate data are based on information presented in Table D1-23
AESO estimates of the frequency and pattern of in-frame engine maintenance tests for F/A-18, AH-1W, and HH-1N aircraft used as the basis for estimating engine test rates and patterns for other aircraft
High power tests for fixed wing aircraft use all engines. Low power tests for fixed wing aircraft use either one or two engines. All helicopter engine tests use all engines
Engine power settings and associated fuel flow rates based on data in emission factor source documents and AESO LTO/Maintenance cycle evaluation documents
Sulfur oxide emission rates for turbine engines (jets, turboprops, and helicopters) are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90
PM10 emission factor for piston engines based on industrial gasoline engines (U.S. EPA 1996, Section 3.3), assuming a fuel density of 673 kilogram per cubic meter and an energy content of 40,282 BTU pe kilogram (18,272 BTU per pound).
All values independently rounded for display after calculation.

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TABLE D1-35. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

Aircraft Type	Test Procedure	Test Mode	Total Emissions from Annual Maintenance Tests (tons/year) ROG	NOx	CO	SOx	PM10	Flight Activity	Average Emissions per Type of Test Event (pounds) ROG	NOx	CO	SOx	PM10
F/A-18A-D	High Power	APU Use	0.000	0.003	0.001	0.000	0.000	High Power	27.97	62.87	134.35	1.96	13.08
	Test	Idle	1.311	0.026	3.094	0.009	0.304	Test					
		Intermediate	0.048	0.066	0.418	0.006	0.149						
		Full Power	0.022	1.800	0.075	0.029	0.201						
		AB Test	0.018	1.248	3.130	0.054	0.000						
	Low Power 2-	APU Use	0.001	0.030	0.009	0.002	0.001	Low Power 2-	37.63	0.81	88.83	0.26	8.73
	Engine Test	Idle	18.059	0.360	42.631	0.124	4.190	Engine Test					
	Low Power 1-	APU Use	0.001	0.014	0.004	0.001	0.000	Low Power 1-	18.81	0.44	44.43	0.13	4.37
	Engine Test	Idle	4.139	0.083	9.770	0.028	0.960	Engine Test					
	APU Test	APU Use	0.000	0.001	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
F/A-18E/F	High Power	APU Use	0.000	0.003	0.001	0.000	0.000	High Power	45.80	100.60	942.54	2.47	13.36
	Test	Idle	1.539	0.093	2.523	0.011	0.362	Test					
		Intermediate	0.013	0.138	0.165	0.008	0.180						
		Full Power	0.012	3.359	0.086	0.038	0.160						
		AB Test	0.841	1.688	46.708	0.071	0.000						
	Low Power 2-	APU Use	0.001	0.031	0.010	0.002	0.001	Low Power 2-	42.08	2.62	69.00	0.31	9.90
	Engine Test	Idle	21.207	1.287	34.765	0.157	4.989	Engine Test					
	Low Power 1-	APU Use	0.001	0.014	0.005	0.001	0.001	Low Power 1-	21.04	1.34	34.51	0.16	4.95
	Engine Test	Idle	4.860	0.295	7.967	0.036	1.143	Engine Test					
	APU Test	APU Use	0.000	0.001	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
EA-6B	High Power	APU Use	0.000	0.000	0.000	0.000	0.000	High Power	17.57	30.04	37.30	1.30	30.10
	Test	Idle	0.080	0.007	0.157	0.001	0.057	Test					
		Intermediate	0.004	0.046	0.018	0.002	0.048						
		Full Power	0.005	0.097	0.012	0.003	0.045						
	Low Power 2-	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-	22.87	1.92	45.18	0.32	16.49
	Engine Test	Idle	1.098	0.092	2.168	0.016	0.791	Engine Test					
	Low Power 1-	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-	11.44	0.96	22.59	0.16	8.24
	Engine Test	Idle	0.252	0.021	0.497	0.004	0.181	Engine Test					
AV-8B	High Power	APU Use	0.000	0.001	0.000	0.000	0.000	High Power	8.66	23.66	50.34	0.84	8.85
	Test	Idle	0.081	0.007	0.436	0.002	0.046	Test					
		Intermediate	0.003	0.060	0.044	0.003	0.023						
		Full Power	0.003	0.169	0.022	0.004	0.019						
	Low Power	APU Use	0.000	0.006	0.002	0.000	0.000	Low Power	11.59	1.12	62.65	0.24	6.54
	Test	Idle	1.112	0.102	6.012	0.023	0.628	Test					
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00

TABLE D1-35. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
F-86	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	12.96	12.64	17.33	0.51	13.92
		Idle	0.060	0.002	0.078	0.000	0.026						
		Intermediate	0.001	0.021	0.006	0.001	0.021						
		Full Power	0.003	0.040	0.002	0.001	0.022						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	17.25	0.63	22.47	0.14	7.47
		Idle	0.828	0.030	1.079	0.007	0.359						
UC-12B	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	11.12	1.57	13.26	0.11	0.60
		Idle	0.054	0.001	0.061	0.000	0.002						
		Intermediate	0.001	0.003	0.003	0.000	0.001						
		Full Power	0.001	0.003	0.002	0.000	0.001						
	Low Power 2-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-Engine Test	15.48	0.30	17.57	0.06	0.45
		Idle	0.743	0.014	0.843	0.003	0.022						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-Engine Test	7.74	0.15	8.78	0.03	0.22
		Idle	0.170	0.003	0.193	0.001	0.005						
MU-2	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	6.43	2.10	5.12	0.09	0.49
		Idle	0.192	0.007	0.150	0.001	0.007						
		Intermediate	0.000	0.028	0.002	0.001	0.003						
		Full Power	0.000	0.028	0.002	0.001	0.004						
	Low Power 2-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-Engine Test	9.20	0.33	7.15	0.05	0.34
		Idle	2.649	0.096	2.060	0.013	0.099						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-Engine Test	4.60	0.17	3.58	0.02	0.17
		Idle	0.607	0.022	0.472	0.003	0.023						
C-130	High Power Test (all engines)	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test (all engines)	19.57	17.61	27.33	0.92	31.92
		Idle	0.048	0.008	0.065	0.001	0.037						
		Intermediate	0.000	0.017	0.002	0.001	0.022						
		Full Power	0.000	0.019	0.001	0.001	0.021						
	Low Power 2-Engine Test	APU Use	0.000	0.001	0.004	0.000	0.000	Low Power 2-Engine Test	13.86	2.23	18.85	0.25	10.62
		Idle	0.333	0.053	0.449	0.006	0.255						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.002	0.000	0.000	Low Power 1-Engine Test	6.93	1.14	9.50	0.13	5.31
		Idle	0.076	0.012	0.103	0.001	0.058						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.04	0.16	0.00	0.00

TABLE D1-35. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
T-39D	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	5.32	6.30	67.29	0.49	17.65
		Idle	0.012	0.004	0.113	0.000	0.022						
		Intermediate	0.001	0.004	0.029	0.000	0.010						
		Full Power	0.001	0.008	0.026	0.000	0.011						
	Low Power 2-Engine Test	APU Use	0.000	0.001	0.000	0.000	0.000	Low Power 2-Engine Test	6.89	2.20	64.94	0.24	12.79
		Idle	0.165	0.051	1.558	0.006	0.307						
	Low Power 1-Engine Test	APU Use	0.000	0.001	0.000	0.000	0.000	Low Power 1-Engine Test	3.44	1.13	32.48	0.12	6.39
		Idle	0.038	0.012	0.357	0.001	0.070						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
AH-1W	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	1.25	4.73	22.54	0.41	4.36
		Idle	0.001	0.002	0.018	0.000	0.002						
		Intermediate	0.001	0.005	0.013	0.000	0.004						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	0.10	0.38	1.89	0.03	0.35
		Idle	0.000	0.000	0.003	0.000	0.000						
		Intermediate	0.000	0.001	0.002	0.000	0.001						
	Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	Engine Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						

TABLE D1-35. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
UH-1L	High Power/ Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	High Power/ Engine Change	7.08	5.68	8.92	0.38	4.02
		Idle	0.002	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.001	0.001	0.000	0.001						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	4.07	0.10	1.90	0.02	0.25
		Idle	0.031	0.001	0.014	0.000	0.002						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	1.68	1.12	1.33	0.08	0.82
		Idle	0.006	0.000	0.003	0.000	0.000						
		Intermediate	0.000	0.004	0.002	0.000	0.003						
	Vibration Analysis	APU Use	0.000	0.000	0.000	0.000	0.000	Vibration Analysis	7.08	5.68	8.92	0.38	4.02
		Idle	0.007	0.000	0.003	0.000	0.000						
		Intermediate	0.001	0.006	0.006	0.000	0.004						
	Rotor Tracking	APU Use	0.000	0.000	0.000	0.000	0.000	Rotor Tracking	1.75	0.28	4.19	0.04	0.47
		Idle	0.005	0.001	0.013	0.000	0.001						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	2.48	0.40	1.51	0.04	0.38
		Idle	0.001	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	1.66	0.38	1.13	0.03	0.33
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						

TABLE D1-35. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: NO ACTION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
HH-1N	High Power/ Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	High Power/ Engine Change	1.64	3.18	10.02	0.32	3.40
		Idle	0.000	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.001	0.001	0.000	0.001						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	0.89	0.37	3.66	0.05	0.50
		Idle	0.007	0.003	0.027	0.000	0.004						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	0.38	1.29	1.62	0.09	0.98
		Idle	0.001	0.001	0.005	0.000	0.001						
		Intermediate	0.000	0.004	0.001	0.000	0.003						
	Vibration Analysis	APU Use	0.000	0.000	0.000	0.000	0.000	Vibration Analysis	0.25	0.57	1.66	0.06	0.61
		Idle	0.000	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.001	0.000	0.000						
	Rotor Tracking	APU Use	0.000	0.000	0.000	0.000	0.000	Rotor Tracking	0.63	0.52	3.72	0.06	0.67
		Idle	0.002	0.002	0.011	0.000	0.002						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	0.55	0.38	2.46	0.04	0.46
		Idle	0.000	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	0.37	0.31	1.72	0.03	0.36
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
Cessna 172	High Power Test	Idle	0.001	0.000	0.043	0.000	0.000	High Power Test	0.27	0.04	16.91	0.00	0.03
		Intermediate	0.001	0.000	0.069	0.000	0.000						
		Full Power	0.001	0.000	0.100	0.000	0.000						
	Low Power Test	Idle	0.014	0.000	0.414	0.000	0.001	Low Power Test	0.19	0.01	8.21	0.00	0.01
		Intermediate	0.009	0.000	0.572	0.000	0.001						
Combined In-Frame Engine Tests			60.78	11.67	169.72	0.69	15.92						

Notes: All in-frame engine test emissions occur in the Kern County ozone nonattainment and Searles Valley PM10 nonattainment portion of NAWS China Lake

TABLE D1-36. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18A-D	2	F404-GE-400	F404-GE-400	GTC 36-200	3,254	22	5	High Power	110	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)				Test	110	Idle	G Idle	21.66	624	58.18	1.16	137.34	0.40	13.50
									110	Intermediate	80% rpm	5.75	1,626	3.08	4.23	26.84	0.40	9.55
									110	Full Power	IRP	5.00	8,587	0.31	25.16	1.05	0.40	2.81
									110	AB Test	Max AB	2.86	28,397	0.13	9.22	23.12	0.40	no data
							48	Low Power 2-	1,056	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	1,056	Idle	G Idle	31.09	624	58.18	1.16	137.34	0.40	13.50
							22	Low Power 1-	484	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	484	Idle	G Idle	31.09	624	58.18	1.16	137.34	0.40	13.50
							2	APU Test	44	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
F/A-18E/F	2	F414-GE-400	F404-GE-400	GTC 36-200	3,524	24	5	High Power	120	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9725A)	(Regression	(AESO Fax)				Test	120	Idle	G Idle	21.66	749	54.20	3.29	88.85	0.40	12.75
			Equation						120	Intermediate	80% rpm	5.75	2,109	0.60	6.52	7.79	0.40	8.47
			Presented in						120	Full Power	IRP	5.00	10,986	0.12	34.94	0.89	0.40	1.66
			AESO 9734A)						120	AB Test	Max AB	2.86	35,603	4.72	9.47	262.12	0.40	no data
							48	Low Power 2-	1,152	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	1,152	Idle	G Idle	31.09	749	54.20	3.29	88.85	0.40	12.75
							22	Low Power 1-	528	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	528	Idle	G Idle	31.09	749	54.20	3.29	88.85	0.40	12.75
							2	APU Test	48	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
EA-6B	2	J52-P-408	J52-P-6B	none	335	2	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression					Test	10	Idle	Idle	21.66	779	28.33	2.38	55.96	0.40	20.42
			Equation						10	Intermediate	Int 2	5.75	5,752	0.67	8.38	3.18	0.40	8.67
			Derived From						10	Full Power	Mil	5.00	9,479	0.57	12.32	1.47	0.40	5.73
			Data in															
			AESO 6-90)				48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	96	Idle	Idle	31.09	779	28.33	2.38	55.96	0.40	20.42
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	44	Idle	Idle	31.09	779	28.33	2.38	55.96	0.40	20.42

TABLE D1-36. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	Engine Models and Data Sources Used for Emission Rates: PM10	Engine Models and Data Sources Used for Emission Rates: APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
AV-8B	1	F402-RR-406A (AESO 9912)	F404-GE-400 (AESO Regression Analysis in AESO 9912)	GTC 36-200 (AESO Fax)	661	5	5	High Power Test	25	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									25	Idle	Idle	21.66	1,137	19.66	1.80	106.30	0.40	11.10
									25	Intermediate	85% rpm	5.75	6,811	0.50	9.20	6.80	0.40	3.60
									25	Full Power	Combat	5.00	12,258	0.26	16.50	2.20	0.40	1.90
							48	Low Power Test	240	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									240	Idle	Idle	31.09	1,137	19.66	1.80	106.30	0.40	11.10
							2	APU Test	10	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
F-86	1	J52-P-8B (AESO 6-90)	J52-P-6B (Regression Equation Derived From Data in AESO 6-90)	none	279	2	5	High Power Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									10	Idle	Idle	21.66	680	48.96	1.79	63.78	0.40	21.21
									10	Intermediate	75% T	5.75	4,320	0.67	10.10	3.00	0.40	10.35
									10	Full Power	Mil	5.00	7,370	1.08	13.05	0.71	0.40	7.21
							48	Low Power Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									96	Idle	Idle	31.09	680	48.96	1.79	63.78	0.40	21.21
UC-12B	2	PT6A-41 (EPA 1992)	TPE331-3 (EPA 1992)	none	242	2	5	High Power Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									10	Idle	Idle	21.66	147	101.63	1.97	115.31	0.40	2.95
									10	Intermediate	90%	5.75	473	2.03	7.57	6.49	0.40	1.47
									10	Full Power	100%	5.00	510	1.75	7.98	5.10	0.40	1.75
							48	Low Power 2-Engine Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									96	Idle	Idle	31.09	147	101.63	1.97	115.31	0.40	2.95
							22	Low Power 1-Engine Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									44	Idle	Idle	31.09	147	101.63	1.97	115.31	0.40	2.95
MU-2	2	TPE331-3 (EPA 1992)	TPE331-3 (EPA 1992)	none	1,341	13	5	High Power Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									65	Idle	Idle	21.66	112	79.11	2.86	61.52	0.40	2.95
									65	Intermediate	90%	5.75	409	0.15	11.86	0.98	0.40	1.47
									65	Full Power	100%	5.00	458	0.11	12.36	0.76	0.40	1.75
							48	Low Power 2-Engine Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									624	Idle	Idle	31.09	112	79.11	2.86	61.52	0.40	2.95
							22	Low Power 1-Engine Test	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									286	Idle	Idle	31.09	112	79.11	2.86	61.52	0.40	2.95

TABLE D1-36. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
C-130	4	T56-A-16 (AESO 9908A)	J79-GE-10B (AESO Regression Analysis in AESO 9908A)	GTC85-72 (EPA 1992) GTC 36-200 for PM10 (AESO Fax)	76	1	5	High Power Test (all engines)	5	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
									5	Idle	G Idle L	21.66	599	22.32	3.53	30.11	0.40	17.10
									5	Intermediate	74% shp	5.75	1,800	0.21	9.83	0.94	0.40	12.60
									5	Full Power	Mil	5.00	2,219	0.16	10.45	0.65	0.40	11.40
							48	Low Power 2-Engine Test	48	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
									48	Idle	Idle	31.09	599	22.32	3.53	30.11	0.40	17.10
							22	Low Power 1-Engine Test	22	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
									22	Idle	Idle	31.09	599	22.32	3.53	30.11	0.40	17.10
							2	APU Test	2	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
T-39D	2	J85-GE-2 (AESO 6-90)	J85-GE-5 (Regression Equation Derived From Data in AESO 9620)	GTC 36-200 (AESO Fax)	51	1	5	High Power Test	5	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									5	Idle	Idle	21.66	560	11.86	3.68	111.86	0.40	22.03
									5	Intermediate	60% NR	5.75	1,700	0.96	5.13	35.78	0.40	12.89
									5	Full Power	Mil	5.00	2,890	0.45	6.40	21.56	0.40	9.43
							48	Low Power 2-Engine Test	48	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									48	Idle	Idle	31.09	560	11.86	3.68	111.86	0.40	22.03
							22	Low Power 1-Engine Test	22	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									22	Idle	Idle	31.09	560	11.86	3.68	111.86	0.40	22.03
							2	APU Test	2	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
AH-1W	2	T700-GE (AESO 9709A)	T58-GE-5/8F (AESO 6-90)	none	65	1	2.8	High Power Test	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									2.8	Idle	Idle	60.00	164	2.54	3.28	39.81	0.40	4.20
									2.8	Intermediate	27% Q	60.00	355	0.59	5.15	13.38	0.40	4.20
							5.4	B&B Wash	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									5.4	Idle	Idle	5.00	164	2.54	3.28	39.81	0.40	4.20
									5.4	Intermediate	25% Q	5.00	341	0.61	5.07	14.04	0.40	4.20
							0.3	Engine Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.3	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.3	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20
							0.3	Main Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.3	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.3	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20
							0.2	Tail Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.2	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.2	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20

TABLE D1-36. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UH-1L	1	T53-L-11D	T58-GE-5/8F	none	49	1	0.5	High Power/	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 6-90)	(AESO 6-90)					Engine	0.5	Idle	G Idle	40.00	145	67.41	1.58	31.51	0.40	4.20
								Change	0.5	Intermediate	NR	80.00	645	0.66	6.43	6.83	0.40	4.20
							15	Low Power	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Test	15	Idle	G Idle	25.00	145	67.41	1.58	31.51	0.40	4.20
							7	B&B Wash	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									7	Idle	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
									7	Intermediate	Mil	15.00	685	0.30	6.34	3.34	0.40	4.20
							2	Vibration	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Analysis	2	Idle	G Idle	40.00	145	67.41	1.58	31.51	0.40	4.20
									2	Intermediate	NR	80.00	645	0.66	6.43	6.83	0.40	4.20
							6.1	Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Tracking	6.1	Idle	F Idle	30.00	222	15.75	2.53	37.79	0.40	4.20
							0.9	Main Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.9	Idle	G Idle	15.00	145	67.41	1.58	31.51	0.40	4.20
									0.9	Intermediate	NR	5.00	645	0.66	6.43	6.83	0.40	4.20
							0.4	Tail Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.4	Idle	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
									0.4	Intermediate	NR	5.00	645	0.66	6.43	6.83	0.40	4.20

TABLE D1-36. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
HH-1N	2	T400-CP-400	T58-GE-5/8F	none	148	1	0.5	High Power/	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
		(AESO 9809)	(AESO 6-90)					Engine	0.5	Idle	F Idle	40.00	143	7.46	3.08	30.71	0.40	4.20
								Change	0.5	Intermediate	27% Q	80.00	232	0.35	4.18	6.72	0.40	4.20
							15	Low Power	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Test	15	Idle	F Idle	25.00	143	7.46	3.08	30.71	0.40	4.20
							7	B&B Wash	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									7	Idle	F Idle	10.00	143	7.46	3.08	30.71	0.40	4.20
									7	Intermediate	60% Q	15.00	372	0.12	6.13	0.83	0.40	4.20
							2	Vibration	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Analysis	2	Idle	F Idle	6.00	143	7.46	3.08	30.71	0.40	4.20
									2	Intermediate	27% Q	15.00	232	0.35	4.18	6.72	0.40	4.20
							6.1	Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Tracking	6.1	Idle	10% Q	30.00	161	3.92	3.26	23.12	0.40	4.20
							0.9	Main Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.9	Idle	F Idle	15.00	143	7.46	3.08	30.71	0.40	4.20
									0.9	Intermediate	27% Q	5.00	232	0.35	4.18	6.72	0.40	4.20
							0.4	Tail Rotor	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
								Change	0.4	Idle	F Idle	10.00	143	7.46	3.08	30.71	0.40	4.20
									0.4	Intermediate	27% Q	5.00	232	0.35	4.18	6.72	0.40	4.20
Cessna 172	1	O-320	AP-42, 3.3	none	577	6	5	High Power	30	Idle	Idle	20.00	10	36.92	0.52	1077.00	0.11	1.83
		(EPA 1992)						Test	30	Intermediate	85%	5.00	67	12.38	3.97	989.51	0.11	1.83
									30	Full Power	100%	5.00	89	11.78	2.19	1077.44	0.11	1.83
							48	Low Power	288	Idle	Idle	20.00	10	36.92	0.52	1077.00	0.11	1.83
								Test	288	Intermediate	40%	5.00	47	19.25	0.95	1221.51	0.11	1.83
TOTALS					10,602	81			5,743									

Notes:
ROG = reactive organic compounds NOx = oxides of nitrogen CO = carbon monoxide PM10 = inhalable particulate matter
APU = auxiliary power unit (provides electrical power and air conditioning prior to start of main engines; starts main engines; also provides continuous power for equipment on some aircraft
G Idle = ground idle
F Idle = flight idle
NR = normal rated power
AB = afterburner
IRP = intermediate rated power
Mil = military power setting
int = intermediate power setting; some aircraft have more than one intermediate power setting
% rpm = percent of rated core revolutions per minute (% N2)
% shp = percent of rated shaft horsepower
% Q = percent torque (for turboshaft engines)

TABLE D1-36. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10

% T = percent or rated thrust

Only aircraft based at NAWS China Lake plus detached or transient aircraft with frequent flight activity are likely to require maintenance at NAWS China Lake.
Transient or detached aircraft with low annual sortie totals at Armitage Airfield are unlikely to require maintenance at NAWS China Lake.
Equivalent aircraft numbers are from Table D1-32, and represent a combination of aircraft based at NAWS China Lake plus an allowance for detached or transient aircraft that may occasionally require ligh maintenance.
Engines used for emission rate data are based on information presented in Table D1-23
AESO estimates of the frequency and pattern of in-frame engine maintenance tests for F/A-18, AH-1W, and HH-1N aircraft used as the basis for estimating engine test rates and patterns for other aircraft
High power tests for fixed wing aircraft use all engines. Low power tests for fixed wing aircraft use either one or two engines. All helicopter engine tests use all engines
Engine power settings and associated fuel flow rates based on data in emission factor source documents and AESO LTO/Maintenance cycle evaluation documents
Sulfur oxide emission rates for turbine engines (jets, turboprops, and helicopters) are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90
PM10 emission factor for piston engines based on industrial gasoline engines (U.S. EPA 1996, Section 3.3), assuming a fuel density of 673 kilogram per cubic meter and an energy content of 40,282 BTU pe kilogram (18,272 BTU per pound).
All values independently rounded for display after calculation.

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TABLE D1-37. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
F/A-18A-D	High Power Test	APU Use	0.000	0.003	0.001	0.000	0.000	High Power Test	27.97	62.87	134.35	1.96	13.08
		Idle	1.442	0.029	3.403	0.010	0.335						
		Intermediate	0.053	0.073	0.460	0.007	0.164						
		Full Power	0.024	1.980	0.083	0.031	0.221						
		AB Test	0.019	1.373	3.442	0.060	0.000						
	Low Power 2-Engine Test	APU Use	0.001	0.033	0.010	0.002	0.001	Low Power 2-Engine Test	37.63	0.81	88.83	0.26	8.73
		Idle	19.865	0.396	46.894	0.137	4.609						
	Low Power 1-Engine Test	APU Use	0.001	0.015	0.005	0.001	0.001	Low Power 1-Engine Test	18.81	0.44	44.43	0.13	4.37
		Idle	4.552	0.091	10.746	0.031	1.056						
	APU Test	APU Use	0.000	0.001	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
F/A-18E/F	High Power Test	APU Use	0.000	0.004	0.001	0.000	0.000	High Power Test	45.80	100.60	942.54	2.47	13.36
		Idle	1.759	0.107	2.883	0.013	0.414						
		Intermediate	0.015	0.158	0.189	0.010	0.205						
		Full Power	0.013	3.839	0.098	0.044	0.182						
		AB Test	0.961	1.929	53.381	0.081	0.000						
	Low Power 2-Engine Test	APU Use	0.001	0.035	0.011	0.002	0.001	Low Power 2-Engine Test	42.08	2.62	69.00	0.31	9.90
		Idle	24.237	1.471	39.731	0.179	5.701						
	Low Power 1-Engine Test	APU Use	0.001	0.016	0.005	0.001	0.001	Low Power 1-Engine Test	21.04	1.34	34.51	0.16	4.95
		Idle	5.554	0.337	9.105	0.041	1.307						
	APU Test	APU Use	0.000	0.001	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
EA-6B	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	17.57	30.04	37.30	1.30	30.10
		Idle	0.080	0.007	0.157	0.001	0.057						
		Intermediate	0.004	0.046	0.018	0.002	0.048						
		Full Power	0.005	0.097	0.012	0.003	0.045						
	Low Power 2-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-Engine Test	22.87	1.92	45.18	0.32	16.49
		Idle	1.098	0.092	2.168	0.016	0.791						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-Engine Test	11.44	0.96	22.59	0.16	8.24
		Idle	0.252	0.021	0.497	0.004	0.181						

TABLE D1-37. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Test Procedure	Test Mode	Total Emissions from Annual Maintenance Tests (tons/year) ROG	NOx	CO	SOx	PM10	Flight Activity	Average Emissions per Type of Test Event (pounds) ROG	NOx	CO	SOx	PM10
AV-8B	High Power Test	APU Use	0.000	0.001	0.000	0.000	0.000	High Power Test	8.66	23.66	50.34	0.84	8.85
		Idle	0.101	0.009	0.545	0.002	0.057						
		Intermediate	0.004	0.075	0.055	0.003	0.029						
		Full Power	0.003	0.211	0.028	0.005	0.024						
	Low Power Test	APU Use	0.000	0.007	0.002	0.000	0.000	Low Power Test	11.59	1.12	62.65	0.24	6.54
		Idle	1.390	0.127	7.515	0.028	0.785						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
F-86	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	12.96	12.64	17.33	0.51	13.92
		Idle	0.060	0.002	0.078	0.000	0.026						
		Intermediate	0.001	0.021	0.006	0.001	0.021						
		Full Power	0.003	0.040	0.002	0.001	0.022						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	17.25	0.63	22.47	0.14	7.47
		Idle	0.828	0.030	1.079	0.007	0.359						
UC-12B	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	11.12	1.57	13.26	0.11	0.60
		Idle	0.054	0.001	0.061	0.000	0.002						
		Intermediate	0.001	0.003	0.003	0.000	0.001						
		Full Power	0.001	0.003	0.002	0.000	0.001						
	Low Power 2-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-Engine Test	15.48	0.30	17.57	0.06	0.45
		Idle	0.743	0.014	0.843	0.003	0.022						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-Engine Test	7.74	0.15	8.78	0.03	0.22
		Idle	0.170	0.003	0.193	0.001	0.005						
MU-2	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	6.43	2.10	5.12	0.09	0.49
		Idle	0.208	0.008	0.162	0.001	0.008						
		Intermediate	0.000	0.030	0.002	0.001	0.004						
		Full Power	0.000	0.031	0.002	0.001	0.004						
	Low Power 2-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-Engine Test	9.20	0.33	7.15	0.05	0.34
		Idle	2.870	0.104	2.232	0.015	0.107						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-Engine Test	4.60	0.17	3.58	0.02	0.17
		Idle	0.658	0.024	0.511	0.003	0.025						

TABLE D1-37. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
C-130	High Power Test (all engines)	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test (all engines)	19.57	17.61	27.33	0.92	31.92
		Idle	0.048	0.008	0.065	0.001	0.037						
		Intermediate	0.000	0.017	0.002	0.001	0.022						
		Full Power	0.000	0.019	0.001	0.001	0.021						
	Low Power 2-Engine Test	APU Use	0.000	0.001	0.004	0.000	0.000	Low Power 2-Engine Test	13.86	2.23	18.85	0.25	10.62
		Idle	0.333	0.053	0.449	0.006	0.255						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.002	0.000	0.000	Low Power 1-Engine Test	6.93	1.14	9.50	0.13	5.31
		Idle	0.076	0.012	0.103	0.001	0.058						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.04	0.16	0.00	0.00
T-39D	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	5.32	6.30	67.29	0.49	17.65
		Idle	0.012	0.004	0.113	0.000	0.022						
		Intermediate	0.001	0.004	0.029	0.000	0.010						
		Full Power	0.001	0.008	0.026	0.000	0.011						
	Low Power 2-Engine Test	APU Use	0.000	0.001	0.000	0.000	0.000	Low Power 2-Engine Test	6.89	2.20	64.94	0.24	12.79
		Idle	0.165	0.051	1.558	0.006	0.307						
	Low Power 1-Engine Test	APU Use	0.000	0.001	0.000	0.000	0.000	Low Power 1-Engine Test	3.44	1.13	32.48	0.12	6.39
		Idle	0.038	0.012	0.357	0.001	0.070						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
AH-1W	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	1.25	4.73	22.54	0.41	4.36
		Idle	0.001	0.002	0.018	0.000	0.002						
		Intermediate	0.001	0.005	0.013	0.000	0.004						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	0.10	0.38	1.89	0.03	0.35
		Idle	0.000	0.000	0.003	0.000	0.000						
		Intermediate	0.000	0.001	0.002	0.000	0.001						
	Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	Engine Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						

TABLE D1-37. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
UH-1L	High Power/ Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	High Power/ Engine Change	7.08	5.68	8.92	0.38	4.02
		Idle	0.002	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.001	0.001	0.000	0.001						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	4.07	0.10	1.90	0.02	0.25
		Idle	0.031	0.001	0.014	0.000	0.002						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	1.68	1.12	1.33	0.08	0.82
		Idle	0.006	0.000	0.003	0.000	0.000						
		Intermediate	0.000	0.004	0.002	0.000	0.003						
	Vibration Analysis	APU Use	0.000	0.000	0.000	0.000	0.000	Vibration Analysis	7.08	5.68	8.92	0.38	4.02
		Idle	0.007	0.000	0.003	0.000	0.000						
		Intermediate	0.001	0.006	0.006	0.000	0.004						
	Rotor Tracking	APU Use	0.000	0.000	0.000	0.000	0.000	Rotor Tracking	1.75	0.28	4.19	0.04	0.47
		Idle	0.005	0.001	0.013	0.000	0.001						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	2.48	0.40	1.51	0.04	0.38
		Idle	0.001	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	1.66	0.38	1.13	0.03	0.33
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						

TABLE D1-37. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: LIMITED EXPANSION ALTERNATIVE

Aircraft Type	Test Procedure	Test Mode	Total Emissions from Annual Maintenance Tests (tons/year) ROG	NOx	CO	SOx	PM10	Flight Activity	Average Emissions per Type of Test Event (pounds) ROG	NOx	CO	SOx	PM10
HH-1N	High Power/ Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	High Power/ Engine Change	1.64	3.18	10.02	0.32	3.40
		Idle	0.000	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.001	0.001	0.000	0.001						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	0.89	0.37	3.66	0.05	0.50
		Idle	0.007	0.003	0.027	0.000	0.004						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	0.38	1.29	1.62	0.09	0.98
		Idle	0.001	0.001	0.005	0.000	0.001						
		Intermediate	0.000	0.004	0.001	0.000	0.003						
	Vibration Analysis	APU Use	0.000	0.000	0.000	0.000	0.000	Vibration Analysis	0.25	0.57	1.66	0.06	0.61
		Idle	0.000	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.001	0.000	0.000						
	Rotor Tracking	APU Use	0.000	0.000	0.000	0.000	0.000	Rotor Tracking	0.63	0.52	3.72	0.06	0.67
		Idle	0.002	0.002	0.011	0.000	0.002						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	0.55	0.38	2.46	0.04	0.46
		Idle	0.000	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	0.37	0.31	1.72	0.03	0.36
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
Cessna 172	High Power Test	Idle	0.002	0.000	0.052	0.000	0.000	High Power Test	0.27	0.04	16.91	0.00	0.03
		Intermediate	0.001	0.000	0.082	0.000	0.000						
		Full Power	0.001	0.000	0.120	0.000	0.000						
	Low Power Test	Idle	0.017	0.000	0.496	0.000	0.001	Low Power Test	0.19	0.01	8.21	0.00	0.01
		Intermediate	0.011	0.001	0.686	0.000	0.001						
Combined In-Frame Engine Tests			67.80	13.12	190.90	0.77	17.67						

Notes: All in-frame engine test emissions occur in the Kern County ozone nonattainment and Searles Valley PM10 nonattainment portion of NAWS China Lake

TABLE D1-38. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F/A-18A-D	2	F404-GE-400	F404-GE-400	GTC 36-200	3,537	24	5	High Power	120	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9734A)	(AESO 9734A)	(AESO Fax)				Test	120	Idle	G Idle	21.66	624	58.18	1.16	137.34	0.40	13.50
									120	Intermediate	80% rpm	5.75	1,626	3.08	4.23	26.84	0.40	9.55
									120	Full Power	IRP	5.00	8,587	0.31	25.16	1.05	0.40	2.81
									120	AB Test	Max AB	2.86	28,397	0.13	9.22	23.12	0.40	no data
							48	Low Power 2-	1,152	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	1,152	Idle	G Idle	31.09	624	58.18	1.16	137.34	0.40	13.50
							22	Low Power 1-	528	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	528	Idle	G Idle	31.09	624	58.18	1.16	137.34	0.40	13.50
							2	APU Test	48	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
F/A-18E/F	2	F414-GE-400	F404-GE-400	GTC 36-200	3,830	26	5	High Power	130	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9725A)	(Regression	(AESO Fax)				Test	130	Idle	G Idle	21.66	749	54.20	3.29	88.85	0.40	12.75
			Equation						130	Intermediate	80% rpm	5.75	2,109	0.60	6.52	7.79	0.40	8.47
			Presented in						130	Full Power	IRP	5.00	10,986	0.12	34.94	0.89	0.40	1.66
			AESO 9734A)						130	AB Test	Max AB	2.86	35,603	4.72	9.47	262.12	0.40	no data
							48	Low Power 2-	1,248	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	1,248	Idle	G Idle	31.09	749	54.20	3.29	88.85	0.40	12.75
							22	Low Power 1-	572	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	572	Idle	G Idle	31.09	749	54.20	3.29	88.85	0.40	12.75
							2	APU Test	52	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
EA-6B	2	J52-P-408	J52-P-6B	none	364	3	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression					Test	15	Idle	Idle	21.66	779	28.33	2.38	55.96	0.40	20.42
			Equation						15	Intermediate	Int 2	5.75	5,752	0.67	8.38	3.18	0.40	8.67
			Derived From						15	Full Power	Mil	5.00	9,479	0.57	12.32	1.47	0.40	5.73
			Data in															
			AESO 6-90)				48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	144	Idle	Idle	31.09	779	28.33	2.38	55.96	0.40	20.42
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	66	Idle	Idle	31.09	779	28.33	2.38	55.96	0.40	20.42
AV-8B	1	F402-RR-406A	F404-GE-400	GTC 36-200	719	5	5	High Power	25	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 9912)	(AESO	(AESO Fax)				Test	25	Idle	Idle	21.66	1,137	19.66	1.80	106.30	0.40	11.10
			Regression						25	Intermediate	85% rpm	5.75	6,811	0.50	9.20	6.80	0.40	3.60
			Analysis in						25	Full Power	Combat	5.00	12,258	0.26	16.50	2.20	0.40	1.90
			AESO 9912)															
							48	Low Power	240	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Test	240	Idle	Idle	31.09	1,137	19.66	1.80	106.30	0.40	11.10
							2	APU Test	10	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22

TABLE D1-38. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
F-86	1	J52-P-8B	J52-P-6B	none	304	2	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(AESO 6-90)	(Regression					Test	10	Idle	Idle	21.66	680	48.96	1.79	63.78	0.40	21.21
			Equation						10	Intermediate	75% T	5.75	4,320	0.67	10.10	3.00	0.40	10.35
			Derived From						10	Full Power	Mil	5.00	7,370	1.08	13.05	0.71	0.40	7.21
			Data in															
			AESO 6-90)				48	Low Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Test	96	Idle	Idle	31.09	680	48.96	1.79	63.78	0.40	21.21
UC-12B	2	PT6A-41	TPE331-3	none	262	3	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)					Test	15	Idle	Idle	21.66	147	101.63	1.97	115.31	0.40	2.95
									15	Intermediate	90%	5.75	473	2.03	7.57	6.49	0.40	1.47
									15	Full Power	100%	5.00	510	1.75	7.98	5.10	0.40	1.75
							48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	144	Idle	Idle	31.09	147	101.63	1.97	115.31	0.40	2.95
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	66	Idle	Idle	31.09	147	101.63	1.97	115.31	0.40	2.95
MU-2	2	TPE331-3	TPE331-3	none	1,457	15	5	High Power	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
		(EPA 1992)	(EPA 1992)					Test	75	Idle	Idle	21.66	112	79.11	2.86	61.52	0.40	2.95
									75	Intermediate	90%	5.75	409	0.15	11.86	0.98	0.40	1.47
									75	Full Power	100%	5.00	458	0.11	12.36	0.76	0.40	1.75
							48	Low Power 2-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	720	Idle	Idle	31.09	112	79.11	2.86	61.52	0.40	2.95
							22	Low Power 1-	0	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
								Engine Test	330	Idle	Idle	31.09	112	79.11	2.86	61.52	0.40	2.95
C-130	4	T56-A-16	J79-GE-10B	GTC85-72	83	1	5	High Power	5	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
		(AESO 9908A)	(AESO	(EPA 1992)				Test (all	5	Idle	G Idle L	21.66	599	22.32	3.53	30.11	0.40	17.10
			Regression	GTC 36-200				engines)	5	Intermediate	74% shp	5.75	1,800	0.21	9.83	0.94	0.40	12.60
			Analysis in	for PM10					5	Full Power	Mil	5.00	2,219	0.16	10.45	0.65	0.40	11.40
			AESO 9908A)	(AESO Fax)														
							48	Low Power 2-	48	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
								Engine Test	48	Idle	Idle	31.09	599	22.32	3.53	30.11	0.40	17.10
							22	Low Power 1-	22	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22
								Engine Test	22	Idle	Idle	31.09	599	22.32	3.53	30.11	0.40	17.10
							2	APU Test	2	APU Use	On	3.00	210	0.13	3.88	14.83	0.40	0.22

TABLE D1-38. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
T-39D	2	J85-GE-2 (AESO 6-90)	J85-GE-5 (Regression Equation Derived From Data in AESO 9620)	GTC 36-200 (AESO Fax)	55	1	5	High Power Test	5	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									5	Idle	Idle	21.66	560	11.86	3.68	111.86	0.40	22.03
									5	Intermediate	60% NR	5.75	1,700	0.96	5.13	35.78	0.40	12.89
									5	Full Power	Mil	5.00	2,890	0.45	6.40	21.56	0.40	9.43
							48	Low Power 2-Engine Test	48	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									48	Idle	Idle	31.09	560	11.86	3.68	111.86	0.40	22.03
							22	Low Power 1-Engine Test	22	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
									22	Idle	Idle	31.09	560	11.86	3.68	111.86	0.40	22.03
							2	APU Test	2	APU Use	On	3.00	197	0.25	6.25	2.00	0.40	0.22
AH-1W	2	T700-GE (AESO 9709A)	T58-GE-5/8F (AESO 6-90)	none	71	1	2.8	High Power Test	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									2.8	Idle	Idle	60.00	164	2.54	3.28	39.81	0.40	4.20
									2.8	Intermediate	27% Q	60.00	355	0.59	5.15	13.38	0.40	4.20
							5.4	B&B Wash	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									5.4	Idle	Idle	5.00	164	2.54	3.28	39.81	0.40	4.20
									5.4	Intermediate	25% Q	5.00	341	0.61	5.07	14.04	0.40	4.20
							0.3	Engine Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.3	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.3	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20
							0.3	Main Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.3	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.3	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20
							0.2	Tail Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.2	Idle	Idle	10.00	164	2.54	3.28	39.81	0.40	4.20
									0.2	Intermediate	25% Q	10.00	341	0.61	5.07	14.04	0.40	4.20

TABLE D1-38. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
UH-1L	1	T53-L-11D (AESO 6-90)	T58-GE-5/8F (AESO 6-90)	none	53	1	0.5	High Power/ Engine Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.5	Idle	G Idle	40.00	145	67.41	1.58	31.51	0.40	4.20
									0.5	Intermediate	NR	80.00	645	0.66	6.43	6.83	0.40	4.20
							15	Low Power Test	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									15	Idle	G Idle	25.00	145	67.41	1.58	31.51	0.40	4.20
							7	B&B Wash	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									7	Idle	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
									7	Intermediate	Mil	15.00	685	0.30	6.34	3.34	0.40	4.20
							2	Vibration Analysis	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									2	Idle	G Idle	40.00	145	67.41	1.58	31.51	0.40	4.20
									2	Intermediate	NR	80.00	645	0.66	6.43	6.83	0.40	4.20
							6.1	Rotor Tracking	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									6.1	Idle	F Idle	30.00	222	15.75	2.53	37.79	0.40	4.20
							0.9	Main Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.9	Idle	G Idle	15.00	145	67.41	1.58	31.51	0.40	4.20
									0.9	Intermediate	NR	5.00	645	0.66	6.43	6.83	0.40	4.20
							0.4	Tail Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.4	Idle	G Idle	10.00	145	67.41	1.58	31.51	0.40	4.20
									0.4	Intermediate	NR	5.00	645	0.66	6.43	6.83	0.40	4.20

TABLE D1-38. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates: ROG, NOx, CO	PM10	APU	Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow): ROG	NOx	CO	SOx	PM10
HH-1N	2	T400-CP-400 (AESO 9809)	T58-GE-5/8F (AESO 6-90)	none	161	2	0.5	High Power/ Engine Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									1.0	Idle	F Idle	40.00	143	7.46	3.08	30.71	0.40	4.20
									1.0	Intermediate	27% Q	80.00	232	0.35	4.18	6.72	0.40	4.20
							15	Low Power Test	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									30	Idle	F Idle	25.00	143	7.46	3.08	30.71	0.40	4.20
							7	B&B Wash	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									14	Idle	F Idle	10.00	143	7.46	3.08	30.71	0.40	4.20
									14	Intermediate	60% Q	15.00	372	0.12	6.13	0.83	0.40	4.20
							2	Vibration Analysis	0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									4	Idle	F Idle	6.00	143	7.46	3.08	30.71	0.40	4.20
									4	Intermediate	27% Q	15.00	232	0.35	4.18	6.72	0.40	4.20
							6.1	Rotor Tracking	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									12.2	Idle	10% Q	30.00	161	3.92	3.26	23.12	0.40	4.20
							0.9	Main Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									1.8	Idle	F Idle	15.00	143	7.46	3.08	30.71	0.40	4.20
									1.8	Intermediate	27% Q	5.00	232	0.35	4.18	6.72	0.40	4.20
							0.4	Tail Rotor Change	0.0	APU Use	On	3.00	102	7.79	3.94	42.77	0.40	0.22
									0.8	Idle	F Idle	10.00	143	7.46	3.08	30.71	0.40	4.20
									0.8	Intermediate	27% Q	5.00	232	0.35	4.18	6.72	0.40	4.20
Cessna 172	1	O-320 (EPA 1992)	AP-42, 3.3	none	627	6	5	High Power Test	30	Idle	Idle	20.00	10	36.92	0.52	######	0.11	1.83
									30	Intermediate	85%	5.00	67	12.38	3.97	989.51	0.11	1.83
									30	Full Power	100%	5.00	89	11.78	2.19	######	0.11	1.83
							48	Low Power Test	288	Idle	Idle	20.00	10	36.92	0.52	######	0.11	1.83
									288	Intermediate	40%	5.00	47	19.25	0.95	######	0.11	1.83
TOTALS					11,523	90			6,383									

Notes:
ROG = reactive organic compounds NOx = oxides of nitrogen CO = carbon monoxide PM10 = inhalable particulate matter
APU = auxiliary power unit (provides electrical power and air conditioning prior to start of main engines; starts main engines; also provides continuous power for equipment on some aircraft
G Idle = ground idle
F Idle = flight idle
NR = normal rated power
AB = afterburner
IRP = intermediate rated power
Mil = military power setting
int = intermediate power setting; some aircraft have more than one intermediate power settinç
% rpm = percent of rated core revolutions per minute (% N2) % shp = percent of rated shaft horsepower
% T = percent or rated thrust % Q = percent torque (for turboshaft engines)

TABLE D1-38. DATA USED TO ESTIMATE EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Number of Engines	Engine Models and Data Sources Used for Emission Rates			Annual Sorties	Equivalent Number of Aircraft	Annual Tests Per Aircraft	Test Procedure	Total Annual Test Events	Test Mode	Engine Power Setting	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
		ROG, NOx, CO	PM10	APU										ROG	NOx	CO	SOx	PM10

Only aircraft based at NAWS China Lake plus detached or transient aircraft with frequent flight activity are likely to require maintenance at NAWS China Lake.
Transient or detached aircraft with low annual sortie totals at Armitage Airfield are unlikely to require maintenance at NAWS China Lake.
Equivalent aircraft numbers are from Table D1-33, and represent a combination of aircraft based at NAWS China Lake plus an allowance for detached or transient aircraft that may occasionally require ligh maintenance.
Engines used for emission rate data are based on information presented in Table D1-23
AESO estimates of the frequency and pattern of in-frame engine maintenance tests for F/A-18, AH-1W, and HH-1N aircraft used as the basis for estimating engine test rates and patterns for other aircraft
High power tests for fixed wing aircraft use all engines. Low power tests for fixed wing aircraft use either one or two engines. All helicopter engine tests use all engines
Engine power settings and associated fuel flow rates based on data in emission factor source documents and AESO LTO/Maintenance cycle evaluation documents
Sulfur oxide emission rates for turbine engines (jets, turboprops, and helicopters) are based on 0.02% fuel sulfur content and 100% conversion to sulfur oxides as recommended by AESO Report 6-90
PM10 emission factor for piston engines based on industrial gasoline engines (U.S. EPA 1996, Section 3.3), assuming a fuel density of 673 kilogram per cubic meter and an energy content of 40,282 BTU pe kilogram (18,272 BTU per pound).
All values independently rounded for display after calculation.

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TABLE D1-39. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Test Procedure	Test Mode	Total Emissions from Annual Maintenance Tests (tons/year)					Flight Activity	Average Emissions per Type of Test Event (pounds)				
			ROG	NOx	CO	SOx	PM10		ROG	NOx	CO	SOx	PM10
F/A-18A-D	High Power Test	APU Use	0.000	0.004	0.001	0.000	0.000	High Power Test	27.97	62.87	134.35	1.96	13.08
		Idle	1.573	0.031	3.713	0.011	0.365						
		Intermediate	0.058	0.079	0.502	0.007	0.179						
		Full Power	0.027	2.160	0.090	0.034	0.241						
		AB Test	0.021	1.498	3.755	0.065	0.000						
	Low Power 2-Engine Test	APU Use	0.001	0.035	0.011	0.002	0.001	Low Power 2-Engine Test	37.63	0.81	88.83	0.26	8.73
		Idle	21.671	0.432	51.157	0.149	5.029						
	Low Power 1-Engine Test	APU Use	0.001	0.016	0.005	0.001	0.001	Low Power 1-Engine Test	18.81	0.44	44.43	0.13	4.37
		Idle	4.966	0.099	11.723	0.034	1.152						
	APU Test	APU Use	0.000	0.001	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
F/A-18E/F	High Power Test	APU Use	0.000	0.004	0.001	0.000	0.000	High Power Test	45.80	100.60	942.54	2.47	13.36
		Idle	1.905	0.116	3.124	0.014	0.448						
		Intermediate	0.016	0.171	0.205	0.011	0.223						
		Full Power	0.014	4.158	0.106	0.048	0.198						
		AB Test	1.041	2.089	57.829	0.088	0.000						
	Low Power 2-Engine Test	APU Use	0.002	0.038	0.012	0.002	0.001	Low Power 2-Engine Test	42.08	2.62	69.00	0.31	9.90
		Idle	26.256	1.594	43.042	0.194	6.177						
	Low Power 1-Engine Test	APU Use	0.001	0.018	0.006	0.001	0.001	Low Power 1-Engine Test	21.04	1.34	34.51	0.16	4.95
		Idle	6.017	0.365	9.864	0.044	1.415						
	APU Test	APU Use	0.000	0.002	0.001	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
EA-6B	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	17.57	30.04	37.30	1.30	30.10
		Idle	0.120	0.010	0.236	0.002	0.086						
		Intermediate	0.006	0.069	0.026	0.003	0.072						
		Full Power	0.007	0.146	0.017	0.005	0.068						
	Low Power 2-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-Engine Test	22.87	1.92	45.18	0.32	16.49
		Idle	1.647	0.138	3.253	0.023	1.187						
	Low Power 1-Engine Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-Engine Test	11.44	0.96	22.59	0.16	8.24
		Idle	0.377	0.032	0.745	0.005	0.272						
AV-8B	High Power Test	APU Use	0.000	0.001	0.000	0.000	0.000	High Power Test	8.66	23.66	50.34	0.84	8.85
		Idle	0.101	0.009	0.545	0.002	0.057						
		Intermediate	0.004	0.075	0.055	0.003	0.029						
		Full Power	0.003	0.211	0.028	0.005	0.024						
	Low Power Test	APU Use	0.000	0.007	0.002	0.000	0.000	Low Power Test	11.59	1.12	62.65	0.24	6.54
		Idle	1.390	0.127	7.515	0.028	0.785						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00

TABLE D1-39. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
F-86	High Power	APU Use	0.000	0.000	0.000	0.000	0.000	High Power	12.96	12.64	17.33	0.51	13.92
	Test	Idle	0.060	0.002	0.078	0.000	0.026	Test					
		Intermediate	0.001	0.021	0.006	0.001	0.021						
		Full Power	0.003	0.040	0.002	0.001	0.022						
	Low Power	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power	17.25	0.63	22.47	0.14	7.47
	Test	Idle	0.828	0.030	1.079	0.007	0.359	Test					
UC-12B	High Power	APU Use	0.000	0.000	0.000	0.000	0.000	High Power	11.12	1.57	13.26	0.11	0.60
	Test	Idle	0.081	0.002	0.092	0.000	0.002	Test					
		Intermediate	0.001	0.005	0.004	0.000	0.001						
		Full Power	0.001	0.005	0.003	0.000	0.001						
	Low Power 2-	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-	15.48	0.30	17.57	0.06	0.45
	Engine Test	Idle	1.115	0.022	1.265	0.004	0.032	Engine Test					
	Low Power 1-	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-	7.74	0.15	8.78	0.03	0.22
	Engine Test	Idle	0.255	0.005	0.290	0.001	0.007	Engine Test					
MU-2	High Power	APU Use	0.000	0.000	0.000	0.000	0.000	High Power	6.43	2.10	5.12	0.09	0.49
	Test	Idle	0.240	0.009	0.187	0.001	0.009	Test					
		Intermediate	0.000	0.035	0.003	0.001	0.004						
		Full Power	0.000	0.035	0.002	0.001	0.005						
	Low Power 2-	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 2-	9.20	0.33	7.15	0.05	0.34
	Engine Test	Idle	3.312	0.120	2.575	0.017	0.123	Engine Test					
	Low Power 1-	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power 1-	4.60	0.17	3.58	0.02	0.17
	Engine Test	Idle	0.759	0.027	0.590	0.004	0.028	Engine Test					
C-130	High Power	APU Use	0.000	0.000	0.000	0.000	0.000	High Power	19.57	17.61	27.33	0.92	31.92
	Test (all	Idle	0.048	0.008	0.065	0.001	0.037	Test (all					
	engines)	Intermediate	0.000	0.017	0.002	0.001	0.022	engines)					
		Full Power	0.000	0.019	0.001	0.001	0.021						
	Low Power 2-	APU Use	0.000	0.001	0.004	0.000	0.000	Low Power 2-	13.86	2.23	18.85	0.25	10.62
	Engine Test	Idle	0.333	0.053	0.449	0.006	0.255	Engine Test					
	Low Power 1-	APU Use	0.000	0.000	0.002	0.000	0.000	Low Power 1-	6.93	1.14	9.50	0.13	5.31
	Engine Test	Idle	0.076	0.012	0.103	0.001	0.058	Engine Test					
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.04	0.16	0.00	0.00

TABLE D1-39. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
T-39D	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	5.32	6.30	67.29	0.49	17.65
		Idle	0.012	0.004	0.113	0.000	0.022						
		Intermediate	0.001	0.004	0.029	0.000	0.010						
		Full Power	0.001	0.008	0.026	0.000	0.011						
	Low Power 2-Engine Test	APU Use	0.000	0.001	0.000	0.000	0.000	Low Power 2-Engine Test	6.89	2.20	64.94	0.24	12.79
		Idle	0.165	0.051	1.558	0.006	0.307						
	Low Power 1-Engine Test	APU Use	0.000	0.001	0.000	0.000	0.000	Low Power 1-Engine Test	3.44	1.13	32.48	0.12	6.39
		Idle	0.038	0.012	0.357	0.001	0.070						
	APU Test	APU Use	0.000	0.000	0.000	0.000	0.000	APU Test	0.00	0.06	0.02	0.00	0.00
AH-1W	High Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	High Power Test	1.25	4.73	22.54	0.41	4.36
		Idle	0.001	0.002	0.018	0.000	0.002						
		Intermediate	0.001	0.005	0.013	0.000	0.004						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	0.10	0.38	1.89	0.03	0.35
		Idle	0.000	0.000	0.003	0.000	0.000						
		Intermediate	0.000	0.001	0.002	0.000	0.001						
	Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	Engine Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	0.21	0.76	3.77	0.07	0.71
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						

TABLE D1-39. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

			Total Emissions from Annual Maintenance Tests (tons/year)						Average Emissions per Type of Test Event (pounds)				
Aircraft Type	Test Procedure	Test Mode	ROG	NOx	CO	SOx	PM10	Flight Activity	ROG	NOx	CO	SOx	PM10
UH-1L	High Power/ Engine Change	APU Use	0.000	0.000	0.000	0.000	0.000	High Power/ Engine Change	7.08	5.68	8.92	0.38	4.02
		Idle	0.002	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.001	0.001	0.000	0.001						
	Low Power Test	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power Test	4.07	0.10	1.90	0.02	0.25
		Idle	0.031	0.001	0.014	0.000	0.002						
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	1.68	1.12	1.33	0.08	0.82
		Idle	0.006	0.000	0.003	0.000	0.000						
		Intermediate	0.000	0.004	0.002	0.000	0.003						
	Vibration Analysis	APU Use	0.000	0.000	0.000	0.000	0.000	Vibration Analysis	7.08	5.68	8.92	0.38	4.02
		Idle	0.007	0.000	0.003	0.000	0.000						
		Intermediate	0.001	0.006	0.006	0.000	0.004						
	Rotor Tracking	APU Use	0.000	0.000	0.000	0.000	0.000	Rotor Tracking	1.75	0.28	4.19	0.04	0.47
		Idle	0.005	0.001	0.013	0.000	0.001						
	Main Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor Change	2.48	0.40	1.51	0.04	0.38
		Idle	0.001	0.000	0.001	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor Change	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor Change	1.66	0.38	1.13	0.03	0.33
		Idle	0.000	0.000	0.000	0.000	0.000						
		Intermediate	0.000	0.000	0.000	0.000	0.000						

TABLE D1-39. ESTIMATED EMISSIONS FROM IN-FRAME ENGINE MAINTENANCE RUN-UPS AT ARMITAGE AIRFIELD: MODERATE EXPANSION ALTERNATIVE

Aircraft Type	Test Procedure	Test Mode	Total Emissions from Annual Maintenance Tests (tons/year) ROG	NOx	CO	SOx	PM10	Flight Activity	Average Emissions per Type of Test Event (pounds) ROG	NOx	CO	SOx	PM10
HH-1N	High Power/	APU Use	0.000	0.000	0.000	0.000	0.000	High Power/	1.64	3.18	10.02	0.32	3.40
	Engine	Idle	0.001	0.000	0.003	0.000	0.000	Engine					
	Change	Intermediate	0.000	0.001	0.002	0.000	0.001	Change					
	Low Power	APU Use	0.000	0.000	0.000	0.000	0.000	Low Power	0.89	0.37	3.66	0.05	0.50
	Test	Idle	0.013	0.006	0.055	0.001	0.008	Test					
	B&B Wash	APU Use	0.000	0.000	0.000	0.000	0.000	B&B Wash	0.38	1.29	1.62	0.09	0.98
		Idle	0.002	0.001	0.010	0.000	0.001						
		Intermediate	0.000	0.008	0.001	0.001	0.005						
	Vibration	APU Use	0.000	0.000	0.000	0.000	0.000	Vibration	0.25	0.57	1.66	0.06	0.61
	Analysis	Idle	0.000	0.000	0.002	0.000	0.000	Analysis					
		Intermediate	0.000	0.001	0.002	0.000	0.001						
	Rotor	APU Use	0.000	0.000	0.000	0.000	0.000	Rotor	0.63	0.52	3.72	0.06	0.67
	Tracking	Idle	0.004	0.003	0.023	0.000	0.004	Tracking					
	Main Rotor	APU Use	0.000	0.000	0.000	0.000	0.000	Main Rotor	0.55	0.38	2.46	0.04	0.46
	Change	Idle	0.000	0.000	0.002	0.000	0.000	Change					
		Intermediate	0.000	0.000	0.000	0.000	0.000						
	Tail Rotor	APU Use	0.000	0.000	0.000	0.000	0.000	Tail Rotor	0.37	0.31	1.72	0.03	0.36
	Change	Idle	0.000	0.000	0.001	0.000	0.000	Change					
		Intermediate	0.000	0.000	0.000	0.000	0.000						
Cessna 172	High Power	Idle	0.002	0.000	0.052	0.000	0.000	High Power	0.27	0.04	16.91	0.00	0.03
	Test	Intermediate	0.001	0.000	0.082	0.000	0.000	Test					
		Full Power	0.001	0.000	0.120	0.000	0.000						
	Low Power	Idle	0.017	0.000	0.496	0.000	0.001	Low Power	0.19	0.01	8.21	0.00	0.01
	Test	Intermediate	0.011	0.001	0.686	0.000	0.001	Test					
Combined In-Frame Engine Tests			74.66	14.33	208.08	0.85	19.51						

Notes: All in-frame engine test emissions occur in the Kern County ozone nonattainment and Searles Valley PM10 nonattainment portion of NAWS China Lake

TABLE D1-40. GROUND SUPPORT EQUIPMENT USE ESTIMATES CORRELATED WITH KNOWN FUEL USE: 1996 CONDITIONS

ITEM ID	DESCRIPTION AND FUEL	Engine Size (hp)	Fuel Use Rate (gal/hr)	Number of Items	Aggregate Equipment Use Rate Estimate		Annual Use Hours Per Item	Cumulative Use Hours Per Year	Annual JP Fuel Use (gal/yr)
AS32A30A	Tow Tractor (JP-8)	42.6	0.7	11	0.1	hrs/total non-GA sortie	80.3	883.7	619
AS32A42	Tow Tractor (JP-8)	80	1.3	13	0.1	hrs/fixed wing non-GA sortie	65.8	855.5	1,112
AS32A37	Tow Tractor (JP-8)	192	5	2	0.02	hrs/fixed wing non-GA sortie	85.6	171.1	856
AS32A30	Tow Tractor (gasoline)	90	4.5	11	0.05	hrs/fixed wing non-GA sortie	38.9	427.8	na
AS32K1D	Weapons Loader (JP-8)	40	3	1	0.01	hrs/total non-GA sortie	88.4	88.4	265
AS32K1C	Weapons Loader (JP-8)	27	1.35	2	0.02	hrs/total non-GA sortie	88.4	176.7	239
HLU196	Weapons Hoist (gasoline)	3	0.5	16	0.1	hrs/total non-GA sortie	55.2	883.7	na
NC8A1	Mobile Generator (JP-8)	123	8	16	0.2	hrs/ASU engine test	7.0	111.2	890
NC8A	Mobile Generator (JP-8)	123	8	2	0.05	hrs/ASU engine test	13.9	27.8	222
NC10A1	Towed Generator (JP-8)	220	11	10	0.2	hrs/ASU engine test	11.1	111.2	1,223
NC10C	Towed Generator (JP-8)	215	11	1	0.05	hrs/ASU engine test	27.8	27.8	306
AM47A4	Air Start Unit (JP-8)	550	60	8	0.03	hrs/ASU sortie + test	6.4	51.3	3,078
GTE851	Air Start Unit (JP-8)	250	30	12	0.05	hrs/ASU sortie + test	7.1	85.5	2,565
AM32C17	Portable AC Unit (JP-8)	200	10	9	0.2	hrs/ASU engine test	12.4	111.2	1,112
AS32M14	8.5 Ton Mobile Crane (JP-8	123	8	1	4	hrs/month/item	48.0	48.0	384
AM27T5	Hydraulic Test Stand (JP-8)	97	4.9	8	2.5	hrs/month/item	30.0	240.0	1,176
AM42M2	Portable Light Set (JP-8)	36	2	7	1.5	hrs/month/item	18.0	126.0	252
waterdemon	Demineralization Cart (gas)	5	0.25	4	4	hrs/month/item	48.0	192.0	na
GSE Equipment Totals								4,619	14,298

Notes: ASU = ground-based air start unit.
GA = general aviation aircraft
Actual JP fuel use by GSE equipment during 1996 was 14,279 gallons.
Total sorties for 1996 estimated at 9,365; helicopter sorties estimated at 282; GA aircraft sorties estimated at 528.
Total non-GA sorties for 1996 estimated at 8,837.
Total fixed wing, non-GA sorties for 1996 estimated at 8,555.
Only A-6E, EA-6B, F-86, T-38, and UC-8B aircraft require ground-based air start units.
Total sorties requiring air start units for 1996 estimated at 1,154.
Total engine tests requiring air start units estimated at 556.

Cumulative tow tractor use = 15.9 minutes per non-GA aircraft/helicopter sortie.
Cumulative weapons loader use = 7.8 minutes per non-GA aircraft/helicopter sortie.
Cumulative air start unit use = 4.8 minutes per aircraft sortie or engine test requiring ASU.
Cumulative portable generator use = 30 minutes per engine test requiring ASU.
Cumulative portable AC unit use = 12 minutes per engine test requiring ASU.

TABLE D1-41. GROUND SUPPORT EQUIPMENT USE ESTIMATES FOR THE NO ACTION ALTERNATIVE

ITEM ID	DESCRIPTION AND FUEL	Engine Size (hp)	Fuel Use Rate (gal/hr)	Number of Items	Aggregate Equipment Use Rate Estimate		Annual Use Hours Per Item	Cumulative Use Hours Per Year	Annual JP Fuel Use (gal/yr)
AS32A30A	Tow Tractor (JP-8)	42.6	0.7	11	0.1	hrs/total non-GA sortie	82.2	904.2	633
AS32A42	Tow Tractor (JP-8)	80	1.3	13	0.1	hrs/fixed wing non-GA sortie	67.4	876.0	1,139
AS32A37	Tow Tractor (JP-8)	192	5	2	0.02	hrs/fixed wing non-GA sortie	87.6	175.2	876
AS32A30	Tow Tractor (gasoline)	90	4.5	11	0.05	hrs/fixed wing non-GA sortie	39.8	438.0	na
AS32K1D	Weapons Loader (JP-8)	40	3	1	0.01	hrs/total non-GA sortie	90.4	90.4	271
AS32K1C	Weapons Loader (JP-8)	27	1.35	2	0.02	hrs/total non-GA sortie	90.4	180.8	244
HLU196	Weapons Hoist (gasoline)	3	0.5	16	0.1	hrs/total non-GA sortie	56.5	904.2	na
NC8A1	Mobile Generator (JP-8)	123	8	16	0.2	hrs/ASU engine test	3.2	51.2	410
NC8A	Mobile Generator (JP-8)	123	8	2	0.05	hrs/ASU engine test	6.4	12.8	102
NC10A1	Towed Generator (JP-8)	220	11	10	0.2	hrs/ASU engine test	5.1	51.2	563
NC10C	Towed Generator (JP-8)	215	11	1	0.05	hrs/ASU engine test	12.8	12.8	141
AM47A4	Air Start Unit (JP-8)	550	60	8	0.03	hrs/ASU sortie + test	3.1	24.8	1,489
GTE851	Air Start Unit (JP-8)	250	30	12	0.05	hrs/ASU sortie + test	3.4	41.4	1,241
AM32C17	Portable AC Unit (JP-8)	200	10	9	0.2	hrs/ASU engine test	5.7	51.2	512
AS32M14	8.5 Ton Mobile Crane (JP-8	123	8	1	4	hrs/month/item	48.0	48.0	384
AM27T5	Hydraulic Test Stand (JP-8)	97	4.9	8	2.5	hrs/month/item	30.0	240.0	1,176
AM42M2	Portable Light Set (JP-8)	36	2	7	1.5	hrs/month/item	18.0	126.0	252
waterdemon	Demineralization Cart (gas)	5	0.25	4	4	hrs/month/item	48.0	192.0	na
GSE Equipment Totals								4,420	9,432

Notes: ASU = ground-based air start unit.
GA = general aviation aircraft
Total sorties estimated at 9,570; helicopter sorties estimated at 282; GA aircraft sorties estimated at 528.
Total non-GA sorties estimated at 9,042.
Total fixed wing, non-GA sorties estimated at 8,760.
Only EA-6B, F-86, T-38, and UC-8B aircraft would require ground-based air start units.
Total sorties requiring air start units estimated at 571.
Total engine tests requiring air start units estimated at 256.

Cumulative tow tractor use = 15.9 minutes per non-GA aircraft/helicopter sortie.
Cumulative weapons loader use = 7.8 minutes per non-GA aircraft/helicopter sortie.
Cumulative air start unit use = 4.8 minutes per aircraft sortie or engine test requiring ASU.
Cumulative portable generator use = 30 minutes per engine test requiring ASU.
Cumulative portable AC unit use = 12 minutes per engine test requiring ASU.

TABLE D1-42. GROUND SUPPORT EQUIPMENT USE ESTIMATES FOR THE LIMITED EXPANSION ALTERNATIVE

ITEM ID	DESCRIPTION AND FUE	Engine Size (hp)	Fuel Use Rate (gal/hr)	Number of Items	Aggregate Equipment Use Rate Estimate		Annual Use Hours Per Item	Cumulative Use Hours Per Year	Annual JP Fuel Use (gal/yr)
AS32A30A	Tow Tractor (JP-8)	42.6	0.7	11	0.1	hrs/total non-GA sortie	94.5	1,040.0	728
AS32A42	Tow Tractor (JP-8)	80	1.3	13	0.1	hrs/fixed wing non-GA soı	77.5	1,007.6	1,310
AS32A37	Tow Tractor (JP-8)	192	5	2	0.02	hrs/fixed wing non-GA soı	100.8	201.5	1,008
AS32A30	Tow Tractor (gasoline)	90	4.5	11	0.05	hrs/fixed wing non-GA soı	45.8	503.8	na
AS32K1D	Weapons Loader (JP-8)	40	3	1	0.01	hrs/total non-GA sortie	104.0	104.0	312
AS32K1C	Weapons Loader (JP-8)	27	1.35	2	0.02	hrs/total non-GA sortie	104.0	208.0	281
HLU196	Weapons Hoist (gasoline)	3	0.5	16	0.1	hrs/total non-GA sortie	65.0	1,040.0	na
NC8A1	Mobile Generator (JP-8)	123	8	16	0.2	hrs/ASU engine test	3.2	51.2	410
NC8A	Mobile Generator (JP-8)	123	8	2	0.05	hrs/ASU engine test	6.4	12.8	102
NC10A1	Towed Generator (JP-8)	220	11	10	0.2	hrs/ASU engine test	5.1	51.2	563
NC10C	Towed Generator (JP-8)	215	11	1	0.05	hrs/ASU engine test	12.8	12.8	141
AM47A4	Air Start Unit (JP-8)	550	60	8	0.03	hrs/ASU sortie + test	3.4	27.4	1,642
GTE851	Air Start Unit (JP-8)	250	30	12	0.05	hrs/ASU sortie + test	3.8	45.6	1,368
AM32C17	Portable AC Unit (JP-8)	200	10	9	0.2	hrs/ASU engine test	5.7	51.2	512
AS32M14	8.5 Ton Mobile Crane (JP	123	8	1	4.6	hrs/month/item	55.2	55.2	442
AM27T5	Hydraulic Test Stand (JP-	97	4.9	8	2.875	hrs/month/item	34.5	276.0	1,352
AM42M2	Portable Light Set (JP-8)	36	2	7	1.725	hrs/month/item	20.7	144.9	290
waterdemı	Demineralization Cart (ga	5	0.25	4	4.6	hrs/month/item	55.2	220.8	na
GSE Equipment Totals								5,054	10,460

Notes: ASU = ground-based air start unit.
GA = general aviation aircraft
Total sorties estimated at 11,009; helicopter sorties estimated at 324; GA aircraft sorties estimated at 609.
Total non-GA sorties estimated at 10,400.
Total fixed wing, non-GA sorties estimated at 10,076.
Only EA-6B, F-86, T-38, and UC-8B aircraft would require ground-based air start units.
Total sorties requiring air start units estimated at 656.
Total engine tests requiring air start units estimated at 256.
Baseline equipment use estimates for mobile crane, hydraulic test stands, portable light sets, and demineralization carts increas

Cumulative tow tractor use = 15.9 minutes per non-GA aircraft/helicopter sortie.
Cumulative weapons loader use = 7.8 minutes per non-GA aircraft/helicopter sortie.
Cumulative air start unit use = 4.8 minutes per aircraft sortie or engine test requiring ASU.
Cumulative portable generator use = 30 minutes per engine test requiring ASU.
Cumulative portable AC unit use = 12 minutes per engine test requiring ASU.

TABLE D1-43. GROUND SUPPORT EQUIPMENT USE ESTIMATES FOR THE MODERATE EXPANSION ALTERNATIVE

ITEM ID	DESCRIPTION AND FUEL	Engine Size (hp)	Fuel Use Rate (gal/hr)	Number of Items	Aggregate Equipment Use Rate Estimate		Annual Use Hours Per Item	Cumulative Use Hours Per Year	Annual JP Fuel Use (gal/yr)
AS32A30A	Tow Tractor (JP-8)	42.6	0.7	11	0.1	hrs/total non-GA sortie	102.8	1,130.4	791
AS32A42	Tow Tractor (JP-8)	80	1.3	13	0.1	hrs/fixed wing non-GA sortie	84.2	1,095.2	1,424
AS32A37	Tow Tractor (JP-8)	192	5	2	0.02	hrs/fixed wing non-GA sortie	109.5	219.0	1,095
AS32A30	Tow Tractor (gasoline)	90	4.5	11	0.05	hrs/fixed wing non-GA sortie	49.8	547.6	na
AS32K1D	Weapons Loader (JP-8)	40	3	1	0.01	hrs/total non-GA sortie	113.0	113.0	339
AS32K1C	Weapons Loader (JP-8)	27	1.35	2	0.02	hrs/total non-GA sortie	113.0	226.1	305
HLU196	Weapons Hoist (gasoline)	3	0.5	16	0.1	hrs/total non-GA sortie	70.7	1,130.4	na
NC8A1	Mobile Generator (JP-8)	123	8	16	0.2	hrs/ASU engine test	4.1	66.2	530
NC8A	Mobile Generator (JP-8)	123	8	2	0.05	hrs/ASU engine test	8.3	16.6	132
NC10A1	Towed Generator (JP-8)	220	11	10	0.2	hrs/ASU engine test	6.6	66.2	728
NC10C	Towed Generator (JP-8)	215	11	1	0.05	hrs/ASU engine test	16.6	16.6	182
AM47A4	Air Start Unit (JP-8)	550	60	8	0.03	hrs/ASU sortie + test	3.9	31.4	1,883
GTE851	Air Start Unit (JP-8)	250	30	12	0.05	hrs/ASU sortie + test	4.4	52.3	1,569
AM32C17	Portable AC Unit (JP-8)	200	10	9	0.2	hrs/ASU engine test	7.4	66.2	662
AS32M14	8.5 Ton Mobile Crane (JP-8	123	8	1	5	hrs/month/item	60.0	60.0	480
AM27T5	Hydraulic Test Stand (JP-8	97	4.9	8	3.125	hrs/month/item	37.5	300.0	1,470
AM42M2	Portable Light Set (JP-8)	36	2	7	1.875	hrs/month/item	22.5	157.5	315
waterdem	Demineralization Cart (gas)	5	0.25	4	5	hrs/month/item	60.0	240.0	na
GSE Equipment Totals								5,535	11,906

Notes: ASU = ground-based air start unit.
GA = general aviation aircraft
Total sorties estimated at 11,965; helicopter sorties estimated at 352; GA aircraft sorties estimated at 661.
Total non-GA sorties estimated at 11,304.
Total fixed wing, non-GA sorties estimated at 10,952.
Only EA-6B, F-86, T-38, and UC-8B aircraft would require ground-based air start units.
Total sorties requiring air start units estimated at 715.
Total engine tests requiring air start units estimated at 331.
Baseline equipment use estimates for mobile crane, hydraulic test stands, portable light sets, and demineralization carts increased by 25%.

Cumulative tow tractor use = 15.9 minutes per non-GA aircraft/helicopter sortie.
Cumulative weapons loader use = 7.8 minutes per non-GA aircraft/helicopter sortie.
Cumulative air start unit use = 4.8 minutes per aircraft sortie or engine test requiring ASU.
Cumulative portable generator use = 30 minutes per engine test requiring ASU.
Cumulative portable AC unit use = 12 minutes per engine test requiring ASU.

TABLE D1-44. EMISSION ESTIMATES FOR GROUND SUPPORT EQUIPMENT: NO ACTION ALTERNATIVE

							Emission Rate (grams per horsepower-hour)					Annual Emissions, Tons Per Year				
ITEM ID	DESCRIPTION AND FUEL	Number of Items	Annual Use Hours Per Item	Cumulative Use Hours Per Year	Engine Size (hp)	Typical Load Factor	ROG	NOx	CO	SOx	PM10	ROG	NOx	CO	SOx	PM10
AS32A30A	Tow Tractor (JP-8)	11	82.2	904.2	42.6	85%	1.76	13.16	6.06	0.10	1.62	0.064	0.475	0.219	0.003	0.058
AS32A42	Tow Tractor (JP-8)	13	67.4	876.0	80	85%	1.76	13.16	6.06	0.10	1.62	0.116	0.864	0.398	0.006	0.106
AS32A37	Tow Tractor (JP-8)	2	87.6	175.2	192	80%	1.76	13.16	6.06	0.10	1.62	0.052	0.390	0.180	0.003	0.048
AS32A30	Tow Tractor (gasoline)	11	39.8	438.0	90	85%	12.22	5.16	258.70	0.27	0.06	0.451	0.191	9.555	0.010	0.002
AS32K1D	Weapons Loader (JP-8)	1	90.4	90.4	40	75%	1.25	13.22	3.03	0.10	1.01	0.004	0.040	0.009	0.000	0.003
AS32K1C	Weapons Loader (JP-8)	2	90.4	180.8	27	75%	1.25	13.22	3.03	0.10	1.01	0.005	0.053	0.012	0.000	0.004
HLU196	Weapons Hoist (gasoline)	16	56.5	904.2	3	100%	23.09	0.81	670.70	0.27	0.22	0.069	0.002	2.005	0.001	0.001
NC8A1	Mobile Generator (JP-8)	16	3.2	51.2	123	75%	1.25	13.22	3.03	0.10	1.01	0.007	0.069	0.016	0.001	0.005
NC8A	Mobile Generator (JP-8)	2	6.4	12.8	123	75%	1.25	13.22	3.03	0.10	1.01	0.002	0.017	0.004	0.000	0.001
NC10A1	Towed Generator (JP-8)	10	5.1	51.2	220	75%	1.25	13.22	3.03	0.10	1.01	0.012	0.123	0.028	0.001	0.009
NC10C	Towed Generator (JP-8)	1	12.8	12.8	215	75%	1.25	13.22	3.03	0.10	1.01	0.003	0.030	0.007	0.000	0.002
AM47A4	Air Start Unit (JP-8)	8	3.1	24.8	550	100%	1.25	13.22	3.03	0.10	1.01	0.019	0.199	0.046	0.001	0.015
GTE851	Air Start Unit (JP-8)	12	3.4	41.4	250	100%	1.25	13.22	3.03	0.10	1.01	0.014	0.151	0.035	0.001	0.012
AM32C17	Portable AC Unit (JP-8)	9	5.7	51.2	200	75%	1.25	13.22	3.03	0.10	1.01	0.011	0.112	0.026	0.001	0.009
AS32M14	8.5 Ton Mobile Crane (JP-8)	1	48.0	48.0	123	75%	1.25	13.22	3.03	0.10	1.01	0.006	0.065	0.015	0.000	0.005
AM27T5	Hydraulic Test Stand (JP-8)	8	30.0	240.0	97	85%	1.25	13.22	3.03	0.10	1.01	0.027	0.288	0.066	0.002	0.022
AM42M2	Portable Light Set (JP-8)	7	18.0	126.0	36	100%	1.25	13.22	3.03	0.10	1.01	0.006	0.066	0.015	0.000	0.005
waterdemon	Demineralization Cart (gas)	4	48.0	192.0	5	100%	23.09	0.81	670.70	0.27	0.22	0.024	0.001	0.710	0.000	0.000
GSE Equipment Totals				4,420								0.891	3.136	13.345	0.033	0.308

Notes: hp = horsepower

Equipment identifications, number of items, engine sizes, and fuel type data provided by NAWS China Lake personnel

Annual ground support equipment use estimates are based on Table D1-41.

Load factors were selected to produce reasonable in-use load ratings for the equipment type and its normal use, using typical in-use horsepower load data from U.S. Environmental Protectioı Agency (1991) as comparison values.

Emission rates for tow tractors operating on JP fuel are based on diesel equipment emission rates from U.S. Environmental Protection Agency (1991), multiplied by a JP-5 adjustment facto (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

Emission rates for portable diesel engine equipment operated on JP fuel are based on diesel emission rates (U.S. Environmental Protection Agency, 1995) multiplied by a JP-5 adjustmer factor (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

The sulfur oxide emission rate for tow tractors and portable equipment using JP fuel is based on manufacturer data for 80 horsepower hydraulic test stand equipment (Castro 1997)

Emission rates for gasoline-fueled tow tractors are based on U.S. Environmental Protection Agency (1991) data for airport service vehicles, including EPA in-use adjustments

Emission rates for other gasoline-fueled equipment is based on U.S. Environmental Protection Agency (1991) data for light commercial engine equipment, including EPA in-use adjustments

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions From NAS Lemoore "Huffers" and TSE.

U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emission Study - Report. (ANR-443). (NTIS # PB92126960)

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42)

TABLE D1-45. EMISSION ESTIMATES FOR GROUND SUPPORT EQUIPMENT: LIMITED EXPANSION ALTERNATIVE

ITEM ID	DESCRIPTION AND FUEL	Number of Items	Annual Use Hours Per Item	Cumulative Use Hours Per Year	Engine Size (hp)	Typical Load Factor	Emission Rate (grams per horsepower-hour) ROG	NOx	CO	SOx	PM10	Annual Emissions, Tons Per Year ROG	NOx	CO	SOx	PM10
AS32A30A	Tow Tractor (JP-8)	11	94.5	1,040.0	42.6	85%	1.76	13.16	6.06	0.10	1.62	0.073	0.546	0.252	0.004	0.067
AS32A42	Tow Tractor (JP-8)	13	77.5	1,007.6	80	85%	1.76	13.16	6.06	0.10	1.62	0.133	0.994	0.458	0.007	0.122
AS32A37	Tow Tractor (JP-8)	2	100.8	201.5	192	80%	1.76	13.16	6.06	0.10	1.62	0.060	0.449	0.207	0.003	0.055
AS32A30	Tow Tractor (gasoline)	11	45.8	503.8	90	85%	12.22	5.16	258.70	0.27	0.06	0.519	0.219	10.991	0.011	0.003
AS32K1D	Weapons Loader (JP-8)	1	104.0	104.0	40	75%	1.25	13.22	3.03	0.10	1.01	0.004	0.045	0.010	0.000	0.003
AS32K1C	Weapons Loader (JP-8)	2	104.0	208.0	27	75%	1.25	13.22	3.03	0.10	1.01	0.006	0.061	0.014	0.000	0.005
HLU196	Weapons Hoist (gasoline)	16	65.0	1,040.0	3	100%	23.09	0.81	670.70	0.27	0.22	0.079	0.003	2.307	0.001	0.001
NC8A1	Mobile Generator (JP-8)	16	3.2	51.2	123	75%	1.25	13.22	3.03	0.10	1.01	0.007	0.069	0.016	0.001	0.005
NC8A	Mobile Generator (JP-8)	2	6.4	12.8	123	75%	1.25	13.22	3.03	0.10	1.01	0.002	0.017	0.004	0.000	0.001
NC10A1	Towed Generator (JP-8)	10	5.1	51.2	220	75%	1.25	13.22	3.03	0.10	1.01	0.012	0.123	0.028	0.001	0.009
NC10C	Towed Generator (JP-8)	1	12.8	12.8	215	75%	1.25	13.22	3.03	0.10	1.01	0.003	0.030	0.007	0.000	0.002
AM47A4	Air Start Unit (JP-8)	8	3.4	27.4	550	100%	1.25	13.22	3.03	0.10	1.01	0.021	0.219	0.050	0.002	0.017
GTE851	Air Start Unit (JP-8)	12	3.8	45.6	250	100%	1.25	13.22	3.03	0.10	1.01	0.016	0.166	0.038	0.001	0.013
AM32C17	Portable AC Unit (JP-8)	9	5.7	51.2	200	75%	1.25	13.22	3.03	0.10	1.01	0.011	0.112	0.026	0.001	0.009
AS32M14	8.5 Ton Mobile Crane (JP-8)	1	55.2	55.2	123	75%	1.25	13.22	3.03	0.10	1.01	0.007	0.074	0.017	0.001	0.006
AM27T5	Hydraulic Test Stand (JP-8)	8	34.5	276.0	97	85%	1.25	13.22	3.03	0.10	1.01	0.031	0.332	0.076	0.002	0.025
AM42M2	Portable Light Set (JP-8)	7	20.7	144.9	36	100%	1.25	13.22	3.03	0.10	1.01	0.007	0.076	0.017	0.001	0.006
waterdemon	Demineralization Cart (gas)	4	55.2	220.8	5	100%	23.09	0.81	670.70	0.27	0.22	0.028	0.001	0.816	0.000	0.000
GSE Equipment Totals				5,054								1.018	3.537	15.333	0.037	0.349

Notes: hp = horsepower

Equipment identifications, number of items, engine sizes, and fuel type data provided by NAWS China Lake personnel

Annual ground support equipment use estimates are based on Table D1-42.

Load factors were selected to produce reasonable in-use load ratings for the equipment type and its normal use, using typical in-use horsepower load data from U.S. Environmental Protectioi Agency (1991) as comparison values.

Emission rates for tow tractors operating on JP fuel are based on diesel equipment emission rates from U.S. Environmental Protection Agency (1991), multiplied by a JP-5 adjustment facto (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

Emission rates for portable diesel engine equipment operated on JP fuel are based on diesel emission rates (U.S. Environmental Protection Agency, 1995) multiplied by a JP-5 adjustmer factor (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

The sulfur oxide emission rate for tow tractors and portable equipment using JP fuel is based on manufacturer data for 80 horsepower hydraulic test stand equipment (Castro 1997)

Emission rates for gasoline-fueled tow tractors are based on U.S. Environmental Protection Agency (1991) data for airport service vehicles, including EPA in-use adjustments

Emission rates for other gasoline-fueled equipment is based on U.S. Environmental Protection Agency (1991) data for light commercial engine equipment, including EPA in-use adjustments

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions From NAS Lemoore "Huffers" and TSE.

U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emission Study - Report. (ANR-443). (NTIS # PB92126960)

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42)

TABLE D1-46. EMISSION ESTIMATES FOR GROUND SUPPORT EQUIPMENT: MODERATE EXPANSION ALTERNATIVE

							Emission Rate (grams per horsepower-hour)					Annual Emissions, Tons Per Year				
ITEM ID	DESCRIPTION AND FUEL	Number of Items	Annual Use Hours Per Item	Cumulative Use Hours Per Year	Engine Size (hp)	Typical Load Factor	ROG	NOx	CO	SOx	PM10	ROG	NOx	CO	SOx	PM10
AS32A30A	Tow Tractor (JP-8)	11	102.8	1,130.4	42.6	85%	1.76	13.16	6.06	0.10	1.62	0.079	0.594	0.273	0.004	0.073
AS32A42	Tow Tractor (JP-8)	13	84.2	1,095.2	80	85%	1.76	13.16	6.06	0.10	1.62	0.144	1.080	0.497	0.008	0.133
AS32A37	Tow Tractor (JP-8)	2	109.5	219.0	192	80%	1.76	13.16	6.06	0.10	1.62	0.065	0.488	0.225	0.004	0.060
AS32A30	Tow Tractor (gasoline)	11	49.8	547.6	90	85%	12.22	5.16	258.70	0.27	0.06	0.564	0.238	11.946	0.012	0.003
AS32K1D	Weapons Loader (JP-8)	1	113.0	113.0	40	75%	1.25	13.22	3.03	0.10	1.01	0.005	0.049	0.011	0.000	0.004
AS32K1C	Weapons Loader (JP-8)	2	113.0	226.1	27	75%	1.25	13.22	3.03	0.10	1.01	0.006	0.067	0.015	0.000	0.005
HLU196	Weapons Hoist (gasoline)	16	70.7	1,130.4	3	100%	23.09	0.81	670.70	0.27	0.22	0.086	0.003	2.507	0.001	0.001
NC8A1	Mobile Generator (JP-8)	16	4.1	66.2	123	75%	1.25	13.22	3.03	0.10	1.01	0.008	0.089	0.020	0.001	0.007
NC8A	Mobile Generator (JP-8)	2	8.3	16.6	123	75%	1.25	13.22	3.03	0.10	1.01	0.002	0.022	0.005	0.000	0.002
NC10A1	Towed Generator (JP-8)	10	6.6	66.2	220	75%	1.25	13.22	3.03	0.10	1.01	0.015	0.159	0.036	0.001	0.012
NC10C	Towed Generator (JP-8)	1	16.6	16.6	215	75%	1.25	13.22	3.03	0.10	1.01	0.004	0.039	0.009	0.000	0.003
AM47A4	Air Start Unit (JP-8)	8	3.9	31.4	550	100%	1.25	13.22	3.03	0.10	1.01	0.024	0.251	0.058	0.002	0.019
GTE851	Air Start Unit (JP-8)	12	4.4	52.3	250	100%	1.25	13.22	3.03	0.10	1.01	0.018	0.190	0.044	0.001	0.015
AM32C17	Portable AC Unit (JP-8)	9	7.4	66.2	200	75%	1.25	13.22	3.03	0.10	1.01	0.014	0.145	0.033	0.001	0.011
AS32M14	8.5 Ton Mobile Crane (JP-8)	1	60.0	60.0	123	75%	1.25	13.22	3.03	0.10	1.01	0.008	0.081	0.018	0.001	0.006
AM27T5	Hydraulic Test Stand (JP-8)	8	37.5	300.0	97	85%	1.25	13.22	3.03	0.10	1.01	0.034	0.360	0.083	0.003	0.028
AM42M2	Portable Light Set (JP-8)	7	22.5	157.5	36	100%	1.25	13.22	3.03	0.10	1.01	0.008	0.083	0.019	0.001	0.006
waterdemon	Demineralization Cart (gas)	4	60.0	240.0	5	100%	23.09	0.81	670.70	0.27	0.22	0.031	0.001	0.887	0.000	0.000
GSE Equipment Totals				5,535								1.116	3.940	16.688	0.041	0.387

Notes: hp = horsepower

Equipment identifications, number of items, engine sizes, and fuel type data provided by NAWS China Lake personnel

Annual ground support equipment use estimates are based on Table D1-43.

Load factors were selected to produce reasonable in-use load ratings for the equipment type and its normal use, using typical in-use horsepower load data from U.S. Environmental Protectioı Agency (1991) as comparison values.

Emission rates for tow tractors operating on JP fuel are based on diesel equipment emission rates from U.S. Environmental Protection Agency (1991), multiplied by a JP-5 adjustment facto (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

Emission rates for portable diesel engine equipment operated on JP fuel are based on diesel emission rates (U.S. Environmental Protection Agency, 1995) multiplied by a JP-5 adjustmer factor (Castro, 1997): 10% increase for ROG, 6% decrease for NOx, no change for CO, and 1% increase for PM10.

The sulfur oxide emission rate for tow tractors and portable equipment using JP fuel is based on manufacturer data for 80 horsepower hydraulic test stand equipment (Castro 1997)

Emission rates for gasoline-fueled tow tractors are based on U.S. Environmental Protection Agency (1991) data for airport service vehicles, including EPA in-use adjustments

Emission rates for other gasoline-fueled equipment is based on U.S. Environmental Protection Agency (1991) data for light commercial engine equipment, including EPA in-use adjustments

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions From NAS Lemoore "Huffers" and TSE.

U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emission Study - Report. (ANR-443). (NTIS # PB92126960)

U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42)

TABLE D1-47. MONTHLY TEMPERATURE PATTERNS USED TO ESTIMATE JET FUEL VOLATILITY

		MONTHLY MEAN AIR TEMPERATURE VALUES, DEGREES FAHRENHEIT												
LOCATION	PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
NAWS CHINA LAKE	MEAN MAX	57	63	69	78	85	96	103	100	94	82	68	60	80
	MEAN MIN	31	36	41	49	56	65	72	69	62	51	38	31	50
	MIDPOINT	44	49.5	55	63.5	70.5	80.5	87.5	84.5	78	66.5	53	45.5	65
TEMP FOR JP-8 VOLATILITY:		40	50	60	60	70	80	90	80	80	70	50	50	

	TEMPERATURE FOR VOLATILITY CALCULATIONS					
	40	50	60	70	80	90
NUMBER OF MONTHS	1	3	2	2	3	1

Data Source:
WeatherDisc Associates. 1990. Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1. CD-ROM.

TABLE D1-48. AP-42 EMISSION RATE EQUATION FOR VAPOR DISPLACEMENT DURING FUEL TRANSFERS

EF = 12.46*S*VP*MW/T = LBS/1,000 GALLONS TRANSFERRED
S = SATURATION FACTOR (AP-42 SECT. 5.2, TABLE 5.2-1)
VP = TRUE VAPOR PRESSURE, LBS/SQ INCH ABSOLUTE (psia) [AP-42 SECT. 7.1, TABLE 7.1-2]
MW = MOLECULAR WEIGHT OF VAPORS (LBS/MOLE) [AP-42 SECT. 7.1, TABLE 7.1-2]
T = FUEL TEMPERATURE IN DEGREES RANKIN (R = 460+F) [or more accurately, R = 459.67+F]

SATURATION FACTORS, AP-42 TABLE 5.2-1:

LOADING MODE	CONTAINER	S FACTOR
SUBMERGED, CLEAN TANK	TRUCK/RAIL TANK	0.50
SUBMERGED, DEDICATED NORMAL SERVICE	TRUCK/RAIL TANK	0.60
SUBMERGED, DEDICATED VAPOR BALANCE SERVICE	TRUCK/RAIL TANK	1.00
SPLASH, CLEAN TANK	TRUCK/RAIL TANK	1.45
SPLASH, DEDICATED NORMAL SERVICE	TRUCK/RAIL TANK	1.45
SPLASH, DEDICATED VAPOR BALANCE SERVICE	TRUCK/RAIL TANK	1.00
SUBMERGED LOADING	SHIP	0.20
SUBMERGED LOADING	BARGE	0.50

FUEL PROPERTIES, AP-42 TABLE 7.1-2:

PROPERTY	UNITS	GASOLINE RVP 13	GASOLINE RVP 10	GASOLINE RVP 7	CRUDE OIL RVP 5	JP-4	JP-5	FUEL OIL #2	RESIDUAL OIL #6
MW OF VAPOR AT 60 F	lb/mole	62	66	68	50	80	130	130	190
CONDENSED VAPOR DENSITY	lb/gal	4.9	5.1	5.2	4.5	5.4	6.1	6.1	6.4
LIQUID DENSITY	lb/gal	5.6	5.6	5.6	7.1	6.4	7.0	7.1	7.9
TRUE VAPOR PRESSURE BY TEMPERATURE									
40 degrees F	psi	4.7	3.4	2.3	1.8	0.8	0.0041	0.0031	0.00002
50 degrees F	psi	5.7	4.2	2.9	2.3	1.0	0.0060	0.0045	0.00003
60 degrees F	psi	6.9	5.2	3.5	2.8	1.9	0.0085	0.0074	0.00004
70 degrees F	psi	8.3	6.2	4.3	3.4	1.6	0.0110	0.0090	0.00006
80 degrees F	psi	9.9	7.4	5.2	4.0	1.9	0.0150	0.0120	0.00009
90 degrees F	psi	11.7	8.8	6.2	4.8	2.4	0.0210	0.0160	0.00130
100 degrees F	psi	13.8	10.5	7.4	5.7	2.7	0.0290	0.0220	0.00190

TABLE D1-49. EMISSIONS FROM VAPOR DISPLACEMENT DURING AIRCRAFT REFUELING

SOURCE CATEGORY	TYPICAL SIZE OR QUANTITY	SIZE UNITS	STANDARD EMISSION FACTORS ROG	NOx	CO	SOx	PM10	EMISSION FACTOR UNITS
JP-5 AIRCRAFT FUEL TRANSFERS, 40 F	1	MILLION GALLONS	19.26	0.00	0.00	0.00	0.00	LBS/MILLION GAL
JP-5 AIRCRAFT FUEL TRANSFERS, 50 F	1	MILLION GALLONS	27.63	0.00	0.00	0.00	0.00	LBS/MILLION GAL
JP-5 AIRCRAFT FUEL TRANSFERS, 60 F	1	MILLION GALLONS	38.39	0.00	0.00	0.00	0.00	LBS/MILLION GAL
JP-5 AIRCRAFT FUEL TRANSFERS, 70 F	1	MILLION GALLONS	48.75	0.00	0.00	0.00	0.00	LBS/MILLION GAL
JP-5 AIRCRAFT FUEL TRANSFERS, 80 F	1	MILLION GALLONS	65.24	0.00	0.00	0.00	0.00	LBS/MILLION GAL
JP-5 AIRCRAFT FUEL TRANSFERS, 90 F	1	MILLION GALLONS	89.68	0.00	0.00	0.00	0.00	LBS/MILLION GAL
JP-5 AIRCRAFT FUEL TRANSFERS, 100 F	1	MILLION GALLONS	121.63	0.00	0.00	0.00	0.00	LBS/MILLION GAL

TABLE D1-50. BASELINE JP USAGE AT NAWS CHINA LAKE

MONTH	AVE TEMP (F)	TOTAL GALLONS	FUEL USED FOR NON-AICRCAFT PURPOSES: FUEL NOT IN JPT-1 OR JPT-2	GSE EQUIPMENT DELIVERIES	FIRE DEPT DELIVERIES	TEST FIRE PIT DELIVERIES	WSL TANK DELIVERIES	TOTAL OTHER FUEL DELIVERIES	TOTAL FUEL FOR AIRCRAFT
JANUARY	40	581,683		1,190	1,188	4878		7,256	574,427
FEBRUARY	50	722,432		1,190		4878	4,007	10,075	712,357
MARCH	60	745,461		1,190		4878		6,068	739,393
APRIL	60	747,339		1,190	1,188	4878	4,007	11,263	736,076
MAY	70	764,426		1,190		4878		6,068	758,358
JUNE	80	772,820		1,190		4878	4,007	10,075	762,745
JULY	90	248,887		1,190	1,188	4878		7,256	241,631
AUGUST	80	720,409	4,998	1,190		4878	4,007	10,075	705,336
SEPTEMBER	80	656,165	3,810	1,190		4878		6,068	646,287
OCTOBER	70	864,154	8,155	1,190	1,187	4878		7,255	848,744
NOVEMBER	50	797,158	4,304	1,190		4878	4,008	10,076	782,778
DECEMBER	50	562,898		1,190		4878		6,067	556,831
TOTALS		8,183,832	21,267	14,280	4,751	58,536	20,036	97,602	8,064,963

NOTES

Total Gallons = Average of gallons received and gallons issued by month

Ave Temperature, obtained from Weatherdisc Associates, rounded to nearest 10 degrees for emission calculation purposes.

For new fuel facility, in use August Through December 1996, all fuel in tanks JPT-1 and JPT-2 assumed to be used for aircraft refueling activities

Deliveries of 14,279 gallons for GSE equipment, 4751 gallons for fire department tank, 58536 gallons for test fire pits, and 20036 gallons for Weapons Survivability fuel tank subtracted from total gallons issued. Gallons partitioned over the calendar year equally or based on number of deliveries (I.e., 4 deliveries = 1 delivery per quarter).

TABLE D1-51. TOTAL FUEL USAGE BY TEMPERATURE

TEMP (f)	AIRCRAFT REFUELING	MISC REFUELING (NON-AIRCRAFT)	TOTAL FUEL FARM TANK THROUGHPUT
40	574,427	7,256	581,683
50	2,051,966	26,218	2,082,488
60	1,475,469	17,331	1,492,800
70	1,607,102	13,323	1,628,580
80	2,114,368	26,218	2,149,394
90	241,631	7,256	248,887
	8,064,963	97,602	8,183,832

TABLE D1-52. FUEL TRANSFER EMISSIONS FOR THE NO ACTION ALTERNATIVE

	Quantity of Fuel (gal)	ROG Emissions lb/yr	ROG Emissions tpy
Tanker truck refilling[1]	8064963	362.37	0.1812
Aircraft refueling[1]	8064963	362.37	0.1812
Misc. equipment fueling	97602	4.54	0.0023
Defueling[2]	342551	64.15	0.0321
Fuel farm tank filling	8183832	152.27	0.0761
TOTAL FOR NO ACTION ALTERNATIVE		945.7	0.4729
% Increase for Limited Expansion Alternative: 15			
TOTAL FOR LIMITED EXPANSION ALTERNATIVE		1087.555	0.543835
% Increase for Moderate Expansion Alternative: 25			
TOTAL FOR MODERATE EXPANSION ALTERNATIVE		1182.125	0.591125

[1] Fuel quantity equal to the average of gallons received and the gallons issued at the fuel farm

[2] Defueling assumes four transfers of the same quantity of ruel: aircraft to tanker truck, tanker truck to fuel tank, fuel tank to tanker truck, tanker truck to other equipment on base

Information provided by China Lake:

Fuel farm facility records

E-mail from Reuben Gomez to Brenda Mohn regarding deliveries to other tanks and equipment

Emission calculation method:

AP-42 emission factors (Section 5.2 and 7.1) for fuel dispensing operations

Emissions calculated by multiplying estimated fuel throughputs by emission factors.

Emission calculated include transfering fuel from fuel farm to tanker trucks, from tanker trucks to aircraft, from tanker trucks to other equipment, from defueling operations, and from filling fuel farm tanks.

APPENDIX D2 - EMISSIONS ASSOCIATED WITH RANGE OPERATIONS

D2.1 INTRODUCTION

This appendix contains documentation for the analysis of emissions associated with range-related flight activity at NAWS. Documentation for analyses of other CLUMP-related emission sources at NAWS are presented in Appendix D1 (Armitage Airfield operations); Appendix D3 (sources associated with ground troop training exercises); and Appendix D4 (emissions associated with ordnance use and testing). In addition, Appendix D5 contains a discussion of Clean Air Act conformity requirements promulgated by the US Environmental Protection Agency (EPA), a record of nonapplicability (RONA) for the Limited Expansion Alternative, and a RONA for the Moderate Expansion Alternative.

Emission sources covered in this range operations appendix include: flight operations associated with aircrew training, ground troop training, and test and evaluation programs at NAWS; and use of portable generators to support range operations. Aircraft emission estimates have been prepared in a manner consistent with, but more detailed than, procedures outlined in US Environmental Protection Agency (1992). Most emission rate data has been taken from various documents prepared by the Navy's Aircraft Environmental Support Office (AESO). To be consistent with normal emission inventory procedures, only emission released within 3,000 feet of ground level are included in the emissions analyses.

Emission summaries for range-related flight activity are presented in Table D2-21. Emission estimates for field generators used to support range operations are presented in Table D2-22 (No Action Alternative). The baseline emissions for field generators are extrapolated to future conditions by assuming a 15% increase of the Limited Expansion Alternative and a 25% increase for the Moderate Expansion Alternative. These emissions are summarized in Tables D2-23 and D2-24.

D2.2 RANGE-RELATED FLIGHT OPERATIONS

Flight Activity Estimates

Flight activity analyses for the NAWS ranges are based on a combination of radar flight track analyses and NAWS staff estimates of the relative distribution of flight activity over various range sub-areas. An analysis of radar tapes for 3 months of flight activity (in 1996) was conducted by Wyle Research (1998).

Radar track segments were identified by aircraft type, altitude, range management unit, air speed, and time spent within altitude zones over individual management units. Flight tracks within 3,000 feet of ground level were eliminated from the Armitage Airfield and Mainsite areas to avoid double-counting flight operations associated with Armitage Airfield. Estimated average air speed and power settings were then identified for each aircraft type to simplify noise-modeling analyses. The data derived from the 3-month period in 1996 were then extrapolated to an annual basis. The nature of the radar track data precludes separation of aircrew training flights from ground troop training flights or test and evaluation flights.

The radar tape analysis produced a distribution of flight activity by range management unit that NAWS staff considered somewhat unrepresentative of actual patterns. In general, flight activity over the South Range seemed to be significantly underestimated. In addition, flight activity over portions of the North Range seemed to be overestimated. NAWS staff made independent estimates of aircraft operations and average flight durations within various range subunits. These estimates were converted into adjustment factors which were applied to the Wyle Research (1998) radar tape analysis estimates of flight time within the different management units of the China Lake ranges.

Wyle Research Analysis. Baseline flight activity over the NAWS range areas has been evaluated by Wyle Research (1998) as part of a recent noise study. Radar tapes for 3 months of 1996 flight activity were analyzed and plotted. Figure 1.5-6 in the noise study report by Wyle Research (see Appendix C) shows the plot of flight tracks produced by that analysis.

Table D2-1 summarizes the Wyle Research (1998) data for 1996 conditions. The UH/HH-1 helicopter designation represents a combination of UH-1 and HH-1N helicopters. The A-6/EA-6B aircraft designation represents a combination of A-6E and EA-6B aircraft models. The F-14 aircraft designation represents a combination of F-14A and F-14B/D models. These model variations were not important for modeling aircraft noise levels, but they are important for estimating aircraft emissions.

NAWS Adjustments. Table D2-2 summarizes the adjusted flight-hour estimates for the No Action Alternative. As can be seen by comparison with Table D2-1, low altitude flight-hour estimates for the North Range have been significantly reduced from the estimate generated by the radar tape analysis. In contrast, low altitude flight hour estimates for the South Range have been significantly increased over the estimate generated by the radar tape analysis.

In addition to adjusting the radar tape analysis data, Table D2-2 has split the various lumped helicopter and aircraft categories into the component models that have different engines. The UH-1L/HH-1N category was split as 25% UH-1L, 75% HH-1N. Under the No Action Alternative, baseline A-6E flight hours have been converted into F/A-18 flight hours. In addition, total F/A-18 flight hours have been split into F/A-18A-D model hours (48% of the total) and F/A-18E/F model hours (52% of the total).

Table D2-3 converts the No Action Alternative estimate of range-related flight activity into a projection for the Limited Expansion Alternative. Table D2-3 was developed by increasing all data in Table D2-2 by 15%. Table D2-4 (Moderate Expansion Alternative) was developed by increasing all data in Table D2-2 by 25%.

Aircraft Emissions Analyses

Appendix D1 included a discussion of emission rate data availability for aircraft and helicopter engines. That discussion and Table D1-23 in Appendix D1 should be consulted for identification of engine models in different aircraft models and substitute engine models used for aircraft emissions analyses.

Table D2-5 summarizes the power settings, fuel flow rates, and emission rate data used to evaluate emissions associated with range-related flight activity. Power setting assumptions shown in Table D2-5 for some aircraft models differ from those identified by Wyle Research for noise modeling purposes. The power setting assumptions presented in Table D2-5 are based on AESO recommendations for low altitude range operations. The PM_{10} emission rate for F-4 aircraft has been estimated using a regression equation derived from AESO data (Figure D2-1). The power settings, fuel flow rates, and emission rates presented in Table D2-5 have been used for all of the range-related flight activity emissions analyses.

The analysis of emissions from range-related flight activity is presented as a series of tables for each activity scenario. Tables D2-6 through D2-10 present the emissions analysis for the No Action Alternative by major pollutant. Tables D2-11 through D2-15 present the analysis of the Limited Expansion Alternative. Table D2-16 through D2-20 present analysis of the Moderate Expansion Alternative.

Table D2-21 provides a summary of emissions from range-related flight activity under each of the alternatives.

D2.3 GENERATORS SUPPORTING RANGE OPERATIONS

NAWS staff provided an inventory of diesel generators used to provide power for equipment used at test sites or during range operations. Fuel delivery logs provided by NAWS staff, were correlated with the generator inventory and used to develop emission estimates for generators used to support range operations. Most of the generators are used in the North Range.

Table D2-22 presents generator emissions by county for the North Range and South Range. For purposes of this EIS, 30% of the South Range generator emissions are allocated to the Searles Valley PM_{10} nonattainment area. The remaining 70% are allocated to the Mojave Desert PM_{10} nonattainment area. Tables D2-23 and D2-24 present the emissions for the Limited Expansion and Moderate Expansion Alternatives.

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TABLE D2-1. WYLE RESEARCH ESTIMATE OF ANNUAL RANGE-RELATED FLIGHT OPERATIONS AT NAWS CHINA LAKE: 1996 CONDITIONS

	ALTITUDE (AGL) OF RADAR TRACK	AH-1W, 100% RPM, 100 KNOTS			UH/HH-1, 100% RPM, 80 KNOTS			CH-46, 94% QBPA, 130 KNOTS			CH-53E, 90% QBPA, 150 KNOTS		
SUBAREA	FLIGHT SEGMENT	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
Airport Lake	< 2,000 FT	16	24.0	6.40	24	3.0	1.20			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00	4	37.0	2.47			0.00
	4,000 - 5,000 FT			0.00			0.00	4	42.0	2.80			0.00
	5,000 - 10,000 FT			0.00			0.00	4	43.0	2.87			0.00
	> 10,000 FT	16	1.0	0.27			0.00			0.00			0.00
Baker North	< 250 FT	24	20.0	8.00	8	16.0	2.13	16	14.0	3.73			0.00
	250 - 500 FT	8	8.0	1.07	8	4.0	0.53	8	33.0	4.40			0.00
	500 - 1,000 FT	4	1.0	0.07			0.00	20	55.0	18.33			0.00
	1,000 - 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00	4	37.0	2.47			0.00
	4,000 - 5,000 FT			0.00			0.00	8	20.0	2.67			0.00
	5,000 - 10,000 FT			0.00			0.00	8	21.0	2.80			0.00
	> 10,000 FT	16	6.0	1.60			0.00			0.00	4	11.0	0.73
Baker South	< 250 FT	4	29.0	1.93	12	2.0	0.40	4	11.0	0.73			0.00
	250 - 500 FT	8	18.0	2.40	12	1.0	0.20	4	12.0	0.80	4	9.0	0.60
	500 - 1,000 FT	8	9.0	1.20	8	1.0	0.13	4	11.0	0.73	4	13.0	0.87
	1,000 - 2,000 FT			0.00			0.00	4	12.0	0.80	8	7.0	0.93
	2,000 - 3,000 FT			0.00			0.00	8	6.0	0.80	8	6.0	0.80
	3,000 - 4,000 FT			0.00			0.00	8	7.0	0.93	4	1.0	0.07
	4,000 - 5,000 FT			0.00			0.00	4	2.0	0.13			0.00
	5,000 - 10,000 FT			0.00			0.00	8	19.0	2.53	4	15.0	1.00
	> 10,000 FT			0.00			0.00			0.00	4	15.0	1.00
Charlie North	< 250 FT	36	34.0	20.40	12	8.0	1.60	28	38.0	17.73			0.00
	250 - 500 FT	8	6.0	0.80	8	7.0	0.93	24	37.0	14.80			0.00
	500 - 1,000 FT	4	1.0	0.07			0.00	20	67.0	22.33			0.00
	1,000 - 2,000 FT			0.00			0.00	4	32.0	2.13			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00	4	37.0	2.47			0.00
	> 10,000 FT	16	3.0	0.80			0.00			0.00			0.00
Charlie South	< 250 FT	63	35.0	36.75	28	27.0	12.60	32	69.0	36.80			0.00
	250 - 500 FT	24	18.0	7.20	36	12.0	7.20	40	53.0	35.33			0.00
	500 - 1,000 FT	8	10.0	1.33	8	2.0	0.27	28	60.0	28.00	4	1.0	0.07
	1,000 - 2,000 FT	4	1.0	0.07			0.00	4	1.0	0.07			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00	4	1.0	0.07
	3,000 - 4,000 FT			0.00			0.00			0.00	4	1.0	0.07
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00	4	42.0	2.80	4	1.0	0.07
	> 10,000 FT	16	4.0	1.07			0.00			0.00			0.00

TABLE D2-1. WYLE RESEARCH ESTIMATE OF ANNUAL RANGE-RELATED FLIGHT OPERATIONS AT NAWS CHINA LAKE: 1996 CONDITIONS

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	AH-1W, 100% RPM, 100 KNOTS			UH/HH-1, 100% RPM, 80 KNOTS			CH-46, 94% QBPA, 130 KNOTS			CH-53E, 90% QBPA, 150 KNOTS		
		SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
Coso	< 2,000 FT	12	4.0	0.80	24	19.0	7.60			0.00			0.00
	2,000 - 3,000 FT			0.00	4	2.0	0.13			0.00			0.00
	3,000 - 4,000 FT			0.00	4	22.0	1.47	4	1.0	0.07			0.00
	4,000 - 5,000 FT			0.00	4	24.0	1.60	4	20.0	1.33			0.00
	5,000 - 10,000 FT			0.00	4	20.0	1.33	4	1.0	0.07			0.00
	> 10,000 FT			0.00	4	2.0	0.13	4	1.0	0.07			0.00
Coso Targets	< 2,000 FT	12	39.0	7.80	20	18.0	6.00	4	10.0	0.67			0.00
	2,000 - 3,000 FT	4	2.0	0.13	4	31.0	2.07	4	10.0	0.67			0.00
	3,000 - 4,000 FT	4	1.0	0.07	4	27.0	1.80	4	39.0	2.60			0.00
	4,000 - 5,000 FT			0.00	4	26.0	1.73	4	39.0	2.60			0.00
	5,000 - 10,000 FT			0.00	4	11.0	0.73	4	41.0	2.73			0.00
	> 10,000 FT			0.00	4	4.0	0.27	4	21.0	1.40			0.00
Geothermal	< 2,000 FT			0.00	4	1.0	0.07			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00	4	19.0	1.27			0.00
	4,000 - 5,000 FT			0.00			0.00	4	19.0	1.27			0.00
	5,000 - 10,000 FT			0.00	4	1.0	0.07			0.00			0.00
	> 10,000 FT	16	1.0	0.27			0.00			0.00			0.00
George &	< 2,000 FT	20	40.0	13.33	28	17.0	7.93	4	2.0	0.13			0.00
Main Magazine	2,000 - 3,000 FT			0.00			0.00	4	1.0	0.07			0.00
	3,000 - 4,000 FT			0.00			0.00	4	13.0	0.87			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00	4	31.0	2.07	4	11.0	0.73
	> 10,000 FT	16	3.0	0.80			0.00			0.00	4	1.0	0.07
Mainsite &	< 2,000 FT			0.00			0.00			0.00			0.00
Armitage	2,000 - 3,000 FT	4	1.0	0.07			0.00			0.00			0.00
Airfield	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT	16	1.0	0.27			0.00			0.00	4	6.0	0.40
	> 10,000 FT	16	4.0	1.07			0.00			0.00	4	2.0	0.13
Propulsion Labs	< 2,000 FT	12	1.0	0.20	36	3.0	1.80			0.00			0.00
& Ordnance T&E	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00	4	7.0	0.47
	> 10,000 FT			0.00			0.00			0.00	4	2.0	0.13
Mojave B North	< 2,000 FT			0.00	8	4.0	0.53			0.00			0.00
	2,000 - 3,000 FT			0.00	12	13.0	2.60			0.00			0.00
	3,000 - 4,000 FT			0.00	8	2.0	0.27			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00			0.00
	> 10,000 FT			0.00			0.00			0.00			0.00

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SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	AH-1W, 100% RPM, 100 KNOTS			UH/HH-1, 100% RPM, 80 KNOTS			CH-46, 94% QBPA, 130 KNOTS			CH-53E, 90% QBPA, 150 KNOTS		
		SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
Mojave B South	< 2,000 FT			0.00	4	53.0	3.53			0.00			0.00
	2,000 - 3,000 FT	4	8.0	0.53	4	48.0	3.20	4	4.0	0.27			0.00
	3,000 - 4,000 FT	4	8.0	0.53	4	47.0	3.13	4	1.0	0.07			0.00
	4,000 - 5,000 FT			0.00			0.00	4	1.0	0.07			0.00
	5,000 - 10,000 FT	4	11.0	0.73			0.00	4	1.0	0.07			0.00
	> 10,000 FT	4	26.0	1.73			0.00	8	13.0	1.73			0.00
Randsburg Wash	< 2,000 FT	4	1.0	0.07	12	35.0	7.00			0.00			0.00
	2,000 - 3,000 FT			0.00	4	48.0	3.20			0.00			0.00
	3,000 - 4,000 FT			0.00	4	54.0	3.60			0.00			0.00
	4,000 - 5,000 FT			0.00	4	3.0	0.20			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00			0.00
	> 10,000 FT	4	1.0	0.07			0.00	4	1.0	0.07			0.00
Superior Valley	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT	4	5.0	0.33			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT	4	12.0	0.80			0.00	8	6.0	0.80			0.00
	> 10,000 FT	4	27.0	1.80			0.00	8	13.0	1.73			0.00
NORTH RANGE SUBTOTAL	< 2,000 FT	275		109.82	276		50.60	248		187.53	20		2.47
	2,000 - 3,000 FT	8		0.20	8		2.20	16		1.53	12		0.87
	3,000 - 4,000 FT	4		0.07	8		3.27	32		10.67	8		0.13
	4,000 - 5,000 FT	0		0.00	8		3.33	28		10.80	0		0.00
	5,000 - 10,000 FT	16		0.27	12		2.13	40		18.33	20		2.67
	> 10,000 FT	112		5.87	8		0.40	8		1.47	20		2.07
	Subtotal	415		116.22	320		61.93	372		230.33	80		8.20
	Below 3,000 Ft	283		110.02	284		52.80	264		189.07	32		3.33
	% of Subtotal	68.19%		94.67%	88.75%		85.25%	70.97%		82.08%	40.00%		40.65%
SOUTH RANGE SUBTOTAL	< 2,000 FT	4		0.07	24		11.07	0		0.00	0		0.00
	2,000 - 3,000 FT	8		0.87	20		9.00	4		0.27	0		0.00
	3,000 - 4,000 FT	4		0.53	16		7.00	4		0.07	0		0.00
	4,000 - 5,000 FT	0		0.00	4		0.20	4		0.07	0		0.00
	5,000 - 10,000 FT	8		1.53	0		0.00	12		0.87	0		0.00
	> 10,000 FT	12		3.60	0		0.00	20		3.53	0		0.00
	Subtotal	36		6.60	64		27.27	44		4.80	0		0.00
	Below 3,000 Ft	12		0.93	44		20.07	4		0.27	0		0.00
	% of Subtotal	33.33%		14.14%	68.75%		73.59%	9.09%		5.56%	#N/A		#N/A

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	ALTITUDE (AGL) OF RADAR TRACK	AH-1W, 100% RPM, 100 KNOTS			UH/HH-1, 100% RPM, 80 KNOTS			CH-46, 94% QBPA, 130 KNOTS			CH-53E, 90% QBPA, 150 KNOTS		
SUBAREA	FLIGHT SEGMENT	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
COMBINED	< 2,000 FT	279		109.88	300		61.67	248		187.53	20		2.47
NORTH AND	2,000 - 3,000 FT	16		1.07	28		11.20	20		1.80	12		0.87
SOUTH RANGES	3,000 - 4,000 FT	8		0.60	24		10.27	36		10.73	8		0.13
	4,000 - 5,000 FT	0		0.00	12		3.53	32		10.87	0		0.00
	5,000 - 10,000 FT	24		1.80	12		2.13	52		19.20	20		2.67
	> 10,000 FT	124		9.47	8		0.40	28		5.00	20		2.07
	TOTALS	451		122.82	384		89.20	416		235.13	80		8.20
	BELOW 3,000 FT	295		110.95	328		72.87	268		189.33	32		3.33
	% OF TOTAL	65.41%		90.34%	85.42%		81.69%	64.42%		80.52%	40.00%		40.65%
CONFORMITY ANALYSIS AREA SUBTOTALS BELOW 3,000 FEET AGL:													
Kern County Ozone Nonattainment Area		125		52.28	107		21.59	129		104.09	32		3.33
Owens Valley PM10 Nonattainment Area		8		3.97	12		4.03	4		0.67	0		0.00
Searles Valley PM10 Nonattainment Are		269		104.34	261		47.11	259		188.22	32		3.33
Mojave Desert PM10 Nonattainment Are		11		0.87	39		17.26	4		0.24	0		0.00
Inyo County Attainment Area		8		1.78	15		4.46	1		0.20	0		0.00
TOTALS CROSS-CHECK:		451		122.82	384		89.20	416		235.13	80		8.20
BELOW 3,000 FEET CROSS-CHECK:		295		110.95	328		72.87	268		189.33	32		3.33

NOTES:

Data based on Wyle (1998) analysis and plotting of radar flight tracks; power setting and airspeed estimates are those presented in Wyle (1998).
Wyle (1998) data incorporate initial adjustments to exclude flight operations associated with Armitage Airfield from the range-related flight activity analysis
Kern County ozone nonattainment area includes Baker South, Charlie South, 10% of George/Main Magazines, and 95% of Mainsite/Armitage Airfield
Owens Valley PM10 nonattainment area includes 50% of the Coso Targets area.
Mojave Desert PM10 nonattainment area includes 97% of Mojave B North, 90% of Mojave B South, 80% of Randsburg Wash, and Superior Valley
Inyo County attainment area includes 15% of Coso Targets, 40% of Coso Range, and 2% of George/Main Magazine
Searles Valley PM10 nonattainment area determined by difference (Total of North and South Ranges less Owens Valley, Inyo County attainment, and Mojave Desert)

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	OH-58, 100% RPM, 100 KNOTS			F/A-18, 85% RPM, 400 KNOTS			F-16, 87% RPM, 450 KNOTS			AV-8, 75% RPM, 350 KNOTS		
		SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
Airport Lake	< 2,000 FT			0.00	60	13.0	13.00	4	13.0	0.87	12	12.0	2.40
	2,000 - 3,000 FT			0.00	56	23.0	21.47	4	1.0	0.07	12	9.0	1.80
	3,000 - 4,000 FT			0.00	56	17.0	15.87	4	1.0	0.07	4	27.0	1.80
	4,000 - 5,000 FT			0.00	67	13.0	14.52			0.00	8	20.0	2.67
	5,000 - 10,000 FT			0.00	107	22.0	39.23	16	9.0	2.40	24	21.0	8.40
	> 10,000 FT			0.00	187	16.0	49.87	12	28.0	5.60	36	16.0	9.60
Baker North	< 250 FT			0.00			0.00			0.00			0.00
	250 - 500 FT			0.00	8	8.0	1.07			0.00	4	5.0	0.33
	500 - 1,000 FT			0.00	32	7.0	3.73			0.00	8	3.0	0.40
	1,000 - 2,000 FT			0.00	67	10.0	11.17			0.00	28	9.0	4.20
	2,000 - 3,000 FT			0.00	52	14.0	12.13			0.00	16	7.0	1.87
	3,000 - 4,000 FT			0.00	60	9.0	9.00			0.00	12	1.0	0.20
	4,000 - 5,000 FT			0.00	36	6.0	3.60			0.00	12	1.0	0.20
	5,000 - 10,000 FT			0.00	127	9.0	19.05	8	19.0	2.53	48	20.0	16.00
	> 10,000 FT			0.00	262	17.0	74.23	16	24.0	6.40	95	17.0	26.92
Baker South	< 250 FT			0.00	4	6.0	0.40	4	10.0	0.67	28	9.0	4.20
	250 - 500 FT			0.00	48	10.0	8.00	4	10.0	0.67	44	10.0	7.33
	500 - 1,000 FT			0.00	83	14.0	19.37	4	10.0	0.67	119	9.0	17.85
	1,000 - 2,000 FT			0.00	151	13.0	32.72	4	10.0	0.67	139	16.0	37.07
	2,000 - 3,000 FT			0.00	175	13.0	37.92	4	9.0	0.60	155	19.0	49.08
	3,000 - 4,000 FT			0.00	191	11.0	35.02	4	11.0	0.73	139	21.0	48.65
	4,000 - 5,000 FT			0.00	171	16.0	45.60	4	11.0	0.73	139	22.0	50.97
	5,000 - 10,000 FT			0.00	286	18.0	85.80	8	23.0	3.07	147	26.0	63.70
	> 10,000 FT			0.00	278	29.0	134.37	16	24.0	6.40	127	22.0	46.57
Charlie North	< 250 FT			0.00	8	24.0	3.20			0.00	4	1.0	0.07
	250 - 500 FT			0.00	12	11.0	2.20			0.00	8	2.0	0.27
	500 - 1,000 FT			0.00	12	15.0	3.00			0.00	16	3.0	0.80
	1,000 - 2,000 FT			0.00	32	9.0	4.80			0.00	4	3.0	0.20
	2,000 - 3,000 FT			0.00	20	20.0	6.67			0.00			0.00
	3,000 - 4,000 FT			0.00	24	10.0	4.00			0.00	8	1.0	0.13
	4,000 - 5,000 FT			0.00	16	5.0	1.33			0.00	4	1.0	0.07
	5,000 - 10,000 FT			0.00	52	4.0	3.47	4	2.0	0.13	4	1.0	0.07
	> 10,000 FT			0.00	44	13.0	9.53	16	6.0	1.60	4	1.0	0.07
Charlie South	< 250 FT			0.00	12	23.0	4.60			0.00	8	1.0	0.13
	250 - 500 FT			0.00	32	7.0	3.73			0.00	24	3.0	1.20
	500 - 1,000 FT			0.00	180	6.0	18.00			0.00	44	10.0	7.33
	1,000 - 2,000 FT			0.00	445	14.0	103.83	12	1.0	0.20	143	11.0	26.22
	2,000 - 3,000 FT			0.00	365	9.0	54.75	4	1.0	0.07	95	8.0	12.67
	3,000 - 4,000 FT			0.00	199	11.0	36.48			0.00	56	3.0	2.80
	4,000 - 5,000 FT			0.00	107	9.0	16.05	4	1.0	0.07	56	2.0	1.87
	5,000 - 10,000 FT			0.00	167	13.0	36.18	12	1.0	0.20	56	12.0	11.20
	> 10,000 FT			0.00	286	17.0	81.03	24	19.0	7.60	32	3.0	1.60

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	OH-58, 100% RPM, 100 KNOTS			F/A-18, 85% RPM, 400 KNOTS			F-16, 87% RPM, 450 KNOTS			AV-8, 75% RPM, 350 KNOTS		
		SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
Coso	< 2,000 FT			0.00	63	8.0	8.40	4	8.0	0.53	16	19.0	5.07
	2,000 - 3,000 FT			0.00	56	5.0	4.67	4	1.0	0.07			0.00
	3,000 - 4,000 FT			0.00	56	7.0	6.53			0.00			0.00
	4,000 - 5,000 FT			0.00	52	7.0	6.07			0.00	4	6.0	0.40
	5,000 - 10,000 FT			0.00	135	18.0	40.50	12	38.0	7.60	32	20.0	10.67
	> 10,000 FT			0.00	250	19.0	79.17	24	19.0	7.60	48	26.0	20.80
Coso Targets	< 2,000 FT			0.00	111	12.0	22.20			0.00	44	4.0	2.93
	2,000 - 3,000 FT			0.00	111	14.0	25.90			0.00	20	13.0	4.33
	3,000 - 4,000 FT			0.00	115	15.0	28.75			0.00	28	8.0	3.73
	4,000 - 5,000 FT			0.00	119	8.0	15.87			0.00	16	14.0	3.73
	5,000 - 10,000 FT			0.00	147	11.0	26.95	4	7.0	0.47	48	13.0	10.40
	> 10,000 FT			0.00	230	14.0	53.67			0.00	48	17.0	13.60
Geothermal	< 2,000 FT			0.00	4	1.0	0.07			0.00	8	7.0	0.93
	2,000 - 3,000 FT			0.00	4	7.0	0.47			0.00			0.00
	3,000 - 4,000 FT			0.00	4	39.0	2.60			0.00			0.00
	4,000 - 5,000 FT			0.00	4	24.0	1.60	4	1.0	0.07			0.00
	5,000 - 10,000 FT			0.00	12	1.0	0.20	4	1.0	0.07	4	1.0	0.07
	> 10,000 FT			0.00	48	1.0	0.80	4	1.0	0.07	12	27.0	5.40
George & Main Magazine	< 2,000 FT			0.00	187	2.0	6.23	4	14.0	0.93	32	21.0	11.20
	2,000 - 3,000 FT			0.00	159	6.0	15.90	12	5.0	1.00	24	23.0	9.20
	3,000 - 4,000 FT			0.00	187	12.0	37.40	12	2.0	0.40	24	24.0	9.60
	4,000 - 5,000 FT			0.00	172	19.0	54.47	4	1.0	0.07	20	33.0	11.00
	5,000 - 10,000 FT			0.00	226	26.0	97.93	16	44.0	11.73	44	25.0	18.33
	> 10,000 FT			0.00	282	31.0	145.70	20	45.0	15.00	32	24.0	12.80
Mainsite & Armitage Airfield	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00	187	2.0	6.23			0.00	40	5.0	3.33
	3,000 - 4,000 FT			0.00	52	6.0	5.20			0.00	24	1.0	0.40
	4,000 - 5,000 FT			0.00	32	4.0	2.13			0.00	4	1.0	0.07
	5,000 - 10,000 FT			0.00	107	11.0	19.62			0.00	16	3.0	0.80
	> 10,000 FT			0.00	159	23.0	60.95	16	36.0	9.60	8	18.0	2.40
Propulsion Labs & Ordnance T&E	< 2,000 FT			0.00			0.00			0.00	8	1.0	0.13
	2,000 - 3,000 FT			0.00	20	1.0	0.33			0.00	8	1.0	0.13
	3,000 - 4,000 FT			0.00	12	5.0	1.00			0.00	8	1.0	0.13
	4,000 - 5,000 FT			0.00	8	1.0	0.13			0.00	8	1.0	0.13
	5,000 - 10,000 FT			0.00	56	15.0	14.00			0.00	8	19.0	2.53
	> 10,000 FT			0.00	139	31.0	71.82	4	51.0	3.40	12	44.0	8.80
Mojave B North	< 2,000 FT			0.00	111	11.0	20.35			0.00			0.00
	2,000 - 3,000 FT			0.00	135	13.0	29.25			0.00	4	1.0	0.07
	3,000 - 4,000 FT			0.00	131	13.0	28.38			0.00	4	1.0	0.07
	4,000 - 5,000 FT			0.00	123	14.0	28.70			0.00	4	1.0	0.07
	5,000 - 10,000 FT			0.00	298	16.0	79.47	20	6.0	2.00	20	21.0	7.00
	> 10,000 FT			0.00	421	15.0	105.25	20	26.0	8.67	24	40.0	16.00

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	OH-58, 100% RPM, 100 KNOTS SEGMENTS	MIN/SEG	CUM HRS	F/A-18, 85% RPM, 400 KNOTS SEGMENTS	MIN/SEG	CUM HRS	F-16, 87% RPM, 450 KNOTS SEGMENTS	MIN/SEG	CUM HRS	AV-8, 75% RPM, 350 KNOTS SEGMENTS	MIN/SEG	CUM HRS
Mojave B South	< 2,000 FT	4	3.0	0.20	103	13.0	22.32	8	1.0	0.13			0.00
	2,000 - 3,000 FT			0.00	131	6.0	13.10			0.00			0.00
	3,000 - 4,000 FT			0.00	95	3.0	4.75	4	1.0	0.07	4	1.0	0.07
	4,000 - 5,000 FT			0.00	127	2.0	4.23	8	6.0	0.80	12	7.0	1.40
	5,000 - 10,000 FT			0.00	223	6.0	22.30	24	6.0	2.40	28	8.0	3.73
	> 10,000 FT			0.00	401	11.0	73.52	16	4.0	1.07	40	28.0	18.67
Randsburg Wash	< 2,000 FT	4	1.0	0.07	123	12.0	24.60	16	1.0	0.27	12	12.0	2.40
	2,000 - 3,000 FT			0.00	195	8.0	26.00	16	1.0	0.27	8	1.0	0.13
	3,000 - 4,000 FT			0.00	210	10.0	35.00	16	1.0	0.27	12	14.0	2.80
	4,000 - 5,000 FT			0.00	179	11.0	32.82	16	1.0	0.27	20	6.0	2.00
	5,000 - 10,000 FT			0.00	306	14.0	71.40	20	16.0	5.33	28	14.0	6.53
	> 10,000 FT			0.00	453	15.0	113.25	24	25.0	10.00	56	27.0	25.20
Superior Valley	< 2,000 FT			0.00	16	11.0	2.93			0.00			0.00
	2,000 - 3,000 FT	4	1.0	0.07	64	10.0	10.67	28	14.0	6.53	8	17.0	2.27
	3,000 - 4,000 FT			0.00	115	8.0	15.33	36	17.0	10.20	24	15.0	6.00
	4,000 - 5,000 FT			0.00	151	6.0	15.10	36	18.0	10.80	32	15.0	8.00
	5,000 - 10,000 FT			0.00	223	9.0	33.45	28	24.0	11.20	36	17.0	10.20
	> 10,000 FT			0.00	306	11.0	56.10	4	1.0	0.07	36	13.0	7.80
NORTH RANGE SUBTOTAL	< 2,000 FT	0		0.00	1,551		269.72	40		5.20	741		130.27
	2,000 - 3,000 FT	0		0.00	1,205		186.43	28		1.80	370		82.42
	3,000 - 4,000 FT	0		0.00	956		181.85	20		1.20	303		67.45
	4,000 - 5,000 FT	0		0.00	784		161.37	16		0.93	271		71.10
	5,000 - 10,000 FT	0		0.00	1,422		382.93	84		28.20	431		142.17
	> 10,000 FT	0		0.00	2,165		761.13	152		63.27	454		148.55
	Subtotal	0		0.00	8,083		1,943.43	340		100.60	2,570		641.95
	Below 3,000 Ft	0		0.00	2,756		456.15	68		7.00	1,111		212.68
	% of Subtotal	#N/A		#N/A	34.10%		23.47%	20.00%		6.96%	43.23%		33.13%
SOUTH RANGE SUBTOTAL	< 2,000 FT	8		0.27	353		70.20	24		0.40	12		2.40
	2,000 - 3,000 FT	4		0.07	525		79.02	44		6.80	20		2.47
	3,000 - 4,000 FT	0		0.00	551		83.47	56		10.53	44		8.93
	4,000 - 5,000 FT	0		0.00	580		80.85	60		11.87	68		11.47
	5,000 - 10,000 FT	0		0.00	1,050		206.62	92		20.93	112		27.47
	> 10,000 FT	0		0.00	1,581		348.12	64		19.80	156		67.67
	Subtotal	12		0.33	4,640		868.27	340		70.33	412		120.40
	Below 3,000 Ft	12		0.33	878		149.22	68		7.20	32		4.87
	% of Subtotal	100.00%		100.00%	18.92%		17.19%	20.00%		10.24%	7.77%		4.04%

TABLE D2-1. WYLE RESEARCH ESTIM/

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	OH-58, 100% RPM, 100 KNOTS SEGMENTS	MIN/SEG	CUM HRS	F/A-18, 85% RPM, 400 KNOTS SEGMENTS	MIN/SEG	CUM HRS	F-16, 87% RPM, 450 KNOTS SEGMENTS	MIN/SEG	CUM HRS	AV-8, 75% RPM, 350 KNOTS SEGMENTS	MIN/SEG	CUM HRS
COMBINED	< 2,000 FT	8		0.27	1,904		339.92	64		5.60	753		132.67
NORTH AND	2,000 - 3,000 FT	4		0.07	1,730		265.45	72		8.60	390		84.88
SOUTH RANGES	3,000 - 4,000 FT	0		0.00	1,507		265.32	76		11.73	347		76.38
	4,000 - 5,000 FT	0		0.00	1,364		242.22	76		12.80	339		82.57
	5,000 - 10,000 FT	0		0.00	2,472		589.55	176		49.13	543		169.63
	> 10,000 FT	0		0.00	3,746		1,109.25	216		83.07	610		216.22
	TOTALS	12		0.33	12,723		2,811.70	680		170.93	2,982		762.35
	BELOW 3,000 FT	12		0.33	3,634		605.37	136		14.20	1,143		217.55
	% OF TOTAL	100.00%		100.00%	28.56%		21.53%	20.00%		8.31%	38.33%		28.54%
CONFORMITY ANALYSIS AREA SUBTO'													
BELOW 3,000 FEET AGL:													
Kern County Ozone Nonattainment Area		0		0.00	1,707		291.45	38		3.73	843		168.29
Owens Valley PM10 Nonattainment Area		0		0.00	111		24.05	0		0.00	32		3.63
Searles Valley PM10 Nonattainment Are:		1		0.03	2,652		434.37	72		6.84	1,066		206.03
Mojave Desert PM10 Nonattainment Are:		11		0.30	784		134.07	61		7.08	28		4.36
Inyo County Attainment Area		0		0.00	88		12.88	4		0.28	17		3.52
TOTALS CROSS-CHECK:		12		0.33	12,723		2,811.70	680		170.93	2,982		762.35
BELOW 3,000 FEET CROSS-CHECK:		12		0.33	3,634		605.37	136		14.20	1,143		217.55

NOTES:

Data based on Wyle (1998) analysis ;
Wyle (1998) data incorporate initial ac
Kern County ozone nonattainment ar
Owens Valley PM10 nonattainment a
Mojave Desert PM10 nonattainment ;
Inyo County attainment area includes
Searles Valley PM10 nonattainment ;

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	F-14, 85% RPM, 400 KNOTS SEGMENTS	MIN/SEG	CUM HRS	F-4, 98% RPM, 550 KNOTS SEGMENTS	MIN/SEG	CUM HRS	A-6/EA-6B, 90% RPM, 250 KNOTS SEGMENTS	MIN/SEG	CUM HRS	T-38, 90% RPM, 300 KNOTS SEGMENTS	MIN/SEG	CUM HRS
Airport Lake	< 2,000 FT			0.00	4	8.0	0.53			0.00			0.00
	2,000 - 3,000 FT			0.00	4	9.0	0.60	4	42.0	2.80			0.00
	3,000 - 4,000 FT			0.00			0.00	4	41.0	2.73			0.00
	4,000 - 5,000 FT			0.00			0.00	4	6.0	0.40			0.00
	5,000 - 10,000 FT	4	1.0	0.07	12	43.0	8.60			0.00			0.00
	> 10,000 FT			0.00	12	21.0	4.20			0.00			0.00
Baker North	< 250 FT			0.00			0.00			0.00			0.00
	250 - 500 FT	4	4.0	0.27			0.00			0.00			0.00
	500 - 1,000 FT	4	1.0	0.07			0.00			0.00			0.00
	1,000 - 2,000 FT	4	7.0	0.47	4	1.0	0.07			0.00			0.00
	2,000 - 3,000 FT	4	6.0	0.40	4	1.0	0.07			0.00			0.00
	3,000 - 4,000 FT			0.00	4	16.0	1.07			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT	8	27.0	3.60	12	1.0	0.20			0.00			0.00
	> 10,000 FT	24	8.0	3.20	8	1.0	0.13			0.00			0.00
Baker South	< 250 FT	12	6.0	1.20			0.00			0.00			0.00
	250 - 500 FT	16	9.0	2.40			0.00			0.00			0.00
	500 - 1,000 FT	16	22.0	5.87			0.00			0.00			0.00
	1,000 - 2,000 FT	24	21.0	8.40			0.00			0.00			0.00
	2,000 - 3,000 FT	28	20.0	9.33			0.00			0.00			0.00
	3,000 - 4,000 FT	28	21.0	9.80	8	1.0	0.13			0.00			0.00
	4,000 - 5,000 FT	28	19.0	8.87	4	1.0	0.07			0.00			0.00
	5,000 - 10,000 FT	28	32.0	14.93			0.00			0.00			0.00
	> 10,000 FT	28	29.0	13.53			0.00			0.00			0.00
Charlie North	< 250 FT			0.00			0.00			0.00			0.00
	250 - 500 FT			0.00			0.00			0.00			0.00
	500 - 1,000 FT			0.00			0.00			0.00			0.00
	1,000 - 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00			0.00
	> 10,000 FT			0.00			0.00			0.00			0.00
Charlie South	< 250 FT			0.00			0.00			0.00			0.00
	250 - 500 FT	4	3.0	0.20			0.00			0.00			0.00
	500 - 1,000 FT	8	2.0	0.27			0.00	4	1.0	0.07	4	1.0	0.07
	1,000 - 2,000 FT	8	1.0	0.13			0.00	4	1.0	0.07	4	46.0	3.07
	2,000 - 3,000 FT	8	1.0	0.13	4	1.0	0.07	4	1.0	0.07	4	1.0	0.07
	3,000 - 4,000 FT	4	1.0	0.07	4	1.0	0.07			0.00			0.00
	4,000 - 5,000 FT			0.00	4	1.0	0.07	4	1.0	0.07			0.00
	5,000 - 10,000 FT			0.00	4	1.0	0.07			0.00			0.00
	> 10,000 FT			0.00			0.00			0.00			0.00

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	F-14, 85% RPM, 400 KNOTS			F-4, 98% RPM, 550 KNOTS			A-6/EA-6B, 90% RPM, 250 KNOTS			T-38, 90% RPM, 300 KNOTS		
		SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS
Coso	< 2,000 FT	4	27.0	1.80			0.00	4	48.0	3.20			0.00
	2,000 - 3,000 FT	4	26.0	1.73			0.00	4	47.0	3.13			0.00
	3,000 - 4,000 FT	4	27.0	1.80			0.00	4	46.0	3.07			0.00
	4,000 - 5,000 FT	4	28.0	1.87			0.00	4	14.0	0.93			0.00
	5,000 - 10,000 FT	8	35.0	4.67	8	31.0	4.13	4	11.0	0.73			0.00
	> 10,000 FT	4	52.0	3.47	8	34.0	4.53			0.00			0.00
Coso Targets	< 2,000 FT			0.00			0.00	4	1.0	0.07			0.00
	2,000 - 3,000 FT			0.00			0.00	4	43.0	2.87			0.00
	3,000 - 4,000 FT			0.00			0.00	4	11.0	0.73			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00			0.00
	> 10,000 FT			0.00	8	6.0	0.80			0.00			0.00
Geothermal	< 2,000 FT			0.00			0.00	4	1.0	0.07			0.00
	2,000 - 3,000 FT			0.00			0.00	4	1.0	0.07			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00			0.00
	> 10,000 FT			0.00			0.00			0.00			0.00
George & Main Magazine	< 2,000 FT			0.00	12	1.0	0.20	4	46.0	3.07			0.00
	2,000 - 3,000 FT	4	1.0	0.07	12	1.0	0.20	4	48.0	3.20			0.00
	3,000 - 4,000 FT	4	1.0	0.07	16	5.0	1.33	4	54.0	3.60			0.00
	4,000 - 5,000 FT	4	54.0	3.60	12	12.0	2.40	4	53.0	3.53			0.00
	5,000 - 10,000 FT	4	72.0	4.80	12	47.0	9.40	4	55.0	3.67			0.00
	> 10,000 FT	8	52.0	6.93	12	47.0	9.40			0.00			0.00
Mainsite & Armitage Airfield	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00	4	1.0	0.07			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00	4	1.0	0.07
	4,000 - 5,000 FT			0.00			0.00			0.00	4	1.0	0.07
	5,000 - 10,000 FT	4	1.0	0.07			0.00			0.00	4	1.0	0.07
	> 10,000 FT	4	87.0	5.80			0.00			0.00			0.00
Propulsion Labs & Ordnance T&E	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00	4	17.0	1.13			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT	4	71.0	4.73	4	5.0	0.33			0.00			0.00
	> 10,000 FT	8	64.0	8.53	8	27.0	3.60			0.00			0.00
Mojave B North	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT	4	1.0	0.07			0.00			0.00			0.00
	4,000 - 5,000 FT	4	11.0	0.73			0.00			0.00			0.00
	5,000 - 10,000 FT	8	11.0	1.47			0.00			0.00			0.00
	> 10,000 FT	8	7.0	0.93			0.00			0.00			0.00

TABLE D2-1. WYLE RESEARCH ESTIM/

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	F-14, 85% RPM, 400 KNOTS SEGMENTS	MIN/SEG	CUM HRS	F-4, 98% RPM, 550 KNOTS SEGMENTS	MIN/SEG	CUM HRS	A-6/EA-6B, 90% RPM, 250 KNOTS SEGMENTS	MIN/SEG	CUM HRS	T-38, 90% RPM, 300 KNOTS SEGMENTS	MIN/SEG	CUM HRS
Mojave B South	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00	4	1.0	0.07
	3,000 - 4,000 FT			0.00			0.00			0.00	8	1.0	0.13
	4,000 - 5,000 FT	4	1.0	0.07			0.00			0.00	8	1.0	0.13
	5,000 - 10,000 FT			0.00			0.00			0.00	4	1.0	0.07
	> 10,000 FT			0.00			0.00			0.00	4	15.0	1.00
Randsburg Wash	< 2,000 FT			0.00			0.00			0.00			0.00
	2,000 - 3,000 FT			0.00			0.00			0.00			0.00
	3,000 - 4,000 FT			0.00			0.00			0.00			0.00
	4,000 - 5,000 FT			0.00			0.00			0.00			0.00
	5,000 - 10,000 FT			0.00			0.00			0.00			0.00
	> 10,000 FT			0.00			0.00			0.00			0.00
Superior Valley	< 2,000 FT			0.00			0.00			0.00	8	1.0	0.13
	2,000 - 3,000 FT			0.00			0.00			0.00	36	11.0	6.60
	3,000 - 4,000 FT			0.00			0.00			0.00	40	12.0	8.00
	4,000 - 5,000 FT			0.00			0.00			0.00	40	11.0	7.33
	5,000 - 10,000 FT			0.00			0.00			0.00	40	12.0	8.00
	> 10,000 FT			0.00			0.00			0.00	4	21.0	1.40
NORTH RANGE SUBTOTAL	< 2,000 FT	104		21.07	20		0.80	24		6.53	8		3.13
	2,000 - 3,000 FT	48		11.67	24		0.93	28		12.20	4		0.07
	3,000 - 4,000 FT	40		11.73	36		3.73	16		10.13	4		0.07
	4,000 - 5,000 FT	36		14.33	20		2.53	16		4.93	4		0.07
	5,000 - 10,000 FT	60		32.87	52		22.73	8		4.40	4		0.07
	> 10,000 FT	76		41.47	56		22.67	0		0.00	0		0.00
	Subtotal	364		133.13	208		53.40	92		38.20	24		3.40
	Below 3,000 Ft	152		32.73	44		1.73	52		18.73	12		3.20
	% of Subtotal	41.76%		24.59%	21.15%		3.25%	56.52%		49.04%	50.00%		94.12%
SOUTH RANGE SUBTOTAL	< 2,000 FT	0		0.00	0		0.00	0		0.00	8		0.13
	2,000 - 3,000 FT	0		0.00	0		0.00	0		0.00	40		6.67
	3,000 - 4,000 FT	4		0.07	0		0.00	0		0.00	48		8.13
	4,000 - 5,000 FT	8		0.80	0		0.00	0		0.00	48		7.47
	5,000 - 10,000 FT	8		1.47	0		0.00	0		0.00	44		8.07
	> 10,000 FT	8		0.93	0		0.00	0		0.00	8		2.40
	Subtotal	28		3.27	0		0.00	0		0.00	196		32.87
	Below 3,000 Ft	0		0.00	0		0.00	0		0.00	48		6.80
	% of Subtotal	0.00%		0.00%	#N/A		#N/A	#N/A		#N/A	24.49%		20.69%

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	F-14, 85% RPM, 400 KNOTS SEGMENTS	F-14 MIN/SEG	F-14 CUM HRS	F-4, 98% RPM, 550 KNOTS SEGMENTS	F-4 MIN/SEG	F-4 CUM HRS	A-6/EA-6B, 90% RPM, 250 KNOTS SEGMENTS	A-6/EA-6B MIN/SEG	A-6/EA-6B CUM HRS	T-38, 90% RPM, 300 KNOTS SEGMENTS	T-38 MIN/SEG	T-38 CUM HRS
COMBINED	< 2,000 FT	104		21.07	20		0.80	24		6.53	16		3.27
NORTH AND	2,000 - 3,000 FT	48		11.67	24		0.93	28		12.20	44		6.73
SOUTH RANGES	3,000 - 4,000 FT	44		11.80	36		3.73	16		10.13	52		8.20
	4,000 - 5,000 FT	44		15.13	20		2.53	16		4.93	52		7.53
	5,000 - 10,000 FT	68		34.33	52		22.73	8		4.40	48		8.13
	> 10,000 FT	84		42.40	56		22.67	0		0.00	8		2.40
	TOTALS	392		136.40	208		53.40	92		38.20	220		36.27
	BELOW 3,000 FT	152		32.73	44		1.73	52		18.73	60		10.00
	% OF TOTAL	38.78%		24.00%	21.15%		3.25%	56.52%		49.04%	27.27%		27.57%
CONFORMITY ANALYSIS AREA SUBTO													
BELOW 3,000 FEET AGL:													
Kern County Ozone Nonattainment Area		124		27.94	6		0.11	17		0.89	12		3.20
Owens Valley PM10 Nonattainment Area		0		0.00	0		0.00	4		1.47	0		0.00
Searles Valley PM10 Nonattainment Are		149		31.32	44		1.73	43		14.17	12		3.21
Mojave Desert PM10 Nonattainment Are		0		0.00	0		0.00	0		0.00	48		6.79
Inyo County Attainment Area		3		1.41	0		0.01	5		3.10	0		0.00
TOTALS CROSS-CHECK:		392		136.40	208		53.40	92		38.20	220		36.27
BELOW 3,000 FEET CROSS-CHECK:		152		32.73	44		1.73	52		18.73	60		10.00

NOTES:

Data based on Wyle (1998) analysis a
Wyle (1998) data incorporate initial ac
Kern County ozone nonattainment ar
Owens Valley PM10 nonattainment a
Mojave Desert PM10 nonattainment a
Inyo County attainment area includes
Searles Valley PM10 nonattainment a

TABLE D2-1. WYLE RESEARCH ESTIM/

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	C-12, 100% RPM, 150 KNOTS SEGMENTS	C-12 MIN/SEG	C-12 CUM HRS	C-130, 970 CTIT, 200 KNOTS SEGMENTS	C-130 MIN/SEG	C-130 CUM HRS	TOTALS SEGMENTS	TOTALS CUM HRS	ALTITUDE SUBTOTALS CUM HRS	ALTITUDE SUBTOTALS % TIME
Airport Lake	< 2,000 FT			0.00			0.00	120	24.40		
	2,000 - 3,000 FT			0.00			0.00	80	26.73	51.13	22.66%
	3,000 - 4,000 FT			0.00			0.00	72	22.93		
	4,000 - 5,000 FT			0.00			0.00	83	20.38		
	5,000 - 10,000 FT			0.00			0.00	167	61.57		
	> 10,000 FT			0.00	4	1.0	0.07	267	69.60	225.62	100.00%
Baker North	< 250 FT			0.00			0.00	48	13.87		
	250 - 500 FT			0.00			0.00	40	7.67		
	500 - 1,000 FT			0.00			0.00	68	22.60		
	1,000 - 2,000 FT			0.00			0.00	103	15.90		
	2,000 - 3,000 FT			0.00			0.00	76	14.47	74.50	29.66%
	3,000 - 4,000 FT			0.00			0.00	80	12.73		
	4,000 - 5,000 FT			0.00			0.00	56	6.47		
	5,000 - 10,000 FT			0.00			0.00	211	44.18		
	> 10,000 FT			0.00	4	1.0	0.07	429	113.28	251.17	100.00%
Baker South	< 250 FT			0.00			0.00	68	9.53		
	250 - 500 FT			0.00			0.00	140	22.40		
	500 - 1,000 FT			0.00			0.00	246	46.68		
	1,000 - 2,000 FT			0.00			0.00	330	80.58		
	2,000 - 3,000 FT			0.00			0.00	378	98.53	257.73	30.96%
	3,000 - 4,000 FT			0.00			0.00	382	95.33		
	4,000 - 5,000 FT			0.00			0.00	350	106.37		
	5,000 - 10,000 FT			0.00	4	1.0	0.07	485	171.10		
	> 10,000 FT			0.00			0.00	453	201.87	832.40	100.00%
Charlie North	< 250 FT			0.00			0.00	88	43.00		
	250 - 500 FT			0.00			0.00	60	19.00		
	500 - 1,000 FT			0.00			0.00	52	26.20		
	1,000 - 2,000 FT			0.00			0.00	40	7.13		
	2,000 - 3,000 FT			0.00			0.00	20	6.67	102.00	81.08%
	3,000 - 4,000 FT			0.00			0.00	32	4.13		
	4,000 - 5,000 FT			0.00			0.00	20	1.40		
	5,000 - 10,000 FT			0.00	4	1.0	0.07	68	6.20		
	> 10,000 FT			0.00	4	1.0	0.07	84	12.07	125.80	100.00%
Charlie South	< 250 FT			0.00			0.00	143	90.88		
	250 - 500 FT			0.00	12	19.0	3.80	172	58.67		
	500 - 1,000 FT			0.00	12	54.0	10.80	300	66.20		
	1,000 - 2,000 FT			0.00	12	54.0	10.80	636	144.45		
	2,000 - 3,000 FT			0.00			0.00	488	67.88	428.08	67.85%
	3,000 - 4,000 FT			0.00			0.00	267	39.48		
	4,000 - 5,000 FT			0.00			0.00	175	18.12		
	5,000 - 10,000 FT			0.00	8	25.0	3.33	255	53.85		
	> 10,000 FT			0.00	4	2.0	0.13	362	91.43	630.97	100.00%

TABLE D2-1. WYLE RESEARCH ESTIM/

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	C-12, 100% RPM, 150 KNOTS SEGMENTS	MIN/SEG	CUM HRS	C-130, 970 CTIT, 200 KNOTS SEGMENTS	MIN/SEG	CUM HRS	TOTALS SEGMENTS	CUM HRS	ALTITUDE SUBTOTALS CUM HRS	% TIME
Coso	< 2,000 FT			0.00			0.00	127	27.40		
	2,000 - 3,000 FT			0.00			0.00	72	9.73	37.13	14.85%
	3,000 - 4,000 FT	4	1.0	0.07	4	3.0	0.20	80	13.20		
	4,000 - 5,000 FT	4	1.0	0.07	4	2.0	0.13	80	12.40		
	5,000 - 10,000 FT	4	1.0	0.07	4	25.0	1.67	215	71.43		
	> 10,000 FT			0.00	4	1.0	0.07	346	115.83	250.00	100.00%
Coso Targets	< 2,000 FT			0.00			0.00	195	39.67		
	2,000 - 3,000 FT			0.00			0.00	147	35.97	75.63	30.45%
	3,000 - 4,000 FT			0.00			0.00	159	37.68		
	4,000 - 5,000 FT			0.00			0.00	143	23.93		
	5,000 - 10,000 FT	4	2.0	0.13			0.00	211	41.42		
	> 10,000 FT			0.00			0.00	294	69.73	248.40	100.00%
Geothermal	< 2,000 FT			0.00			0.00	20	1.13		
	2,000 - 3,000 FT			0.00			0.00	8	0.53	1.67	10.82%
	3,000 - 4,000 FT			0.00			0.00	8	3.87		
	4,000 - 5,000 FT			0.00			0.00	12	2.93		
	5,000 - 10,000 FT			0.00			0.00	24	0.40		
	> 10,000 FT			0.00			0.00	80	6.53	15.40	100.00%
George & Main Magazine	< 2,000 FT	4	1.0	0.07	4	10.0	0.67	299	43.77		
	2,000 - 3,000 FT	4	4.0	0.27	8	1.0	0.13	231	30.03	73.80	13.35%
	3,000 - 4,000 FT	4	3.0	0.20	12	3.0	0.60	267	54.07		
	4,000 - 5,000 FT			0.00	12	5.0	1.00	228	76.07		
	5,000 - 10,000 FT			0.00	20	20.0	6.67	334	155.33		
	> 10,000 FT			0.00	4	41.0	2.73	378	193.43	552.70	100.00%
Mainsite & Armitage Airfield	< 2,000 FT			0.00			0.00	0	0.00		
	2,000 - 3,000 FT			0.00	4	1.0	0.07	239	9.77	9.77	7.51%
	3,000 - 4,000 FT			0.00	4	1.0	0.07	84	5.73		
	4,000 - 5,000 FT			0.00	4	1.0	0.07	44	2.33		
	5,000 - 10,000 FT			0.00	16	30.0	8.00	167	29.22		
	> 10,000 FT			0.00	4	47.0	3.13	211	83.08	130.13	100.00%
Propulsion Labs & Ordnance T&E	< 2,000 FT			0.00			0.00	56	2.13		
	2,000 - 3,000 FT			0.00	4	1.0	0.07	32	0.53	2.67	2.14%
	3,000 - 4,000 FT			0.00	4	1.0	0.07	28	2.33		
	4,000 - 5,000 FT			0.00			0.00	16	0.27		
	5,000 - 10,000 FT			0.00	8	6.0	0.80	84	22.87		
	> 10,000 FT			0.00			0.00	175	96.28	124.42	100.00%
Mojave B North	< 2,000 FT			0.00			0.00	119	20.88		
	2,000 - 3,000 FT			0.00			0.00	151	31.92	52.80	15.91%
	3,000 - 4,000 FT			0.00			0.00	147	28.78		
	4,000 - 5,000 FT			0.00			0.00	131	29.50		
	5,000 - 10,000 FT			0.00			0.00	346	89.93		
	> 10,000 FT			0.00			0.00	473	130.85	331.87	100.00%

TABLE D2-1. WYLE RESEARCH ESTIM

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	C-12, 100% RPM, 150 KNOTS			C-130, 970 CTIT, 200 KNOTS			TOTALS		ALTITUDE SUBTOTALS	
		SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	MIN/SEG	CUM HRS	SEGMENTS	CUM HRS	CUM HRS	% TIME
Mojave B South	< 2,000 FT			0.00	4	1.0	0.07	123	26.25		
	2,000 - 3,000 FT			0.00	4	7.0	0.47	151	17.63	43.88	23.54%
	3,000 - 4,000 FT			0.00	4	1.0	0.07	127	8.82		
	4,000 - 5,000 FT			0.00			0.00	163	6.70		
	5,000 - 10,000 FT			0.00			0.00	287	29.30		
	> 10,000 FT			0.00			0.00	473	97.72	186.42	100.00%
Randsburg Wash	< 2,000 FT			0.00	8	6.0	0.80	179	35.20		
	2,000 - 3,000 FT			0.00	8	26.0	3.47	231	33.07	68.27	17.71%
	3,000 - 4,000 FT			0.00	8	29.0	3.87	250	45.53		
	4,000 - 5,000 FT			0.00	8	31.0	4.13	227	39.42		
	5,000 - 10,000 FT			0.00	4	5.0	0.33	358	83.60		
	> 10,000 FT			0.00	4	1.0	0.07	545	148.65	385.47	100.00%
Superior Valley	< 2,000 FT			0.00			0.00	24	3.07		
	2,000 - 3,000 FT			0.00	4	13.0	0.87	148	27.33	30.40	12.28%
	3,000 - 4,000 FT			0.00	4	18.0	1.20	219	40.73		
	4,000 - 5,000 FT			0.00	4	18.0	1.20	263	42.43		
	5,000 - 10,000 FT			0.00	4	11.0	0.73	343	65.18		
	> 10,000 FT			0.00			0.00	362	68.90	247.65	100.00%
NORTH RANGE SUBTOTAL	< 2,000 FT	4		0.07	40		26.07	3,351	813.27		
	2,000 - 3,000 FT	4		0.27	16		0.27	1,771	300.85	1,114.12	32.89%
	3,000 - 4,000 FT	8		0.27	24		0.93	1,459	291.50		
	4,000 - 5,000 FT	4		0.07	20		1.20	1,207	270.67		
	5,000 - 10,000 FT	8		0.20	64		20.60	2,221	657.57		
	> 10,000 FT	0		0.00	28		6.27	3,079	1,053.15	3,387.00	100.00%
	Subtotal	28		0.87	192		55.33	13,088	3,387.00		
	Below 3,000 Ft	8		0.33	56		26.33	5,122	1,114.12		
	% of Subtotal	28.57%		38.46%	29.17%		47.59%	39.14%	32.89%		
SOUTH RANGE SUBTOTAL	< 2,000 FT	0		0.00	12		0.87	445	85.40		
	2,000 - 3,000 FT	0		0.00	16		4.80	681	109.95	195.35	16.97%
	3,000 - 4,000 FT	0		0.00	16		5.13	743	123.87		
	4,000 - 5,000 FT	0		0.00	12		5.33	784	118.05		
	5,000 - 10,000 FT	0		0.00	8		1.07	1,334	268.02		
	> 10,000 FT	0		0.00	4		0.07	1,853	446.12	1,151.40	100.00%
	Subtotal	0		0.00	68		17.27	5,840	1,151.40		
	Below 3,000 Ft	0		0.00	28		5.67	1,126	195.35		
	% of Subtotal	#N/A		#N/A	41.18%		32.82%	19.28%	16.97%		

TABLE D2-1. WYLE RESEARCH ESTIM/

SUBAREA	ALTITUDE (AGL) OF RADAR TRACK FLIGHT SEGMENT	C-12, 100% RPM, 150 KNOTS SEGMENTS	MIN/SEG	CUM HRS	C-130, 970 CTIT, 200 KNOTS SEGMENTS	MIN/SEG	CUM HRS	TOTALS SEGMENTS	CUM HRS	ALTITUDE SUBTOTALS CUM HRS	% TIME
COMBINED	< 2,000 FT	4		0.07	52		26.93	3,796	898.67		
NORTH AND	2,000 - 3,000 FT	4		0.27	32		5.07	2,452	410.80	1,309.47	28.85%
SOUTH RANGES	3,000 - 4,000 FT	8		0.27	40		6.07	2,202	415.37		
	4,000 - 5,000 FT	4		0.07	32		6.53	1,991	388.72		
	5,000 - 10,000 FT	8		0.20	72		21.67	3,555	925.58		
	> 10,000 FT	0		0.00	32		6.33	4,932	1,499.27	4,538.40	100.00%
	TOTALS	28		0.87	260		72.60	18,928	4,538.40		
	BELOW 3,000 FT	8		0.33	84		32.00	6,248	1,309.47		
	% OF TOTAL	28.57%		38.46%	32.31%		44.08%	33.01%	28.85%		
CONFORMITY ANALYSIS AREA SUBTO											
BELOW 3,000 FEET AGL:											
Kern County Ozone Nonattainment Area		1		0.03	41		25.54	3,181	702.48		
Owens Valley PM10 Nonattainment Area		0		0.00	0		0.00	171	37.82		
Searles Valley PM10 Nonattainment Are		8		0.33	60		27.22	4,927	1,068.25		
Mojave Desert PM10 Nonattainment Are		0		0.00	24		4.76	1,009	175.72		
Inyo County Attainment Area		0		0.01	0		0.02	142	27.67		
TOTALS CROSS-CHECK:		28		0.87	260		72.60	18,928	4,538.40		
BELOW 3,000 FEET CROSS-CHECK:		8		0.33	84		32.00	6,248	1,309.47		

NOTES:

Data based on Wyle (1998) analysis a
Wyle (1998) data incorporate initial ac
Kern County ozone nonattainment ar
Owens Valley PM10 nonattainment a
Mojave Desert PM10 nonattainment a
Inyo County attainment area includes
Searles Valley PM10 nonattainment a

TABLE D2-2. ESTIMATE OF LOW ALTITUDE RANGE-RELATED FLIGHT HOURS AT NAWS CHINA LAKE: NO ACTION ALTERNATIVE

Subarea	Altitude (AGL) of Radar Track Flight Segment	China Lake Adjustment Factor	CUMULATIVE HOURS BY AIRCRAFT TYPE																	Cum Hours	Percent Of Time
			AH-1W	UH-1L	HH-1N	CH-46E	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	-14B/D	F-4	EA-6B	T-38	C-12	C-130		
Airport Lake	Under 3,000 ft AGL	0.899	5.75	0.27	0.81	0.00	0.00	0.00	15.67	16.98	0.84	3.77	0.00	0.00	1.02	0.84	0.00	0.00	0.00	45.95	22.66%
	Over 3,000 ft AGL		0.24	0.00	0.00	7.31	0.00	0.00	52.44	56.81	7.25	20.19	0.02	0.04	11.50	0.94	0.00	0.00	0.06	156.78	77.34%
	Total		5.99	0.27	0.81	7.31	0.00	0.00	68.11	73.78	8.09	23.96	0.02	0.04	12.52	1.78	0.00	0.00	0.06	202.73	100.00%
Baker North	Under 3,000 ft AGL	0.384	3.51	0.26	0.77	10.17	0.00	0.00	5.18	5.61	0.00	2.61	0.15	0.31	0.05	0.00	0.00	0.00	0.00	28.62	29.66%
	Over 3,000 ft AGL		0.61	0.00	0.00	3.05	0.28	0.00	19.53	21.15	3.43	16.64	0.87	1.74	0.54	0.00	0.00	0.00	0.03	67.87	70.34%
	Total		4.12	0.26	0.77	13.22	0.28	0.00	24.71	26.77	3.43	19.25	1.02	2.05	0.59	0.00	0.00	0.00	0.03	96.49	100.00%
Baker South	Under 3,000 ft AGL	0.384	2.13	0.07	0.21	1.49	1.23	0.00	18.15	19.66	1.25	44.39	3.48	6.97	0.00	0.00	0.00	0.00	0.00	99.01	30.96%
	Over 3,000 ft AGL		0.00	0.00	0.00	1.38	0.79	0.00	55.47	60.09	4.20	80.63	6.04	12.07	0.08	0.00	0.00	0.00	0.03	220.77	69.04%
	Total		2.13	0.07	0.21	2.87	2.02	0.00	73.61	79.75	5.46	125.02	9.52	19.04	0.08	0.00	0.00	0.00	0.03	319.79	100.00%
Charlie North	Under 3,000 ft AGL	0.384	8.17	0.24	0.73	21.90	0.00	0.00	3.66	3.97	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.19	81.08%
	Over 3,000 ft AGL		0.31	0.00	0.00	0.95	0.00	0.00	3.38	3.66	0.67	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.05	9.14	18.92%
	Total		8.48	0.24	0.73	22.85	0.00	0.00	7.04	7.63	0.67	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.05	48.33	100.00%
Charlie South	Under 3,000 ft AGL	0.384	17.42	1.93	5.78	38.49	0.05	0.00	34.12	36.97	0.10	18.27	0.09	0.19	0.03	0.03	1.23	0.00	9.76	164.46	67.85%
	Over 3,000 ft AGL		0.41	0.00	0.00	1.08	0.05	0.00	31.31	33.92	3.02	6.71	0.01	0.02	0.08	0.01	0.00	0.00	1.33	77.94	32.15%
	Total		17.83	1.93	5.78	39.57	0.10	0.00	65.43	70.89	3.12	24.98	0.10	0.20	0.10	0.03	1.23	0.00	11.09	242.40	100.00%
Coso	Under 3,000 ft AGL	0.472	0.38	0.91	2.74	0.00	0.00	0.00	3.92	4.24	0.28	2.39	0.56	1.11	0.00	1.00	0.00	0.00	0.00	17.52	14.85%
	Over 3,000 ft AGL		0.00	0.53	1.60	0.72	0.00	0.00	30.68	33.23	7.17	15.04	1.86	3.71	4.09	0.74	0.00	0.09	0.98	100.45	85.15%
	Total		0.38	1.45	4.34	0.72	0.00	0.00	34.59	37.47	7.46	17.43	2.41	4.82	4.09	1.74	0.00	0.09	0.98	117.98	100.00%
Coso Targets	Under 3,000 ft AGL	0.472	3.74	0.95	2.86	0.63	0.00	0.00	11.34	12.28	0.00	3.43	0.00	0.00	0.00	0.46	0.00	0.00	0.00	35.69	30.45%
	Over 3,000 ft AGL		0.03	0.53	1.60	4.40	0.00	0.00	28.48	30.85	0.22	14.85	0.00	0.00	0.38	0.12	0.00	0.06	0.00	81.53	69.55%
	Total		3.78	1.49	4.46	5.03	0.00	0.00	39.82	43.13	0.22	18.28	0.00	0.00	0.38	0.58	0.00	0.06	0.00	117.22	100.00%
Geothermal	Under 3,000 ft AGL	1.000	0.00	0.02	0.05	0.00	0.00	0.00	0.30	0.32	0.00	0.93	0.00	0.00	0.00	0.04	0.00	0.00	0.00	1.67	10.82%
	Over 3,000 ft AGL		0.27	0.02	0.05	2.53	0.00	0.00	2.50	2.70	0.20	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.73	89.18%
	Total		0.27	0.03	0.10	2.53	0.00	0.00	2.79	3.03	0.20	6.40	0.00	0.00	0.00	0.04	0.00	0.00	0.00	15.40	100.00%
George & Main Magazine	Under 3,000 ft AGL	1.141	15.21	2.26	6.79	0.23	0.00	0.00	14.41	15.61	2.21	23.27	0.03	0.05	0.46	2.38	0.00	0.38	0.91	84.19	13.35%
	Over 3,000 ft AGL		0.91	0.00	0.00	3.35	0.91	0.00	187.65	203.28	31.03	59.01	5.86	11.71	25.70	4.11	0.00	0.23	12.55	546.29	86.65%
	Total		16.12	2.26	6.79	3.57	0.91	0.00	202.05	218.89	33.23	82.28	5.88	11.76	26.16	6.49	0.00	0.61	13.46	630.48	100.00%
Mainsite & Armitage Airfield	Under 3,000 ft AGL	0.899	0.06	0.00	0.00	0.00	0.00	0.00	2.71	2.93	0.00	3.00	0.00	0.00	0.00	0.02	0.00	0.00	0.06	8.78	7.51%
	Over 3,000 ft AGL		1.20	0.00	0.00	0.00	0.48	0.00	37.91	41.07	8.63	3.29	1.76	3.51	0.00	0.00	0.18	0.00	10.12	108.16	92.49%
	Total		1.26	0.00	0.00	0.00	0.48	0.00	40.62	44.00	8.63	6.29	1.76	3.51	0.00	0.02	0.18	0.00	10.18	116.93	100.00%
Propulsion Labs and Ordnance T&E	Under 3,000 ft AGL	0.899	0.18	0.40	1.21	0.00	0.00	0.00	0.14	0.16	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.06	2.40	2.14%
	Over 3,000 ft AGL		0.00	0.00	0.00	0.00	0.54	0.00	37.50	40.63	3.06	10.42	3.97	7.95	4.55	0.00	0.00	0.00	0.78	109.40	97.86%
	Total		0.18	0.40	1.21	0.00	0.54	0.00	37.65	40.78	3.06	10.66	3.97	7.95	4.55	0.00	0.00	0.00	0.84	111.80	100.00%
Mojave B North	Under 3,000 ft AGL	2.266	0.00	1.77	5.32	0.00	0.00	0.00	53.94	58.43	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	119.62	15.91%
	Over 3,000 ft AGL		0.00	0.15	0.45	0.00	0.00	0.00	262.94	284.86	24.17	52.41	2.42	4.83	0.00	0.00	0.00	0.00	0.00	632.23	84.09%
	Total		0.00	1.93	5.78	0.00	0.00	0.00	316.88	343.29	24.17	52.56	2.42	4.83	0.00	0.00	0.00	0.00	0.00	751.85	100.00%

TABLE D2-2. ESTIMATE OF LOW ALTITUDE RANGE-RELATED FLIGHT HOURS AT NAWS CHINA LAKE: NO ACTION ALTERNATIVE

Subarea	Altitude (AGL) of Radar Track Flight Segment	China Lake Adjustment Factor	CUMULATIVE HOURS BY AIRCRAFT TYPE AH-1W	UH-1L	HH-1N	CH-46E	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	-14B/D	F-4	EA-6B	T-38	C-12	C-130	Cum Hours	Percent Of Time
Mojave B	Under 3,000 ft AGL	2.266	1.21	3.81	11.44	0.60	0.00	0.45	38.51	41.72	0.30	0.00	0.00	0.00	0.00	0.00	0.15	0.00	1.21	99.42	23.54%
South	Over 3,000 ft AGL		6.80	1.77	5.32	4.38	0.00	0.00	113.96	123.46	9.82	54.07	0.05	0.10	0.00	0.00	3.02	0.00	0.15	322.91	76.46%
	Total		8.00	5.59	16.76	4.98	0.00	0.45	152.48	165.18	10.12	54.07	0.05	0.10	0.00	0.00	3.17	0.00	1.36	422.33	100.00%
Randsburg	Under 3,000 ft AGL	2.266	0.15	5.78	17.33	0.00	0.00	0.15	55.02	59.61	1.21	5.74	0.00	0.00	0.00	0.00	0.00	0.00	9.67	154.66	17.71%
Wash	Over 3,000 ft AGL		0.15	2.15	6.46	0.15	0.00	0.00	274.54	297.42	35.95	82.77	0.00	0.00	0.00	0.00	0.00	0.00	19.03	718.62	82.29%
	Total		0.30	7.93	23.79	0.15	0.00	0.15	329.57	357.03	37.15	88.51	0.00	0.00	0.00	0.00	0.00	0.00	28.70	873.28	100.00%
Superior Valley	Under 3,000 ft AGL	2.266	0.76	0.00	0.00	0.00	0.00	0.15	14.79	16.02	14.80	5.14	0.00	0.00	0.00	0.00	15.25	0.00	1.96	68.87	12.28%
	Over 3,000 ft AGL		5.89	0.00	0.00	5.74	0.00	0.00	130.48	141.35	73.10	72.50	0.00	0.00	0.00	0.00	56.03	0.00	7.10	492.18	87.72%
	Total		6.65	0.00	0.00	5.74	0.00	0.15	145.26	157.37	87.90	77.63	0.00	0.00	0.00	0.00	71.29	0.00	9.06	561.05	100.00%
North Range	Under 3,000 ft AGL		56.55	7.31	21.94	72.90	1.28	0.00	109.60	118.73	4.68	102.81	4.31	8.62	1.55	4.77	1.23	0.38	10.79	527.47	26.12%
Subtotal	Over 3,000 ft AGL		3.98	1.09	3.26	24.77	3.06	0.00	486.83	527.40	68.87	232.38	20.38	40.76	46.92	5.91	0.18	0.39	25.92	1,492.08	73.88%
	Total		60.53	8.40	25.20	97.67	4.34	0.00	596.42	646.13	73.56	335.20	24.69	49.38	48.47	10.68	1.41	0.77	36.71	2,019.55	100.00%
South Range	Under 3,000 ft AGL		2.11	11.37	34.10	0.60	0.00	0.76	162.26	175.79	16.31	11.03	0.00	0.00	0.00	0.00	15.41	0.00	12.84	442.57	16.97%
Subtotal	Over 3,000 ft AGL		12.84	4.08	12.23	10.27	0.00	0.00	781.93	847.09	143.03	261.74	2.47	4.93	0.00	0.00	59.05	0.00	26.28	2,165.94	83.03%
	Total		14.95	15.44	46.33	10.87	0.00	0.76	944.19	1,022.87	159.34	272.77	2.47	4.93	0.00	0.00	74.46	0.00	39.12	2,608.51	100.00%
Combined	Under 3,000 ft AGL		58.66	18.68	56.04	73.51	1.28	0.76	271.86	294.52	21.00	113.84	4.31	8.62	1.55	4.77	16.63	0.38	23.63	970.03	20.96%
North and	Over 3,000 ft AGL		16.82	5.16	15.49	35.04	3.06	0.00	1,268.75	1,374.48	211.90	494.13	22.84	45.69	46.92	5.91	59.23	0.39	52.20	3,658.02	79.04%
South Ranges	Total		75.48	23.84	71.53	108.55	4.34	0.76	1,540.62	1,669.00	232.90	607.96	27.16	54.31	48.47	10.68	75.87	0.77	75.83	4,628.06	100.00%
Annual Flight Hours Below 3000 Ft AGL:																					
Kern County Ozone Nonattainment Area			21.13	2.22	6.67	40.00	1.28	0.00	56.28	60.97	1.58	67.83	3.58	7.16	0.07	0.28	1.23	0.04	9.91	280.23	28.89%
Owens Valley PM10 Nonattainment Area			1.87	0.48	1.43	0.31	0.00	0.00	5.67	6.14	0.00	1.71	0.00	0.00	0.00	0.23	0.00	0.00	0.00	17.85	1.84%
Searles Valley PM10 Nonattainment Area			53.81	7.88	23.63	72.55	1.28	0.08	116.85	126.58	4.80	100.31	4.09	8.18	1.54	4.02	1.24	0.37	12.83	540.04	55.67%
Mojave Desert PM10 Nonattainment Area			1.96	9.78	29.33	0.54	0.00	0.68	145.79	157.94	16.04	9.87	0.00	0.00	0.00	0.00	15.39	0.00	10.78	398.11	41.04%
Inyo County Attainment Area			1.02	0.55	1.66	0.10	0.00	0.00	3.56	3.85	0.16	1.94	0.22	0.45	0.01	0.52	0.00	0.01	0.02	14.05	1.45%

NOTES:

Wyle (1998) estimates of 1996 baseline flight hours by range subarea (Table D2-1) adjusted to a more representative distribution of flight hours using factors developed by NAWS China Lake staff
1996 Baseline flight hours by A-6E aircraft converted to F/A-18 flight hours, and A-6E aircraft deleted from the No Action Alternative.
Total F/A-18 flight hours split into F/A-18C/D hours (48%) and F/A-18E/F hours (52%) based on Wyle (1998) estimate of future conditions.
Kern County ozone nonattainment area includes Baker South, Charlie South, 10% of George/Main Magazines, and 95% of Mainsite/Armitage Airfield
Owens Valley PM10 nonattainment area includes 50% of the Coso Targets area.
Mojave Desert PM10 nonattainment area includes 97% of Mojave B North, 90% of Mojave B South, 80% of Randsburg Wash, and Superior Valley
Inyo County attainment area includes 15% of Coso Targets, 40% of Coso Range, and 2% of George/Main Magazine
Searles Valley PM10 nonattainment area determined by difference (Total of North and South Ranges less Owens Valley, Inyo County attainment, and Mojave Desert)

TABLE D2-3. ESTIMATE OF LOW ALTITUDE RANGE-RELATED FLIGHT HOURS AT NAWS CHINA LAKE: LIMITED EXPANSION ALTERNATIVE

Subarea	Altitude (AGL) Of Radar Track Flight Segment	China Lake Adjustment Factor	CUMULATIVE HOURS BY AIRCRAFT TYPE																	Cum Hours	Percent Of Time
			AH-1W	UH-1L	HH-1N	CH-46E	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	C-12	C-130		
Airport Lake	Under 3,000 ft AGL	0.899	6.61	0.31	0.93	0.00	0.00	0.00	18.02	19.52	0.96	4.34	0.00	0.00	1.17	0.96	0.00	0.00	0.00	52.84	22.66%
	Over 3,000 ft AGL		0.28	0.00	0.00	8.40	0.00	0.00	60.30	65.33	8.34	23.22	0.02	0.05	13.23	1.08	0.00	0.00	0.07	180.30	77.34%
	Total		6.89	0.31	0.93	8.40	0.00	0.00	78.32	84.85	9.30	27.56	0.02	0.05	14.40	2.04	0.00	0.00	0.07	233.14	100.00%
Baker North	Under 3,000 ft AGL	0.384	4.04	0.29	0.88	11.69	0.00	0.00	5.96	6.46	0.00	3.00	0.18	0.35	0.06	0.00	0.00	0.00	0.00	32.91	29.66%
	Over 3,000 ft AGL		0.71	0.00	0.00	3.50	0.32	0.00	22.45	24.33	3.95	19.14	1.00	2.00	0.62	0.00	0.00	0.00	0.03	78.05	70.34%
	Total		4.74	0.29	0.88	15.20	0.32	0.00	28.41	30.78	3.95	22.14	1.18	2.36	0.68	0.00	0.00	0.00	0.03	110.97	100.00%
Baker South	Under 3,000 ft AGL	0.384	2.44	0.08	0.24	1.71	1.41	0.00	20.87	22.61	1.44	51.04	4.01	8.01	0.00	0.00	0.00	0.00	0.00	113.87	30.96%
	Over 3,000 ft AGL		0.00	0.00	0.00	1.59	0.91	0.00	63.79	69.10	4.83	92.73	6.94	13.88	0.09	0.00	0.00	0.00	0.03	253.89	69.04%
	Total		2.44	0.08	0.24	3.30	2.33	0.00	84.65	91.71	6.27	143.77	10.95	21.89	0.09	0.00	0.00	0.00	0.03	367.76	100.00%
Charlie North	Under 3,000 ft AGL	0.384	9.40	0.28	0.84	25.18	0.00	0.00	4.21	4.56	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.06	81.08%
	Over 3,000 ft AGL		0.35	0.00	0.00	1.09	0.00	0.00	3.89	4.21	0.77	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.06	10.51	18.92%
	Total		9.75	0.28	0.84	26.27	0.00	0.00	8.10	8.78	0.77	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.06	55.58	100.00%
Charlie South	Under 3,000 ft AGL	0.384	20.04	2.22	6.65	44.27	0.06	0.00	39.24	42.51	0.12	21.01	0.11	0.22	0.03	0.03	1.41	0.00	11.22	189.13	67.85%
	Over 3,000 ft AGL		0.47	0.00	0.00	1.24	0.06	0.00	36.01	39.01	3.48	7.72	0.01	0.02	0.09	0.01	0.00	0.00	1.53	89.63	32.15%
	Total		20.51	2.22	6.65	45.51	0.12	0.00	75.25	81.52	3.59	28.72	0.12	0.24	0.12	0.04	1.41	0.00	12.75	278.76	100.00%
Coso	Under 3,000 ft AGL	0.472	0.43	1.05	3.15	0.00	0.00	0.00	4.50	4.88	0.33	2.75	0.64	1.28	0.00	1.15	0.00	0.00	0.00	20.15	14.85%
	Over 3,000 ft AGL		0.00	0.62	1.85	0.83	0.00	0.00	35.28	38.22	8.25	17.29	2.13	4.27	4.70	0.86	0.00	0.11	1.12	115.52	85.15%
	Total		0.43	1.66	4.99	0.83	0.00	0.00	39.78	43.09	8.57	20.04	2.77	5.55	4.70	2.00	0.00	0.11	1.12	135.67	100.00%
Coso Targets	Under 3,000 ft AGL	0.472	4.31	1.09	3.28	0.72	0.00	0.00	13.04	14.13	0.00	3.94	0.00	0.00	0.00	0.53	0.00	0.00	0.00	41.05	30.45%
	Over 3,000 ft AGL		0.04	0.62	1.85	5.07	0.00	0.00	32.75	35.48	0.25	17.08	0.00	0.00	0.43	0.13	0.00	0.07	0.00	93.76	69.55%
	Total		4.34	1.71	5.13	5.79	0.00	0.00	45.79	49.60	0.25	21.02	0.00	0.00	0.43	0.66	0.00	0.07	0.00	134.80	100.00%
Geothermal	Under 3,000 ft AGL	1.000	0.00	0.02	0.06	0.00	0.00	0.00	0.34	0.37	0.00	1.07	0.00	0.00	0.00	0.05	0.00	0.00	0.00	1.92	10.82%
	Over 3,000 ft AGL		0.31	0.02	0.06	2.91	0.00	0.00	2.87	3.11	0.23	6.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.79	89.18%
	Total		0.31	0.04	0.12	2.91	0.00	0.00	3.21	3.48	0.23	7.36	0.00	0.00	0.00	0.05	0.00	0.00	0.00	17.71	100.00%
George & Main Magazine	Under 3,000 ft AGL	1.141	17.49	2.60	7.81	0.26	0.00	0.00	16.57	17.95	2.54	26.76	0.03	0.06	0.52	2.74	0.00	0.44	1.05	96.81	13.35%
	Over 3,000 ft AGL		1.05	0.00	0.00	3.85	1.05	0.00	215.79	233.77	35.68	67.87	6.73	13.47	29.56	4.72	0.00	0.26	14.43	628.24	86.65%
	Total		18.54	2.60	7.81	4.11	1.05	0.00	232.36	251.72	38.22	94.63	6.76	13.53	30.08	7.46	0.00	0.70	15.48	725.05	100.00%
Mainsite & Armitage Airfield	Under 3,000 ft AGL	0.899	0.07	0.00	0.00	0.00	0.00	0.00	3.11	3.37	0.00	3.44	0.00	0.00	0.00	0.02	0.00	0.00	0.07	10.09	7.51%
	Over 3,000 ft AGL		1.38	0.00	0.00	0.00	0.55	0.00	43.60	47.23	9.92	3.79	2.02	4.04	0.00	0.00	0.21	0.00	11.64	124.38	92.49%
	Total		1.45	0.00	0.00	0.00	0.55	0.00	46.71	50.61	9.92	7.23	2.02	4.04	0.00	0.02	0.21	0.00	11.71	134.47	100.00%
Propulsion Labs and Ordnance T&E	Under 3,000 ft AGL	0.899	0.21	0.47	1.40	0.00	0.00	0.00	0.17	0.18	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.07	2.76	2.14%
	Over 3,000 ft AGL		0.00	0.00	0.00	0.00	0.62	0.00	43.13	46.72	3.51	11.99	4.57	9.14	5.24	0.00	0.00	0.00	0.90	125.81	97.86%
	Total		0.21	0.47	1.40	0.00	0.62	0.00	43.29	46.90	3.51	12.26	4.57	9.14	5.24	0.00	0.00	0.00	0.96	128.57	100.00%
Mojave B North	Under 3,000 ft AGL	2.266	0.00	2.04	6.12	0.00	0.00	0.00	62.03	67.20	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	137.56	15.91%
	Over 3,000 ft AGL		0.00	0.17	0.52	0.00	0.00	0.00	302.39	327.58	27.79	60.27	2.78	5.56	0.00	0.00	0.00	0.00	0.00	727.06	84.09%
	Total		0.00	2.21	6.64	0.00	0.00	0.00	364.41	394.78	27.79	60.44	2.78	5.56	0.00	0.00	0.00	0.00	0.00	864.62	100.00%

TABLE D2-3. ESTIMATE OF LOW ALTITUDE RANGE-RELATED FLIGHT HOURS AT NAWS CHINA LAKE: LIMITED EXPANSION ALTERNATIVE

Subarea	Altitude (AGL) Of Radar Track Flight Segment	China Lake Adjustment Factor	CUMULATIVE HOURS BY AIRCRAFT TYPE AH-1W	UH-1L	HH-1N	CH-46E	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	C-12	C-130	Cum Hours	Percent Of Time
Mojave B	Under 3,000 ft AGL	2.266	1.39	4.39	13.16	0.69	0.00	0.52	44.29	47.98	0.35	0.00	0.00	0.00	0.00	0.00	0.17	0.00	1.39	114.33	23.54%
South	Over 3,000 ft AGL		7.82	2.04	6.12	5.04	0.00	0.00	131.06	141.98	11.29	62.18	0.06	0.12	0.00	0.00	3.47	0.00	0.17	371.35	76.46%
	Total		9.21	6.43	19.28	5.73	0.00	0.52	175.35	189.96	11.64	62.18	0.06	0.12	0.00	0.00	3.65	0.00	1.56	485.68	100.00%
Randsburg	Under 3,000 ft AGL	2.266	0.17	6.64	19.93	0.00	0.00	0.17	63.28	68.55	1.39	6.60	0.00	0.00	0.00	0.00	0.00	0.00	11.12	177.86	17.71%
Wash	Over 3,000 ft AGL		0.17	2.48	7.43	0.17	0.00	0.00	315.73	342.04	41.34	95.18	0.00	0.00	0.00	0.00	0.00	0.00	21.88	826.41	82.29%
	Total		0.35	9.12	27.36	0.17	0.00	0.17	379.00	410.59	42.73	101.78	0.00	0.00	0.00	0.00	0.00	0.00	33.00	1,004.27	100.00%
Superior Valley	Under 3,000 ft AGL	2.266	0.87	0.00	0.00	0.00	0.00	0.17	17.01	18.42	17.02	5.91	0.00	0.00	0.00	0.00	17.54	0.00	2.26	79.20	12.28%
	Over 3,000 ft AGL		6.77	0.00	0.00	6.60	0.00	0.00	150.05	162.55	84.07	83.37	0.00	0.00	0.00	0.00	64.44	0.00	8.16	566.01	87.72%
	Total		7.64	0.00	0.00	6.60	0.00	0.17	167.05	180.98	101.09	89.28	0.00	0.00	0.00	0.00	81.98	0.00	10.42	645.21	100.00%
North Range	Under 3,000 ft AGL		65.03	8.41	25.23	83.84	1.47	0.00	126.04	136.54	5.39	118.23	4.96	9.92	1.78	5.48	1.41	0.44	12.41	606.59	26.12%
Subtotal	Over 3,000 ft AGL		4.58	1.25	3.75	28.49	3.52	0.00	559.85	606.51	79.20	267.24	23.43	46.87	53.96	6.80	0.21	0.44	29.81	1,715.89	73.88%
	Total		69.61	9.66	28.98	112.32	4.99	0.00	685.89	743.04	84.59	385.47	28.39	56.79	55.74	12.29	1.62	0.88	42.22	2,322.48	100.00%
South Range	Under 3,000 ft AGL		2.43	13.07	39.21	0.69	0.00	0.87	186.60	202.15	18.76	12.68	0.00	0.00	0.00	0.00	17.72	0.00	14.76	508.95	16.97%
Subtotal	Over 3,000 ft AGL		14.76	4.69	14.07	11.81	0.00	0.00	899.22	974.15	164.48	301.00	2.84	5.67	0.00	0.00	67.91	0.00	30.22	2,490.83	83.03%
	Total		17.20	17.76	53.28	12.51	0.00	0.87	1,085.82	1,176.31	183.24	313.68	2.84	5.67	0.00	0.00	85.63	0.00	44.99	2,999.78	100.00%
Combined	Under 3,000 ft AGL		67.46	21.48	64.44	84.53	1.47	0.87	312.64	338.69	24.15	130.91	4.96	9.92	1.78	5.48	19.13	0.44	27.17	1,115.54	20.96%
North and	Over 3,000 ft AGL		19.34	5.94	17.82	40.30	3.52	0.00	1,459.07	1,580.66	243.69	568.25	26.27	52.54	53.96	6.80	68.12	0.44	60.03	4,206.73	79.04%
South Ranges	Total		86.80	27.42	82.26	124.83	4.99	0.87	1,771.71	1,919.35	267.83	699.16	31.23	62.46	55.74	12.29	87.25	0.88	87.20	5,322.27	100.00%
Annual Flight Hours Below 3000 Ft AGL:																					
Kern County Ozone Nonattainment Area			24.29	2.56	7.67	46.00	1.47	0.00	64.72	70.12	1.81	78.00	4.12	8.23	0.08	0.33	1.41	0.04	11.39	322.26	28.89%
Owens Valley PM10 Nonattainment Area			2.15	0.55	1.64	0.36	0.00	0.00	6.52	7.06	0.00	1.97	0.00	0.00	0.00	0.27	0.00	0.00	0.00	20.52	1.84%
Searles Valley PM10 Nonattainment Area			61.88	9.06	27.17	83.43	1.47	0.09	134.37	145.57	5.52	115.36	4.70	9.40	1.77	4.63	1.43	0.43	14.75	621.04	55.67%
Mojave Desert PM10 Nonattainment Area			2.26	11.24	33.72	0.63	0.00	0.78	167.66	181.63	18.45	11.35	0.00	0.00	0.00	0.00	17.70	0.00	12.40	457.82	41.04%
Inyo County Attainment Area			1.17	0.64	1.91	0.11	0.00	0.00	4.09	4.43	0.18	2.23	0.26	0.51	0.01	0.59	0.00	0.01	0.02	16.15	1.45%

NOTES:

Adjusted flight hours estimates for the No Action Alternative (Table D2-2) increased by 15% for the Limited Expansion Alternative.

Kern County ozone nonattainment area includes Baker South, Charlie South, 10% of George/Main Magazines, and 95% of Mainsite/Armitage Airfield

Owens Valley PM10 nonattainment area includes 50% of the Coso Targets area.

Mojave Desert PM10 nonattainment area includes 97% of Mojave B North, 90% of Mojave B South, 80% of Randsburg Wash, and Superior Valley

Inyo County attainment area includes 15% of Coso Targets, 40% of Coso Range, and 2% of George/Main Magazine

Searles Valley PM10 nonattainment area determined by difference (Total of North and South Ranges less Owens Valley, Inyo County attainment, and Mojave Desert)

TABLE D2-4. ESTIMATE OF ANNUAL RANGE-RELATED FLIGHT OPERATIONS AT NAWS CHINA LAKE: MODERATE EXPANSION ALTERNATIVE

Subarea	Altitude (AGL) Of Radar Track Flight Segment	China Lake Adjustment Factor	CUMULATIVE HOURS BY AIRCRAFT TYPE																	Cum Hours	Percent Of Time
			AH-1W	UH-1L	HH-1N	CH-46E	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	C-12	C-130		
Airport Lake	Under 3,000 ft AGL	0.899	7.19	0.34	1.01	0.00	0.00	0.00	19.88	21.54	1.26	5.03	0.00	0.00	1.53	1.26	0.00	0.00	0.00	59.04	22.77%
	Over 3,000 ft AGL		0.30	0.00	0.00	10.96	0.00	0.00	65.61	71.08	9.49	25.88	0.03	0.06	15.34	1.41	0.00	0.00	0.09	200.25	77.23%
	Total		7.49	0.34	1.01	10.96	0.00	0.00	85.49	92.62	10.75	30.91	0.03	0.06	16.86	2.67	0.00	0.00	0.09	259.28	100.00%
Baker North	Under 3,000 ft AGL	0.384	4.39	0.33	0.98	13.48	0.00	0.00	6.53	7.07	0.00	3.36	0.23	0.46	0.08	0.00	0.00	0.00	0.00	36.91	30.18%
	Over 3,000 ft AGL		0.77	0.00	0.00	4.05	0.42	0.00	24.44	26.48	4.29	20.84	1.09	2.18	0.78	0.00	0.00	0.00	0.04	85.37	69.82%
	Total		5.16	0.33	0.98	17.53	0.42	0.00	30.97	33.55	4.29	24.20	1.32	2.64	0.86	0.00	0.00	0.00	0.04	122.28	100.00%
Baker South	Under 3,000 ft AGL	0.384	2.84	0.09	0.27	2.15	1.68	0.00	22.73	24.63	1.88	55.56	4.41	8.82	0.00	0.00	0.00	0.00	0.00	125.06	31.13%
	Over 3,000 ft AGL		0.00	0.00	0.00	1.74	1.19	0.00	69.34	75.12	5.39	100.49	7.76	15.52	0.10	0.00	0.00	0.00	0.04	276.70	68.87%
	Total		2.84	0.09	0.27	3.89	2.87	0.00	92.07	99.75	7.27	156.06	12.17	24.34	0.10	0.00	0.00	0.00	0.04	401.76	100.00%
Charlie North	Under 3,000 ft AGL	0.384	10.44	0.32	0.95	28.25	0.00	0.00	4.69	5.08	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.38	80.92%
	Over 3,000 ft AGL		0.38	0.00	0.00	1.42	0.00	0.00	4.31	4.67	0.85	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.07	11.88	19.08%
	Total		10.82	0.32	0.95	29.67	0.00	0.00	9.00	9.75	0.85	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.07	62.26	100.00%
Charlie South	Under 3,000 ft AGL	0.384	21.84	2.45	7.36	48.51	0.08	0.00	42.85	46.42	0.14	22.86	0.12	0.25	0.04	0.04	1.84	0.00	12.20	207.00	68.32%
	Over 3,000 ft AGL		0.51	0.00	0.00	1.61	0.08	0.00	38.17	41.35	3.79	8.46	0.01	0.03	0.12	0.01	0.00	0.00	1.84	95.97	31.68%
	Total		22.35	2.45	7.36	50.12	0.15	0.00	81.02	87.77	3.93	31.32	0.14	0.27	0.15	0.05	1.84	0.00	14.04	302.97	100.00%
Coso	Under 3,000 ft AGL	0.472	0.50	1.14	3.43	0.00	0.00	0.00	5.14	5.57	0.42	2.99	0.83	1.67	0.00	1.49	0.00	0.00	0.00	23.20	15.33%
	Over 3,000 ft AGL		0.00	0.80	2.41	1.09	0.00	0.00	38.53	41.75	9.27	18.84	2.56	5.11	5.11	1.12	0.00	0.14	1.46	128.19	84.67%
	Total		0.50	1.95	5.84	1.09	0.00	0.00	43.68	47.32	9.69	21.83	3.39	6.78	5.11	2.61	0.00	0.14	1.46	151.39	100.00%
Coso Targets	Under 3,000 ft AGL	0.472	5.00	1.29	3.86	0.94	0.00	0.00	14.31	15.50	0.00	4.42	0.00	0.00	0.00	0.69	0.00	0.00	0.00	46.01	30.76%
	Over 3,000 ft AGL		0.05	0.80	2.41	6.61	0.00	0.00	35.53	38.49	0.33	18.62	0.00	0.00	0.47	0.17	0.00	0.09	0.00	103.58	69.24%
	Total		5.05	2.09	6.26	7.55	0.00	0.00	49.84	53.99	0.33	23.04	0.00	0.00	0.47	0.87	0.00	0.09	0.00	149.59	100.00%
Geothermal	Under 3,000 ft AGL	1.000	0.00	0.03	0.08	0.00	0.00	0.00	0.45	0.49	0.00	1.17	0.00	0.00	0.00	0.07	0.00	0.00	0.00	2.27	10.46%
	Over 3,000 ft AGL		0.33	0.03	0.08	3.80	0.00	0.00	3.63	3.93	0.30	7.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.40	89.54%
	Total		0.33	0.05	0.15	3.80	0.00	0.00	4.08	4.42	0.30	8.47	0.00	0.00	0.00	0.07	0.00	0.00	0.00	21.67	100.00%
George & Main Magazine	Under 3,000 ft AGL	1.141	19.77	2.91	8.73	0.34	0.00	0.00	18.54	20.09	3.12	29.09	0.04	0.08	0.61	3.57	0.00	0.57	1.35	108.81	13.50%
	Over 3,000 ft AGL		1.14	0.00	0.00	5.02	1.37	0.00	235.66	255.29	39.70	74.87	8.45	16.91	34.15	6.16	0.00	0.34	18.37	697.42	86.50%
	Total		20.91	2.91	8.73	5.36	1.37	0.00	254.20	275.38	42.82	103.96	8.49	16.98	34.75	9.73	0.00	0.91	19.72	806.23	100.00%
Mainsite & Armitage Airfield	Under 3,000 ft AGL	0.899	0.09	0.00	0.00	0.00	0.00	0.00	3.39	3.68	0.00	3.74	0.00	0.00	0.00	0.03	0.00	0.00	0.07	11.01	7.47%
	Over 3,000 ft AGL		1.50	0.00	0.00	0.00	0.72	0.00	47.29	51.23	10.78	4.13	2.20	4.40	0.00	0.00	0.27	0.00	13.84	136.36	92.53%
	Total		1.59	0.00	0.00	0.00	0.72	0.00	50.68	54.90	10.78	7.88	2.20	4.40	0.00	0.03	0.27	0.00	13.91	147.36	100.00%
Propulsion Labs and Ordnance T&E	Under 3,000 ft AGL	0.899	0.24	0.52	1.55	0.00	0.00	0.00	0.19	0.20	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.09	3.09	2.14%
	Over 3,000 ft AGL		0.00	0.00	0.00	0.00	0.81	0.00	47.08	51.00	4.58	13.69	5.64	11.28	6.02	0.00	0.00	0.00	1.08	141.18	97.86%
	Total		0.24	0.52	1.55	0.00	0.81	0.00	47.26	51.20	4.58	13.99	5.64	11.28	6.02	0.00	0.00	0.00	1.17	144.26	100.00%
Mojave B North	Under 3,000 ft AGL	2.266	0.00	2.34	7.02	0.00	0.00	0.00	67.29	72.90	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	149.79	15.90%
	Over 3,000 ft AGL		0.00	0.19	0.57	0.00	0.00	0.00	328.35	355.72	31.42	66.38	3.16	6.32	0.00	0.00	0.00	0.00	0.00	792.10	84.10%
	Total		0.00	2.53	7.59	0.00	0.00	0.00	395.65	428.62	31.42	66.61	3.16	6.32	0.00	0.00	0.00	0.00	0.00	941.89	100.00%

TABLE D2-4. ESTIMATE OF ANNUAL RANGE-RELATED FLIGHT OPERATIONS AT NAWS CHINA LAKE: MODERATE EXPANSION ALTERNATIVE

Subarea	Altitude (AGL) Of Radar Track Flight Segment	China Lake Adjustment Factor	CUMULATIVE HOURS BY AIRCRAFT TYPE																	Cum Hours	Percent Of Time
			AH-1W	UH-1L	HH-1N	CH-46E	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	C-12	C-130		
Mojave B South	Under 3,000 ft AGL	2.266	1.81	5.72	17.16	0.91	0.00	0.57	47.88	51.87	0.38	0.00	0.00	0.00	0.00	0.00	0.23	0.00	1.81	128.34	23.91%
	Over 3,000 ft AGL		10.19	2.66	7.99	5.59	0.00	0.00	142.42	154.29	12.31	68.19	0.06	0.13	0.00	0.00	4.38	0.00	0.23	408.43	76.09%
	Total		12.01	8.38	25.15	6.49	0.00	0.57	190.30	206.16	12.69	68.19	0.06	0.13	0.00	0.00	4.61	0.00	2.04	536.77	100.00%
Randsburg Wash	Under 3,000 ft AGL	2.266	0.23	8.00	24.01	0.00	0.00	0.23	70.68	76.57	1.51	7.63	0.00	0.00	0.00	0.00	0.00	0.00	12.08	200.95	18.21%
	Over 3,000 ft AGL		0.23	3.23	9.69	0.23	0.00	0.00	343.13	371.72	45.54	104.74	0.00	0.00	0.00	0.00	0.00	0.00	24.01	902.50	81.79%
	Total		0.45	11.23	33.70	0.23	0.00	0.23	413.81	448.29	47.05	112.37	0.00	0.00	0.00	0.00	0.00	0.00	36.10	1,103.45	100.00%
Superior Valley	Under 3,000 ft AGL	2.266	1.13	0.00	0.00	0.00	0.00	0.19	18.49	20.03	19.03	6.42	0.00	0.00	0.00	0.00	19.48	0.00	2.95	87.71	12.36%
	Over 3,000 ft AGL		8.84	0.00	0.00	7.17	0.00	0.00	162.68	176.24	93.64	91.75	0.00	0.00	0.00	0.00	70.83	0.00	10.65	621.81	87.64%
	Total		9.97	0.00	0.00	7.17	0.00	0.19	181.17	196.27	112.67	98.17	0.00	0.00	0.00	0.00	90.32	0.00	13.59	709.52	100.00%
North Range Subtotal	Under 3,000 ft AGL		72.31	9.40	28.21	93.68	1.75	0.00	138.70	150.26	6.82	129.18	5.64	11.27	2.25	7.15	1.84	0.57	13.71	672.77	26.19%
	Over 3,000 ft AGL		4.98	1.63	4.89	36.30	4.59	0.00	609.58	660.38	88.77	293.32	27.74	55.49	62.08	8.87	0.27	0.58	36.82	1,896.30	73.81%
	Total		77.29	11.03	33.10	129.98	6.34	0.00	748.29	810.64	95.59	422.50	33.38	66.76	64.34	16.02	2.11	1.15	50.53	2,569.06	100.00%
South Range Subtotal	Under 3,000 ft AGL		3.17	16.07	48.20	0.91	0.00	0.98	204.35	221.38	20.92	14.27	0.00	0.00	0.00	0.00	19.71	0.00	16.84	566.79	17.22%
	Over 3,000 ft AGL		19.26	6.08	18.24	12.99	0.00	0.00	976.58	1,057.96	182.90	331.07	3.22	6.44	0.00	0.00	75.21	0.00	34.89	2,724.84	82.78%
	Total		22.43	22.15	66.44	13.90	0.00	0.98	1,180.93	1,279.34	203.82	345.34	3.22	6.44	0.00	0.00	94.92	0.00	51.73	3,291.63	100.00%
Combined North and South Ranges	Under 3,000 ft AGL		75.48	25.47	76.41	94.59	1.75	0.98	343.05	371.64	27.74	143.46	5.64	11.27	2.25	7.15	21.55	0.57	30.55	1,239.56	21.15%
	Over 3,000 ft AGL		24.24	7.71	23.13	49.29	4.59	0.00	1,586.16	1,718.34	271.67	624.38	30.97	61.93	62.08	8.87	75.48	0.58	71.71	4,621.14	78.85%
	Total		99.72	33.18	99.53	143.87	6.34	0.98	1,929.22	2,089.98	299.41	767.84	36.60	73.20	64.34	16.02	97.04	1.15	102.26	5,860.70	100.00%
Annual Flight Hours Below 3000 Ft AGL:																					
Kern County Ozone Nonattainment Area			26.75	2.83	8.50	50.69	1.75	0.00	70.66	76.55	2.34	84.89	4.54	9.07	0.10	0.42	1.84	0.06	12.40	353.40	28.51%
Owens Valley PM10 Nonattainment Area			2.50	0.64	1.93	0.47	0.00	0.00	7.15	7.75	0.00	2.21	0.00	0.00	0.00	0.35	0.00	0.00	0.00	23.01	1.86%
Searles Valley PM10 Nonattainment Area			68.69	10.29	30.88	93.15	1.75	0.10	147.92	160.25	6.93	126.07	5.30	10.60	2.24	6.03	1.87	0.56	16.28	688.92	55.58%
Mojave Desert PM10 Nonattainment Area			2.95	13.82	41.47	0.82	0.00	0.88	183.40	198.69	20.58	12.74	0.00	0.00	0.00	0.00	19.69	0.00	14.24	509.27	41.09%
Inyo County Attainment Area			1.35	0.71	2.13	0.15	0.00	0.00	4.57	4.96	0.23	2.44	0.33	0.67	0.01	0.77	0.00	0.01	0.03	18.36	1.48%

NOTES:

Adjusted flight hours for the No Action Alternative (Table D2-2) increased by 25% for the Moderate Expansion Alternative.

Kern County ozone nonattainment area includes Baker South, Charlie South, 10% of George/Main Magazines, and 95% of Mainsite/Armitage Airfield

Owens Valley PM10 nonattainment area includes 50% of the Coso Targets area.

Mojave Desert PM10 nonattainment area includes 97% of Mojave B North, 90% of Mojave B South, 80% of Randsburg Wash, and Superior Valley

Inyo County attainment area includes 15% of Coso Targets, 40% of Coso Range, and 2% of George/Main Magazine

Searles Valley PM10 nonattainment area determined by difference (Total of North and South Ranges less Owens Valley, Inyo County attainment, and Mojave Desert)

TABLE D2-5. POWER SETTINGS AND EMISSION RATE PARAMETERS USED TO ESTIMATE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY

EMISSIONS ANALYSIS PARAMETERS	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F-18A-D	F-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	A-6E	EA-6B	T-38	UC-12	C-130
Power Setting	38% Q	NR	54% Q	45% Q	64% Q	100%	85%	85%	87%	84.9%	85%	85%	75% T	75% T	Int 2	90% NR	100%	90% shp
Number of Engines	2	1	2	2	3	1	2	2	1	1	2	2	2	2	2	2	2	4
Fuel Flow (lbs/hour per engine)	425.1	645.0	346.2	551.0	1,382	215.0	2,595	3,357	4,380	9,811	2,515	3,660	7,578	4,320	5,752	2,615	510	2,050
ROG Emission Rate (lbs/1000 lb fuel)	0.56	0.66	0.13	0.91	0.28	0.08	0.54	0.13	0.63	0.50	3.49	0.82	1.85	0.67	0.67	0.52	1.75	0.17
NOx Emission Rate (lbs/1000 lb fuel)	5.55	6.43	5.79	6.96	7.65	5.07	5.45	9.71	9.55	9.20	6.43	8.03	8.26	10.10	8.38	6.14	9.78	10.18
CO Emission Rate (lbs/1000 lb fuel)	10.54	6.83	1.01	18.74	2.63	7.54	4.43	1.40	1.14	6.80	8.48	1.48	2.74	3.00	3.18	24.11	5.10	0.78
SOx Emission Rate (lbs/1000 lb fuel)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
PM1O Emission Rate (lbs/1000 lb fuel)	4.20	4.20	4.20	4.20	2.21	4.20	7.62	6.55	5.45	3.60	7.98	6.20	5.28	10.35	8.67	10.04	1.75	11.90
Data Sources (AESO Memo #)																		
ROG, NOx, CO, SOx:	#9709A	#6-90	#9809	#9820	#9905	#6-90	#9734A	#9725A	#9821	#9912	#9901	#9821	#6-90	#6-90	#6-90	#6-90	EPA 92	#9908A
PM10:	#6-90	#6-90	#6-90	#6-90	#6-90	#6-90	#9734A	#9725A	#9821	#9912	#6-90	#9821	#6-90	#6-90	#6-90	#9620	EPA 92	#9908A

Notes: % = % core rpm
% Q = % torque
% T = % thrust
% NR = % normal rated power
% shp = persent of rated shaft horsepower
Int 2 = intermediate power setting
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Power settings for range-related flight activity modified from settings identified in the Wyle (1998) radar flight track analysis based on AESO recommendations
Engine model identifications are provided in Table D1-23.
Citations for data sources are provided in the text section of Appendix D2.

TABLE D2-6. REACTIVE ORGANIC COMPOUND EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE NO ACTION ALTERNATIVE

	ANNUAL EMISSIONS OF REACTIVE ORGANIC COMPOUNDS, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
ROG Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.005	0.000	0.000	0.020	0.001	0.000	0.079	0.027	0.002	0.166	0.031	0.021	0.001	0.001	0.002	0.000	0.007	0.364
Owens Valley PM10 Nonattainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.003	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.016
Searles Valley PM10 Nonattainment Area	0.013	0.002	0.001	0.036	0.001	0.000	0.164	0.055	0.007	0.246	0.036	0.025	0.022	0.016	0.002	0.000	0.009	0.633
Mojave Desert PM10 Nonattainment Area	0.000	0.002	0.001	0.000	0.000	0.000	0.204	0.069	0.022	0.024	0.000	0.000	0.000	0.000	0.021	0.000	0.008	0.352
Inyo County Attainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.002	0.000	0.005	0.002	0.001	0.000	0.002	0.000	0.000	0.000	0.018
TOTAL:	0.014	0.004	0.003	0.037	0.001	0.000	0.381	0.129	0.029	0.279	0.038	0.026	0.022	0.018	0.022	0.000	0.016	1.019

NOTES:

Range flight hours under 3,000 feet AGL are from the summary at the bottom of Table D2-2.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Pounds of ROG = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-7. NITROGEN OXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE NO ACTION ALTERNATIVE

	ANNUAL EMISSIONS OF NITROGEN OXIDES, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
3,000 FEET AGL:																		
Kern County Ozone Nonattainment Area	0.050	0.005	0.013	0.153	0.020	0.000	0.796	1.987	0.033	3.061	0.058	0.210	0.004	0.014	0.020	0.000	0.413	6.839
Owens Valley PM10 Nonattainment Area	0.004	0.001	0.003	0.001	0.000	0.000	0.080	0.200	0.000	0.077	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.378
Searles Valley PM10 Nonattainment Area	0.127	0.016	0.047	0.278	0.020	0.000	1.653	4.126	0.100	4.527	0.066	0.240	0.097	0.194	0.020	0.002	0.535	12.049
Mojave Desert PM10 Nonattainment Area	0.005	0.020	0.059	0.002	0.000	0.000	2.062	5.148	0.335	0.446	0.000	0.000	0.000	0.000	0.247	0.000	0.450	8.774
Inyo County Attainment Area	0.002	0.001	0.003	0.000	0.000	0.000	0.050	0.126	0.003	0.087	0.004	0.013	0.001	0.025	0.000	0.000	0.001	0.317
TOTAL:	0.138	0.039	0.112	0.282	0.020	0.000	3.845	9.600	0.439	5.137	0.070	0.253	0.097	0.230	0.267	0.002	0.986	21.519

NOTES:

Range flight hours under 3,000 feet AGL are from the summary at the bottom of Table D2-2.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of NOx = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-8. CARBON MONOXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE NO ACTION ALTERNATIVE

	ANNUAL EMISSIONS OF CARBON MONOXIDE, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
CO Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.095	0.005	0.002	0.413	0.007	0.000	0.647	0.287	0.004	2.262	0.076	0.039	0.001	0.005	0.078	0.000	0.032	3.953
Owens Valley PM10 Nonattainment Are	0.008	0.001	0.000	0.003	0.000	0.000	0.065	0.029	0.000	0.057	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.169
Searles Valley PM10 Nonattainment Are	0.241	0.017	0.008	0.749	0.007	0.000	1.343	0.595	0.012	3.346	0.087	0.044	0.032	0.074	0.078	0.001	0.041	6.677
Mojave Desert PM10 Nonattainment Are	0.009	0.022	0.010	0.006	0.000	0.001	1.676	0.742	0.040	0.329	0.000	0.000	0.000	0.000	0.970	0.000	0.034	3.839
Inyo County Attainment Area	0.005	0.001	0.001	0.001	0.000	0.000	0.041	0.018	0.000	0.065	0.005	0.002	0.000	0.009	0.000	0.000	0.000	0.148
TOTAL:	0.263	0.041	0.020	0.759	0.007	0.001	3.125	1.384	0.052	3.797	0.092	0.047	0.032	0.087	1.049	0.001	0.076	10.833

NOTES:

Range flight hours under 3,000 feet AGL are from the summary at the bottom of Table D2-2.
Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of CO = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-9. SULFUR OXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE NO ACTION ALTERNATIVE

	ANNUAL EMISSIONS OF SULFUR OXIDES, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	H-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
SOx Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.004	0.000	0.001	0.009	#####	0.000	0.058	0.082	0.001	0.133	0.004	0.010	0.000	0.001	0.001	0.000	0.016	0.322
Owens Valley PM10 Nonattainment Area	0.000	0.000	0.000	0.000	#####	0.000	0.006	0.008	0.000	0.003	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.019
Searles Valley PM10 Nonattainment Area	0.009	0.001	0.003	0.016	#####	0.000	0.121	0.170	0.004	0.197	0.004	0.012	0.005	0.009	0.001	0.000	0.021	0.575
Mojave Desert PM10 Nonattainment Area	0.000	0.001	0.004	0.000	#####	0.000	0.151	0.212	0.014	0.019	0.000	0.000	0.000	0.000	0.016	0.000	0.018	0.436
Inyo County Attainment Area	0.000	0.000	0.000	0.000	#####	0.000	0.004	0.005	0.000	0.004	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.015
TOTAL:	0.010	0.002	0.008	0.016	#####	0.000	0.282	0.395	0.018	0.223	0.004	0.013	0.005	0.011	0.017	0.000	0.039	1.046

NOTES:

Range flight hours under 3,000 feet AGL are from the summary at the bottom of Table D2-2.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of SOx = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-10. INHALABLE PARTICULATE MATTER EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE NO ACTION ALTERNATIVE

	ANNUAL EMISSIONS OF INHALABLE PARTICULATE MATTER, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14	F-14	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
PM10 Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.038	0.003	0.010	0.093	0.006	0.000	1.113	1.341	0.019	1.198	0.072	0.162	0.003	0.014	0.032	0.000	0.483	4.586
Owens Valley PM10 Nonattainment Area	0.003	0.001	0.002	0.001	0.000	0.000	0.112	0.135	0.000	0.030	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.296
Searles Valley PM10 Nonattainment Area	0.096	0.011	0.034	0.168	0.006	0.000	2.311	2.783	0.057	1.771	0.082	0.186	0.062	0.201	0.033	0.000	0.626	8.426
Mojave Desert PM10 Nonattainment Area	0.004	0.013	0.043	0.001	0.000	0.000	2.883	3.473	0.191	0.174	0.000	0.000	0.000	0.000	0.404	0.000	0.526	7.712
Inyo County Attainment Area	0.002	0.001	0.002	0.000	0.000	0.000	0.070	0.085	0.002	0.034	0.004	0.010	0.000	0.026	0.000	0.000	0.001	0.238
TOTAL:	0.105	0.025	0.081	0.170	0.006	0.000	5.376	6.476	0.251	2.010	0.087	0.196	0.062	0.238	0.437	0.000	1.153	16.672

NOTES:

Range flight hours under 3,000 feet AGL are from the summary at the bottom of Table D2-2.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of PM10 = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-11. REACTIVE ORGANIC COMPOUND EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE LIMITED EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF REACTIVE ORGANIC COMPOUNDS, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
ROG Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.006	0.001	0.000	0.023	0.001	0.000	0.091	0.031	0.003	0.191	0.036	0.025	0.001	0.001	0.002	0.000	0.008	0.419
Owens Valley PM10 Nonattainment Area	0.001	0.000	0.000	0.000	0.000	0.000	0.009	0.003	0.000	0.005	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.019
Searles Valley PM10 Nonattainment Are	0.015	0.002	0.001	0.042	0.001	0.000	0.188	0.064	0.008	0.283	0.041	0.028	0.025	0.018	0.002	0.000	0.010	0.728
Mojave Desert PM10 Nonattainment Are	0.001	0.002	0.002	0.000	0.000	0.000	0.235	0.079	0.025	0.028	0.000	0.000	0.000	0.000	0.024	0.000	0.009	0.405
Inyo County Attainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.002	0.000	0.005	0.002	0.002	0.000	0.002	0.000	0.000	0.000	0.020
TOTAL:	0.016	0.005	0.003	0.043	0.001	0.000	0.438	0.148	0.033	0.321	0.044	0.030	0.025	0.021	0.026	0.000	0.019	1.172

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-3.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of ROG = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-12. NITROGEN OXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE LIMITED EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF NITROGEN OXIDES, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
NOx Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.057	0.005	0.015	0.176	0.023	0.000	0.915	2.285	0.038	3.520	0.067	0.242	0.005	0.016	0.023	0.000	0.475	7.864
Owens Valley PM10 Nonattainment Area	0.005	0.001	0.003	0.001	0.000	0.000	0.092	0.230	0.000	0.089	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.435
Searles Valley PM10 Nonattainment Are	0.146	0.019	0.054	0.320	0.023	0.000	1.900	4.745	0.115	5.206	0.076	0.276	0.111	0.223	0.023	0.002	0.616	13.857
Mojave Desert PM10 Nonattainment Are	0.005	0.023	0.068	0.002	0.000	0.000	2.371	5.920	0.386	0.512	0.000	0.000	0.000	0.000	0.284	0.000	0.518	10.090
Inyo County Attainment Area	0.003	0.001	0.004	0.000	0.000	0.000	0.058	0.144	0.004	0.100	0.004	0.015	0.001	0.029	0.000	0.000	0.001	0.364
TOTAL:	0.159	0.045	0.129	0.324	0.023	0.000	4.422	11.040	0.505	5.908	0.080	0.291	0.112	0.264	0.307	0.002	1.134	24.746

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-3.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of NOx = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-13. CARBON MONOXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE LIMITED EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF CARBON MONOXIDE, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
CO Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.109	0.006	0.003	0.475	0.008	0.000	0.744	0.330	0.005	2.602	0.088	0.045	0.002	0.006	0.089	0.000	0.036	4.546
Owens Valley PM10 Nonattainment Area	0.010	0.001	0.001	0.004	0.000	0.000	0.075	0.033	0.000	0.066	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.194
Searles Valley PM10 Nonattainment Are	0.277	0.020	0.010	0.862	0.008	0.000	1.545	0.684	0.014	3.848	0.100	0.051	0.037	0.085	0.090	0.001	0.047	7.678
Mojave Desert PM10 Nonattainment Are	0.010	0.025	0.012	0.006	0.000	0.001	1.927	0.854	0.046	0.379	0.000	0.000	0.000	0.000	1.116	0.000	0.040	4.415
Inyo County Attainment Area	0.005	0.001	0.001	0.001	0.000	0.000	0.047	0.021	0.000	0.074	0.005	0.003	0.000	0.011	0.000	0.000	0.000	0.170
TOTAL:	0.302	0.047	0.023	0.873	0.008	0.001	3.594	1.592	0.060	4.367	0.106	0.054	0.037	0.100	1.206	0.001	0.087	12.458

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-3.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of CO = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-14. SULFUR OXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE LIMITED EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF SULFUR OXIDES, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
SOx Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.004	0.000	0.001	0.010	0.001	0.000	0.067	0.094	0.002	0.153	0.004	0.012	0.000	0.001	0.001	0.000	0.019	0.370
Owens Valley PM10 Nonattainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.009	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.021
Searles Valley PM10 Nonattainment Area	0.011	0.001	0.004	0.018	0.001	0.000	0.139	0.195	0.005	0.226	0.005	0.014	0.005	0.011	0.001	0.000	0.024	0.661
Mojave Desert PM10 Nonattainment Area	0.000	0.001	0.005	0.000	0.000	0.000	0.174	0.244	0.016	0.022	0.000	0.000	0.000	0.000	0.019	0.000	0.020	0.502
Inyo County Attainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.006	0.000	0.004	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.018
TOTAL:	0.011	0.003	0.009	0.019	0.001	0.000	0.325	0.455	0.021	0.257	0.005	0.015	0.005	0.013	0.020	0.000	0.045	1.203

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-3.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of SOx = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-15. INHALABLE PARTICULATE MATTER EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE LIMITED EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF INHALABLE PARTICULATE MATTER, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
PM10 Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.043	0.003	0.011	0.106	0.007	0.000	1.280	1.542	0.022	1.377	0.083	0.187	0.003	0.016	0.037	0.000	0.556	5.274
Owens Valley PM10 Nonattainment Area	0.004	0.001	0.002	0.001	0.000	0.000	0.129	0.155	0.000	0.035	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.340
Searles Valley PM10 Nonattainment Are	0.110	0.012	0.040	0.193	0.007	0.000	2.657	3.201	0.066	2.037	0.094	0.213	0.071	0.231	0.038	0.000	0.720	9.690
Mojave Desert PM10 Nonattainment Are	0.004	0.015	0.049	0.001	0.000	0.000	3.315	3.994	0.220	0.201	0.000	0.000	0.000	0.000	0.465	0.000	0.605	8.869
Inyo County Attainment Area	0.002	0.001	0.003	0.000	0.000	0.000	0.081	0.097	0.002	0.039	0.005	0.012	0.000	0.030	0.000	0.000	0.001	0.273
TOTAL:	0.120	0.029	0.094	0.196	0.007	0.000	6.182	7.447	0.288	2.312	0.100	0.225	0.071	0.274	0.502	0.000	1.326	19.173

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-3.

Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of PM10 = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-16. REACTIVE ORGANIC COMPOUND EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE MODERATE EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF REACTIVE ORGANIC COMPOUNDS, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
ROG Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.006	0.001	0.000	0.025	0.001	0.000	0.099	0.033	0.003	0.208	0.040	0.027	0.001	0.002	0.002	0.000	0.009	0.459
Owens Valley PM10 Nonattainment Area	0.001	0.000	0.000	0.000	0.000	0.000	0.010	0.003	0.000	0.005	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.021
Searles Valley PM10 Nonattainment Area	0.016	0.002	0.001	0.047	0.001	0.000	0.207	0.070	0.010	0.309	0.047	0.032	0.031	0.023	0.003	0.000	0.011	0.811
Mojave Desert PM10 Nonattainment Area	0.001	0.003	0.002	0.000	0.000	0.000	0.257	0.087	0.028	0.031	0.000	0.000	0.000	0.000	0.027	0.000	0.010	0.446
Inyo County Attainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.002	0.000	0.006	0.003	0.002	0.000	0.003	0.000	0.000	0.000	0.024
TOTAL:	0.018	0.005	0.003	0.048	0.001	0.000	0.481	0.162	0.038	0.352	0.049	0.034	0.032	0.028	0.029	0.001	0.021	1.302

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-4.
Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of ROG = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-17. NITROGEN OXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE MODERATE EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF NITROGEN OXIDES, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
NOx Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.063	0.006	0.017	0.194	0.028	0.000	0.999	2.495	0.049	3.831	0.073	0.267	0.006	0.020	0.030	0.000	0.518	8.597
Owens Valley PM10 Nonattainment Area	0.006	0.001	0.004	0.002	0.000	0.000	0.101	0.253	0.000	0.100	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.483
Searles Valley PM10 Nonattainment Area	0.162	0.021	0.062	0.357	0.028	0.000	2.092	5.223	0.145	5.689	0.086	0.312	0.140	0.291	0.030	0.003	0.680	15.321
Mojave Desert PM10 Nonattainment Area	0.007	0.029	0.083	0.003	0.000	0.000	2.594	6.476	0.430	0.575	0.000	0.000	0.000	0.000	0.316	0.000	0.594	11.108
Inyo County Attainment Area	0.003	0.001	0.004	0.001	0.000	0.000	0.065	0.162	0.005	0.110	0.005	0.020	0.001	0.037	0.000	0.000	0.001	0.415
TOTAL:	0.178	0.053	0.153	0.363	0.028	0.001	4.852	12.113	0.580	6.474	0.091	0.331	0.141	0.345	0.346	0.003	1.275	27.327

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-4.
Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of NOx = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-18. CARBON MONOXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE MODERATE EXPANSION ALTERNATIVE

	AN ANNUAL EMISSIONS OF CARBON MONOXIDE, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
CO Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.120	0.006	0.003	0.523	0.010	0.000	0.812	0.360	0.006	2.832	0.097	0.049	0.002	0.008	0.116	0.000	0.040	4.983
Owens Valley PM10 Nonattainment Area	0.011	0.001	0.001	0.005	0.000	0.000	0.082	0.036	0.000	0.074	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.217
Searles Valley PM10 Nonattainment Are	0.308	0.023	0.011	0.962	0.010	0.000	1.700	0.753	0.017	4.205	0.113	0.057	0.046	0.110	0.118	0.001	0.052	8.487
Mojave Desert PM10 Nonattainment Are	0.013	0.030	0.015	0.008	0.000	0.001	2.108	0.934	0.051	0.425	0.000	0.000	0.000	0.000	1.241	0.000	0.046	4.873
Inyo County Attainment Area	0.006	0.002	0.001	0.002	0.000	0.000	0.053	0.023	0.001	0.081	0.007	0.004	0.000	0.014	0.000	0.000	0.000	0.193
TOTAL:	0.338	0.056	0.027	0.977	0.010	0.001	3.944	1.747	0.069	4.785	0.120	0.061	0.047	0.131	1.359	0.001	0.098	13.770

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-4.
Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of CO = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-19. SULFUR OXIDE EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE MODERATE EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF SULFUR OXIDES, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14A	F-14B/D	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
BELOW 3,000 FEET AGL:																		
Kern County Ozone Nonattainment Area	0.005	0.000	0.001	0.011	0.001	0.000	0.073	0.103	0.002	0.167	0.005	0.013	0.000	0.001	0.002	0.000	0.020	0.405
Owens Valley PM10 Nonattainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.010	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.024
Searles Valley PM10 Nonattainment Are	0.012	0.001	0.004	0.021	0.001	0.000	0.154	0.215	0.006	0.247	0.005	0.016	0.007	0.014	0.002	0.000	0.027	0.732
Mojave Desert PM10 Nonattainment Are	0.001	0.002	0.006	0.000	0.000	0.000	0.190	0.267	0.018	0.025	0.000	0.000	0.000	0.000	0.021	0.000	0.023	0.552
Inyo County Attainment Area	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.007	0.000	0.005	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.020
TOTAL:	0.013	0.003	0.011	0.021	0.001	0.000	0.356	0.499	0.024	0.281	0.006	0.017	0.007	0.016	0.023	0.000	0.050	1.328

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-4.
Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of SOx = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-20. INHALABLE PARTICULATE MATTER EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY AT NAWS CHINA LAKE UNDER THE MODERATE EXPANSION ALTERNATIVE

	ANNUAL EMISSIONS OF INHALABLE PARTICULATE MATTER, TONS PER YEAR																	
	AH-1W	UH-1L	HH-1N	CH-46	CH-53E	OH-58	F/A-18C/D	F/A-18E/F	F-16	AV-8B	F-14	F-14	F-4	EA-6B	T-38	UC-12	C-130	TOTALS
PM10 Emissions Below 3000 Ft AGL:																		
Kern County Ozone Nonattainment Area	0.048	0.004	0.012	0.117	0.008	0.000	1.397	1.683	0.028	1.499	0.091	0.206	0.004	0.021	0.048	0.000	0.605	5.772
Owens Valley PM10 Nonattainment Area	0.004	0.001	0.003	0.001	0.000	0.000	0.141	0.170	0.000	0.039	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.377
Searles Valley PM10 Nonattainment Are	0.123	0.014	0.045	0.216	0.008	0.000	2.925	3.523	0.083	2.226	0.106	0.241	0.090	0.301	0.049	0.000	0.794	10.744
Mojave Desert PM10 Nonattainment Are	0.005	0.019	0.060	0.002	0.000	0.000	3.627	4.369	0.246	0.225	0.000	0.000	0.000	0.000	0.517	0.000	0.695	9.764
Inyo County Attainment Area	0.002	0.001	0.003	0.000	0.000	0.000	0.090	0.109	0.003	0.043	0.007	0.015	0.000	0.039	0.000	0.000	0.001	0.314
TOTAL:	0.135	0.034	0.111	0.219	0.008	0.000	6.783	8.171	0.331	2.533	0.113	0.256	0.090	0.357	0.566	0.001	1.491	21.200

NOTES:

Flight hours under 3,000 feet AGL are from Table D2-4.
Fuel flow per hour per engine, number of engines, and emissions per 1000 pounds of fuel are from Table D2-5

Lb of PM10 = hours below 3000' X fuel flow per hour per engine X number of engines X emissions per 1000 lbs of fuel / 1000

TABLE D2-21. SUMMARY OF EMISSIONS FROM RANGE-RELATED FLIGHT ACTIVITY

EMISSIONS SUMMARY FOR THE NO ACTION ALTERNATIVE:

CONFORMITY ANALYSIS AREA	ANNUAL EMISSIONS, TONS PER YEAR				
	ROG	NOx	CO	SOx	PM10
Kern County Ozone Nonattainment Area	0.36	6.84	3.95	0.32	4.59
Owens Valley PM10 Nonattainment Area	0.02	0.38	0.17	0.02	0.30
Searles Valley PM10 Nonattainment Area	0.63	12.05	6.68	0.58	8.43
Mojave Desert PM10 Nonattainment Area	0.35	8.77	3.84	0.44	7.71
Inyo County Attainment Area	0.02	0.32	0.15	0.02	0.24
NAWS CHINA LAKE TOTAL	1.02	21.52	10.83	1.05	16.67

EMISSIONS SUMMARY FOR THE LIMITED EXPANSION ALTERNATIVE:

CONFORMITY ANALYSIS AREA	ANNUAL EMISSIONS, TONS PER YEAR				
	ROG	NOx	CO	SOx	PM10
Kern County Ozone Nonattainment Area	0.42	7.86	4.55	0.37	5.27
Owens Valley PM10 Nonattainment Area	0.02	0.44	0.19	0.02	0.34
Searles Valley PM10 Nonattainment Area	0.73	13.86	7.68	0.66	9.69
Mojave Desert PM10 Nonattainment Area	0.40	10.09	4.42	0.50	8.87
Inyo County Attainment Area	0.02	0.36	0.17	0.02	0.27
NAWS CHINA LAKE TOTAL	1.17	24.75	12.46	1.20	19.17

EMISSIONS SUMMARY FOR THE MODERATE EXPANSION ALTERNATIVE:

CONFORMITY ANALYSIS AREA	ANNUAL EMISSIONS, TONS PER YEAR				
	ROG	NOx	CO	SOx	PM10
Kern County Ozone Nonattainment Area	0.46	8.60	4.98	0.40	5.77
Owens Valley PM10 Nonattainment Area	0.02	0.48	0.22	0.02	0.38
Searles Valley PM10 Nonattainment Area	0.81	15.32	8.49	0.73	10.74
Mojave Desert PM10 Nonattainment Area	0.45	11.11	4.87	0.55	9.76
Inyo County Attainment Area	0.02	0.41	0.19	0.02	0.31
NAWS CHINA LAKE TOTAL	1.30	27.33	13.77	1.33	21.20

TABLE D2-22. EMISSIONS FROM PORTABLE RANGE GENERATORS FOR THE NO ACTION ALTERNATIVE

SUMMARY FOR NORTH RANGE

County	Fuel Usage (gal/yr)	Emissions (pounds/year) ROG	NOx	CO	SOx	PM10
Inyo						
Owens Valley	3	0.14	1.81	0.39	0.12	0.13
Searles Valley	2526.9	121.19	1527.01	328.95	100.42	107.34
Attainment	30	1.43	18.13	3.91	1.19	1.27
Kern	1370.5	65.73	828.20	178.41	54.46	58.22
San Bernardino County	2827	135.58	1708.36	368.01	35.50	120.09
NORTH RANGE SUBTOTAL	6757.4	324.07	4083.51	879.67	191.69	287.05

SUMMARY FOR THE SOUTH RANGE

County	Fuel Usage (gal/yr)	Emissions (pounds/year) ROG	NOx	CO	SOx	PM10
San Bernardino County						
Searles Valley	411.3	19.08	248.55	53.55	16.35	17.49
Mojave Desert	959.7	44.52	579.95	124.95	38.15	40.81
SOUTH RANGE SUBTOTAL	1371	63.60	828.50	178.50	54.50	58.30
NAWS CHINA LAKE TOTAL (lb/year)	8128.4	387.67	4912.01	1058.17	246.19	345.35

SUMMARY BY CONFORMITY ANALYSIS AREA

	Emissions (TONS/year) ROG	NOx	CO	SOx	PM10
Kern County Ozone Nonattainment Area	0.033	0.414	0.089	0.027	0.029
Owens Valley PM10 Nonattainment Area	0.000	0.001	0.000	0.000	0.000
Searles Valley PM10 Nonattainment Area	0.171	2.156	0.464	0.103	0.152
Mojave Desert PM10 Nonattainment Area	0.022	0.290	0.062	0.019	0.020
Inyo County Attainment Area	0.001	0.009	0.002	0.001	0.001
NAWS CHINA LAKE TOTAL	0.194	2.456	0.529	0.123	0.173

NOTES:

Handwritten logs of fuel deliveries were entered into spreadsheet, sorted by unit number and location when fueled. Fueling location assumed to be location where fuel was burned.

AP-42 emission factors (Table 3.3-1) for uncontrolled diesel industrial engines with fuel input were used to calculate generator emissions. Emission factors were converted from lb/MMBtu to lb/gal by multiplying emission factors by an average heating value for diesel of 19,300 Btu/lb and an average density of 7.1 lb/gal.

For the South Range, it was assumed that 30% of generator use was in the Searles Valley PM10 Nonattainment Area, and that 70% was in the Mojave Desert PM10 Nonattainment Area.

The Kern County Ozone Nonattainment area is also within the Searles Valley PM10 Nonattainment Area

Emissions for the Limited Expansion Alternative are estimated to increase by 15% from the No Action Alternative, with the same distribution among areas.

Emissions for the Moderate Expansion Alternative are estimated to increase by 25% from the No Action Alternative, with the same distribution among areas.

TABLE D2-23. EMISSIONS FROM PORTABLE RANGE GENERATORS FOR THE LIMITED EXPANSION ALTERNATIVE

SUMMARY FOR NORTH RANGE

County	Fuel Usage (gal/yr)	Emissions (pounds/year) ROG	NOx	CO	SOx	PM10
Inyo						
Owens Valley	3.45	0.16	2.08	0.45	0.14	0.15
Searles Valley	2905.94	139.37	1756.06	378.29	115.48	123.44
Attainment	34.50	1.64	20.85	4.50	1.37	1.46
Kern	1576.08	75.59	952.43	205.17	62.63	66.95
San Bernardino County	3251.05	155.92	1964.61	423.21	40.83	138.10
NORTH RANGE SUBTOTAL	7771.01	372.68	4696.04	1011.62	220.44	330.11

SUMMARY FOR THE SOUTH RANGE

County	Fuel Usage (gal/yr)	Emissions (pounds/year) ROG	NOx	CO	SOx	PM10
San Bernardino County						
Searles Valley	473.00	21.94	285.83	61.58	18.80	20.11
Mojave Desert	1103.66	51.20	666.94	143.69	43.87	46.93
SOUTH RANGE SUBTOTAL	1576.65	73.14	952.78	205.28	62.68	67.05
NAWS CHINA LAKE TOTAL (lb/year)	9347.66	445.82	5648.81	1216.90	283.12	397.15

SUMMARY BY CONFORMITY ANALYSIS AREA

	Emissions (TONS/year) ROG	NOx	CO	SOx	PM10
Kern County Ozone Nonattainment Area	0.038	0.476	0.103	0.031	0.033
Owens Valley PM10 Nonattainment Area	0.000	0.001	0.000	0.000	0.000
Searles Valley PM10 Nonattainment Area	0.196	2.479	0.534	0.119	0.174
Mojave Desert PM10 Nonattainment Area	0.026	0.333	0.072	0.022	0.023
Inyo County Attainment Area	0.001	0.010	0.002	0.001	0.001
NAWS CHINA LAKE TOTAL	0.223	2.824	0.608	0.142	0.199

NOTES:

The Kern County Ozone Nonattainment area is also within the Searles Valley PM10 Nonattainment Area

Emissions for the Limited Expansion Alternative are estimated to increase by 15% from the No Action Alternative, with the same distribution among areas.

TABLE D2-24. EMISSIONS FROM PORTABLE RANGE GENERATORS FOR THE MODERATE EXPANSION ALTERNATIVE

SUMMARY FOR NORTH RANGE

County	Fuel Usage (gal/yr)	Emissions (pounds/year) ROG	NOx	CO	SOx	PM10
Inyo						
Owens Valley	3.75	0.175	2.2625	0.4875	0.15	0.1625
Searles Valley	3158.625	151.4875	1908.7625	411.1875	125.525	134.175
Attainment	37.5	1.7875	22.6625	4.8875	1.4875	1.5875
Kern	1713.125	82.1625	1035.25	223.0125	68.075	72.775
San Bernardino County	3533.75	169.475	2135.45	460.0125	44.375	150.1125
NORTH RANGE SUBTOTAL	8446.75	405.09	5104.39	1099.59	239.61	358.81

SUMMARY FOR THE SOUTH RANGE

County	Fuel Usage (gal/yr)	Emissions (pounds/year) ROG	NOx	CO	SOx	PM10
San Bernardino County						
Searles Valley	411.3	23.85	310.69	66.94	20.44	21.86
Mojave Desert	959.7	55.65	724.94	156.19	47.69	51.01
SOUTH RANGE SUBTOTAL	1713.75	79.5	1035.625	223.125	68.125	72.875
NAWS CHINA LAKE TOTAL (lb/year)	10160.5	484.5875	6140.0125	1322.7125	307.7375	431.6875

SUMMARY BY CONFORMITY ANALYSIS AREA

	Emissions (TONS/year) ROG	NOx	CO	SOx	PM10
Kern County Ozone Nonattainment Area	0.041	0.518	0.112	0.034	0.036
Owens Valley PM10 Nonattainment Area	0.000	0.001	0.000	0.000	0.000
Searles Valley PM10 Nonattainment Area	0.213	2.695	0.581	0.129	0.189
Mojave Desert PM10 Nonattainment Area	0.028	0.362	0.078	0.024	0.026
Inyo County Attainment Area	0.001	0.011	0.002	0.001	0.001
NAWS CHINA LAKE TOTAL	0.242	3.070	0.661	0.154	0.216

NOTES:

The Kern County Ozone Nonattainment area is also within the Searles Valley PM10 Nonattainment Area

Emissions for the Moderate Expansion Alternative are estimated to increase by 25% from the No Action Alternative, with the same distribution among areas.

APPENDIX D3 - EMISSIONS ASSOCIATED WITH GROUND TROOP TRAINING

D3.1 INTRODUCTION

This appendix contains documentation for the analysis of emissions associated with ground troop training events at NAWS. Documentation for analyses of other CLUMP-related emission sources at NAWS are presented in Appendix D1 (Armitage Airfield operations); Appendix D2 (range-related flight activity and generators supporting range operations); and Appendix D4 (emissions associated with ordnance use and testing). In addition, Appendix D5 contains a discussion of Clean Air Act conformity requirements promulgated by the U.S. Environmental Protection Agency (EPA), a record of nonapplicability (RONA) for the Limited Expansion Alternative, and a RONA for the Moderate Expansion Alternative.

Emission sources covered in this appendix include: military vehicles associated with ground troop training events; field generators used during ground troop training events; fog oil generators used during Type 3 training events; and ordnance use associated with ground troop training events. Emissions from aircraft and helicopter activity associated with ground troop training exercises are incorporated into the range-related flight activity analyses presented in Appendix D2.

D3.2 DISTRIBUTION OF TRAINING EVENTS

Three types of ground troop training exercises may be conducted at NAWS. Type 1 events are small-scale exercises with no tactical vehicles deployed during the exercise. Trucks may be used to transport troops to or from the exercise. Type 2 events are medium-scale exercises with numerous tactical vehicles participating. Tactical vehicles used during Type 2 events are primarily light armored vehicles (LAVs) and Humvees. Type 3 events are large-scale exercises that include heavy armored vehicles. Typical training activities are as follows:

Description	# of Personnel	Typical Duration of Exercise[1]	Vehicles Used	Aircraft Used	Fuel Used[2] (gallons per day)	Equipment Used
Type 1 (Small-scale)	15 average (can be up to 50 troops)	2 days	2 transport trucks (2.5 tons)	5-20 aircraft	32 gallons of diesel	None
Type 2 (Medium-scale)	100 average (can be up to 200 troops)	5 days	25 LAVs, 20 Humvees, 1 fuel truck, 1 water truck, 3 transport trucks (2.5 tons)	5-35 aircraft (8-15 airborne at any one time)	590 gallons of diesel	1-2 diesel generators
Type 3 (Large-scale)	150 average (can be up to 300 troops)	10 days	28 vehicles and 12 tanks including: -10 diesel trucks, 12 M1A1 or M60 battle tanks, 2 M88 recovery vehicles, 7 Low-boy transport vehicles, 2 fuel trucks, 1 water truck, 6 Humvees	5-35 aircraft (8-15 airborne at any one time)	1,602 gallons of JP/Diesel #2 240 gallons of fog oil	1-2 diesel generators

[1]All three types can last from 2 days to 4 weeks.
[2] Fuel usage represents fuel used for vehicles and generators in ground troop training events. Fuel use estimate does not include aircraft fuel usage.

Type 1 ground troop training involves the use of ground troops only without vehicle support during the training exercise. A small number of training participants (15 on average) are inserted by helicopter, dropped in by parachute or brought in by vehicle to a strategic ground location (for analysis, two transport trucks are assumed, but no vehicles are assumed during the actual training exercise). They are then able to designate a target for incoming aircraft carrying air-to-surface weapons ranging from iron bombs to laser guided missiles. Type 1 exercises also include tactical training in the use of small arms weapons. Aircraft can range in number from 5 to 20. Upon completion of the mission, the ground troops are removed by helicopter or via the ground vehicles (i.e., cars and trucks). These exercises usually last from one to three days (two days is assumed for analysis). Fifty percent of Type 1 exercises on the South Range occur in Randsburg Wash; the remainder are split equally between the Mojave B North and Mojave B South ground troop training areas. On the North Range, Type 1 exercises occur in the Airport Lake ground troop training area.

Type 2 exercises involve the use of ground troops (100 participants on average) and wheeled vehicle support. Vehicle support could be as many as 50 vehicles. Aircraft support during a Type 2 exercise typically involves between 5 and 35 planes carrying air-to-surface weapons. A maximum of 8 to 15 aircraft are in the air at any one time. Type 2 exercises also can include tactical training in the use of small arms. Training exercises last from 3 to 14 days (typical duration used for analysis is 5 days). Ground troops are inserted by helicopter, dropped in by air (parachute drops), or brought in by ground vehicle (i.e., car, trucks, or LAV). For long exercises, trailers may be brought in for sleeping quarters. Type 2 exercises on the South Range are distributed evenly among Mojave B North, Randsburg Wash, Mojave B South, and Superior Valley. Type 2 exercises occur in the Airport Lake area on the North Range.

Type 3 exercises involve the use of ground troops (150 participants on average), up to 28 wheeled vehicles, and 12 tracked vehicles, without restricting vehicular movement to established roads. Aircraft support during a Type 3 exercise is typically the same as for Type 2 exercises (between 5 and 35 planes with a maximum of 8 to 15 aircraft in the air at any one time). Type 3 exercises may involve tactical maneuvering of the tanks throughout the Airport Lake area deploying to fighting positions (revetments) and firing at fixed and mobile targets. Exercises may include several maneuver rotations offering a variety of targets. Training exercises last from 3 to 21 days (typical duration used for analysis is 10 days). Ground troops are inserted by helicopter, dropped in by air (parachute drops), or brought in by ground vehicle (i.e., car, trucks, or LAV). For long exercises, trailers may be brought in for sleeping quarters. Type 3 exercises are not currently conducted at NAWS, but would be introduced in the Airport Lake land use management area under the Moderate Expansion Alternative.

The geographic distribution of ground troop training events under the three alternatives is summarized by management unit in Table D3-1. Table D3-2 converts the geographic distribution by management unit into activity distributions by nonattainment area.

D3.3 MILITARY VEHICLES AND FIELD GENERATORS

The range of military vehicles that may be included in ground troop training exercises at NAWS are summarized in Tables D3-3 and D3-4. Also included in Tables D3-3 and D3-4 are emission rate estimates at various engine load conditions. Table D3-3 presents data on diesel engine vehicles; these vehicles can run on either diesel fuel or JP fuel. Table D3-4 presents data on gas turbine engine vehicles. The only gas turbine engine tactical vehicle in common use is the M1A1 main battle tank. The gas turbine engine design used in the M1A1 tank is essentially a variation of the turboshaft engine type commonly used for helicopters (Hunecke 1997). In addition to military vehicles, portable diesel generators would typically be used during Type 2 and Type 3 events.

Table D3-5 summarizes emission estimates for military vehicles used during a typical Type 1 training event. Table D3-6 summarizes emission estimates for military vehicles and portable generators used during a typical Type 2 event. Table D3-7 summarizes emission estimates for military vehicles and portable generators used during a typical Type 3 event. Table D3-8 summarizes the annual emission estimates for vehicles and generators for each of the project alternatives.

D3.4 FUGITIVE DUST FROM VEHICLE ACTIVITY IN UNPAVED AREAS

In addition to direct vehicle exhaust emissions, military vehicle activity associated with ground troop training would generate fugitive dust as vehicles are operated on dirt roads or in disturbed off-road areas. In the North Range, the access road to the south end of the Airport Lake management unit is paved. In the South Range, the access road into the Randsburg Wash management unit is paved, as are sections of some of the major side roads.

Fugitive dust emissions were calculated using the standard EPA methodology (USEPA 1988). Table D3-9 summarizes equipment use estimates and resulting fugitive dust emissions from Type 1 training events under the No Action, Limited Expansion, and Moderate Expansion alternatives. Table D3-10 summarizes equipment use estimates and resulting fugitive dust emissions from Type 2 training events under the No Action, Limited Expansion, and Moderate Expansion alternatives. Table D3-11 summarizes equipment use estimates and resulting fugitive emissions from Type 3 training events under the No Action, Limited Expansion, and Moderate Expansion alternatives.

D3.5 FOG OIL GENERATORS

Fog oil generators would be used during Type 3 events. Fog oil generators evaporate fuel oil at temperatures below the flash point of the vapor. The oil vapors are ejected at high velocity through a nozzle. The vapors cool rapidly in the air and condense into very fine aerosol droplets. Table D3-12 summarizes emissions associated with fog oil generator use during Type 3 exercise events. All Type 3 events would be centered around the Airport Lake management unit in the North Range (part of the Searles Valley PM_{10} nonattainment area).

D3.6 ORDNANCE USE FOR GROUND TROOP TRAINING

Table D3-13 summarizes estimated ordnance use and associated emission factors for typical Type 1, Type 2, and Type 3 ground troop training events. Table D3-14 summarizes annual emissions for ordnance use during training events under the No Action Alternative, the Limited Expansion Alternative, and the Moderate Expansion Alternative. The assumptions and methods used for calculating emissions from ordnance use for Ground Troop Training are detailed in Appendix D4 (Emissions from Ordnance Use for Test and Training Sites).

D3.7 DISTRIBUTION OF ANNUAL EMISSIONS FROM GROUND TROOP TRAINING

Table D3-15 summarizes the geographic distribution of annual emissions from ground troop training exercises under the No Action Alternative. Table D3-16 summarizes the geographic distribution of annual emissions from ground troop training exercises under the Limited Expansion Alternative. Table D3-17 summarizes the geographic distribution of annual emissions from ground troop training exercises under the Moderate Expansion Alternative.

D3.8 REFERENCES

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TABLE D3-1. GEOGRAPHIC DISTRIBUTION OF GROUND TROOP TRAINING EXERCISES

	NO ACTION EVENTS			LIMITED EXPANSION EVENTS			MODERATE EXPANSION EVENTS		
LOCATION	TYPE 1	TYPE 2	TYPE 3	TYPE 1	TYPE 2	TYPE 3	TYPE 1	TYPE 2	TYPE 3
EVENT TOTALS FOR NORTH/SOUTH RANGE AREAS:									
North Range Events	5	3	0	7	6	0	7	6	1
South Range Events	10	4	0	20	8	0	20	8	0
ALLOCATION AMONG MANAGEMENT UNITS:									
Airport Lake	5	3	0	7	6	0	4	6	1
Coso Targets	0	0	0	0	0	0	3	0	0
Randsburg Wash	5	1.4	0	10	2.8	0	10	2.8	0
Mojave B South	2.5	1.3	0	5	2.6	0	5	2.6	0
Mojave B North	2.5	1.3	0	5	2.6	0	5	2.6	0
TOTALS	15	7	0	27	14	0	27	14	1

Notes:

North Range training events are centered on the Airport Lake and Coso Targets management units. Ground troop training activities in the Airport Lake area may spread into adjacent portions of George Range; there also can be a very slight spill-over of activity into Baker and Charlie ranges.

South Range training events are distributed across the Mojave B North, Randsburg Wash, and Mojave B South management units. Ground troop training activities in the Mojave B South range often spread into Superior Valley.

TABLE D3-2. NONATTAINMENT AREA DISTRIBUTION OF EMISSIONS ASSOCIATED WITH GROUND TROOP TRAINING

NONATTAINMENT AREA	NO ACTION DISTRIBUTION			LIMITED EXPANSION DISTRIBUTION			MODERATE EXPANSION DISTRIBUTION		
	TYPE 1	TYPE 2	TYPE 3	TYPE 1	TYPE 2	TYPE 3	TYPE 1	TYPE 2	TYPE 3
NORTH RANGE EVENTS:									
SEARLES VALLEY	100.0%	100.0%	0.0%	100.0%	100.0%	0.0%	72.1%	100.0%	100.0%
OWENS VALLEY	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	21.9%	0.0%	0.0%
INYO ATTAINMENT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	0.0%	0.0%
SOUTH RANGE EVENTS:									
SEARLES VALLEY	20.0%	14.0%	0.0%	20.0%	14.0%	0.0%	20.0%	14.0%	0.0%
MOJAVE DESERT	80.0%	86.0%	0.0%	80.0%	86.0%	0.0%	80.0%	86.0%	0.0%
OVERALL NAWS CHINA LAKE:									
SEARLES VALLEY	46.7%	50.9%	0.0%	40.7%	50.9%	0.0%	33.5%	50.9%	100.0%
OWENS VALLEY	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.7%	0.0%	0.0%
MOJAVE DESERT	53.3%	49.1%	0.0%	59.3%	49.1%	0.0%	59.3%	49.1%	0.0%
INYO ATTAINMENT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%

Notes:
Airport Lake events = 100% in Searles Valley nonattainment area
Coso Targets events = 35% Searles Valley, 51% Owens Valley, 14% Inyo County attainment area
Randsburg Wash events = 40% Searles Valley, 60% Mojave Desert nonattainment areas
Mojave B South events = 100% Mojave Desert nonattainment area
Mojave B North events = 100% Mojave Desert nonattainment area

TABLE D3-3. EMISSION FACTORS AND RELATED DATA FOR DIESEL ENGINE MILITARY VEHICLES

VEHICLE TYPE	ENGINE HORSEPOWER	VEHICLE LOAD OR POWER	ASSUMED LOAD FACTOR	EXHAUST EMISSION FACTORS (grams/bhp-hr)					EXHAUST EMISSION RATE (pounds per hour)					Gross Weight (tons)	Maximum Speed (mph)	Number of Wheels	Fuel Use Rate (gal/hr)
				ROG	NOx	CO	SOx	PM10	ROG	NOx	CO	SOx	PM10				
M1078/1079	225 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.03	0.36	0.10	0.03	0.03				0.38
2.5 TON		Empty	30%	0.86	9.60	2.80	0.89	0.80	0.13	1.43	0.42	0.13	0.12	3.0			1.50
TRUCK/VAN		Loaded	80%	0.86	9.60	2.80	0.89	0.80	0.34	3.81	1.11	0.35	0.32	5.0			4.00
		Max Load	100%	0.86	9.60	2.80	0.89	0.80	0.43	4.76	1.39	0.44	0.40	5.5	55	4	5.00
M1083/1085	290 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.04	0.46	0.13	0.04	0.04				0.56
5 TON		Empty	30%	0.86	9.60	2.80	0.89	0.80	0.16	1.84	0.54	0.17	0.15	5.0			2.25
TRUCKS		Loaded	80%	0.86	9.60	2.80	0.89	0.80	0.44	4.91	1.43	0.46	0.41	9.0			6.00
		Max Load	100%	0.86	9.60	2.80	0.89	0.80	0.55	6.14	1.79	0.57	0.51	10.0	55	6	7.50
M977/983	445 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.06	0.71	0.21	0.07	0.06				0.94
HEMTT		Empty	40%	0.86	9.60	2.80	0.89	0.80	0.34	3.77	1.10	0.35	0.31	20.0			5.00
10 TON		Loaded	80%	0.86	9.60	2.80	0.89	0.80	0.67	7.53	2.20	0.70	0.63	29.0			10.00
TRUCKS		Max Load	100%	0.86	9.60	2.80	0.89	0.80	0.84	9.42	2.75	0.87	0.78	31.0	55	8	12.50
M978	445 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.06	0.71	0.21	0.07	0.06				0.94
HEMTT		Empty	40%	0.86	9.60	2.80	0.89	0.80	0.34	3.77	1.10	0.35	0.31	20.0			5.00
TANKER		Loaded	80%	0.86	9.60	2.80	0.89	0.80	0.67	7.53	2.20	0.70	0.63	29.0			10.00
TRUCK		Max Load	100%	0.86	9.60	2.80	0.89	0.80	0.84	9.42	2.75	0.87	0.78	31.0	55	8	12.50
MK 48	445 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.06	0.71	0.21	0.07	0.06				1.13
TRACTOR &		Empty	35%	0.86	9.60	2.80	0.89	0.80	0.30	3.30	0.96	0.31	0.27	42.5			5.25
FLATBED		Loaded	80%	0.86	9.60	2.80	0.89	0.80	0.67	7.53	2.20	0.70	0.63	70.0			12.00
		Max Load	100%	0.86	9.60	2.80	0.89	0.80	0.84	9.42	2.75	0.87	0.78	77.0	52	8	15.00
M911 HET	500 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.07	0.79	0.23	0.07	0.07				1.31
TANK		Empty	30%	0.86	9.60	2.80	0.89	0.80	0.28	3.17	0.93	0.29	0.26	43.5			5.25
TRANSPORT		Loaded	80%	0.86	9.60	2.80	0.89	0.80	0.76	8.47	2.47	0.78	0.71	104.0			14.00
		Max Load	100%	0.86	9.60	2.80	0.89	0.80	0.95	10.58	3.09	0.98	0.88	118.5	50	16	17.50
M88A1	750 hp	Idle	7.5%	2.51	11.91	14.68	0.93	2.03	0.31	1.48	1.82	0.12	0.25				2.72
RECOVERY		Intermed	75%	2.51	11.91	14.68	0.93	2.03	3.11	14.77	18.20	1.15	2.52				27.18
VEHICLE		Maximum	100%	2.51	11.91	14.68	0.93	2.03	4.15	19.69	24.27	1.54	3.36	56.0	27	12	36.23
M88A2	1,050 hp	Idle	7.5%	2.51	11.91	14.68	0.93	2.03	0.44	2.07	2.55	0.16	0.35				2.72
RECOVERY		Intermed	75%	2.51	11.91	14.68	0.93	2.03	4.36	20.68	25.49	1.61	3.52				27.18
VEHICLE		Maximum	100%	2.51	11.91	14.68	0.93	2.03	5.81	27.57	33.98	2.15	4.70	56.0	27	12	36.23
M998	150 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.02	0.24	0.07	0.02	0.02				0.19
HUMVEE		Intermed	65%	0.86	9.60	2.80	0.89	0.80	0.18	2.06	0.60	0.19	0.17				1.63
		Maximum	100%	0.86	9.60	2.80	0.89	0.80	0.28	3.17	0.93	0.29	0.26	3.9	65	4	2.50

TABLE D3-3. EMISSION FACTORS AND RELATED DATA FOR DIESEL ENGINE MILITARY VEHICLES

VEHICLE TYPE	ENGINE HORSEPOWER	VEHICLE LOAD OR POWER	ASSUMED LOAD FACTOR	EXHAUST EMISSION FACTORS (grams/bhp-hr) ROG	NOx	CO	SOx	PM10	EXHAUST EMISSION RATE (pounds per hour) ROG	NOx	CO	SOx	PM10	Gross Weight (tons)	Maximum Speed (mph)	Number of Wheels	Fuel Use Rate (gal/hr)
M1097	150 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.02	0.24	0.07	0.02	0.02				0.26
HEAVY		Intermed	65%	0.86	9.60	2.80	0.89	0.80	0.18	2.06	0.60	0.19	0.17				2.28
HUMMER		Maximum	100%	0.86	9.60	2.80	0.89	0.80	0.28	3.17	0.93	0.29	0.26	5.0	65	4	3.50
LAV-25	275 hp	Idle	7.5%	0.86	9.60	2.80	0.89	0.80	0.04	0.44	0.13	0.04	0.04				0.89
(wheeled)		Intermed	65%	0.86	9.60	2.80	0.89	0.80	0.34	3.78	1.10	0.35	0.32				7.71
		Maximum	100%	0.86	9.60	2.80	0.89	0.80	0.52	5.82	1.70	0.54	0.49	14.1	62	8	11.86
M60A3	750 hp	Idle	10%	2.51	11.91	14.68	0.93	2.03	0.42	1.97	2.43	0.15	0.34				3.77
MAIN BATTLE		Intermed	65%	2.51	11.91	14.68	0.93	2.03	2.70	12.80	15.78	1.00	2.18				24.53
TANK		Maximum	100%	2.51	11.91	14.68	0.93	2.03	4.15	19.69	24.27	1.54	3.36	58.0	30	12	37.73

Notes:

HEMTT = heavy expanded mobility tactical truck
HET = heavy equipment transporter
LAV = light armored vehicle
hp = horsepower
bhp-hr = brake horsepower-hour
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Listed vehicles are used primarily by the U.S. Army, U.S. Marine Corps, and National Guard
Most vehicle specifications are from Jane's Tank & Combat Vehicle Regognition Guide (Foss 1996) and Encyclopedia of Modern U.S. Military Weapons (Laur, Llanso, and Boyne 1995). Empty weights for trucks and cargo vehicles generally estimated from maximum gross weight and payload capacity data
Number of wheels for tracked vehicles based on road wheels; drive wheels, idlers, and return rollers are not counted
Gross vehicle weight, number of wheels, and average vehicle speed are used to compute fugitive dust from travel on unpaved surfaces.
The M978 truck normally is configured with a 2,500 gallon tanker.
Data for the M911 heavy equipment transporter is from Crismon (1998), Modern U.S. Military Vehicles
M88 recovery vehicles are modifications of the M48 tank. It takes two M88A1 vehicles or one M88A2 vehicle to tow an M1A1 tank.
Load factors for diesel engine vehicles are estimates; idle load factors include consideration of built-in systems and equipment
Engine exhaust emission factors for wheeled military tactical vehicles based on construction-related off-highway diesel trucks as presented in EPA's 1991 Nonroad Engine and Vehicle Emission Study Report (EPA Report 21A-2001).
Engine exhaust emission factors for tracked military tactical vehicles based on construction-related off-highway diesel tractors as presented in EPA's 1991 Nonroad Engine and Vehicle Emission Study Report (EPA Report 21A-2001).
PM10 entrained from unpaved roads and off-road areas [emission rate equation in AP-42, Volume I, Section 13.2.2 (EPA 1995)]
PM10 tons/day = 0.36*5.9*((%silt+clay)/12)*(mph/30)*((tons GVW/3)^0.7)*((#wheels/4)^0.5)*((365-precip days)/365)*(VMT/day)/(2000 lbs/ton

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Diesel vehicle fuel use rates not used for emission estimates; used only as a cross-check on fuel tanker activity estimates.
Maximum fuel use rates for tactical vehicles are estimates based on fuel tank size, vehicle range, and maximum speed (Foss 1996)
Maximum fuel use rates for trucks and Humvees are estimated on the basis of engine size and gross vehicle weight
Maximum fuel use rates scaled by load factors for other conditions.

TABLE D3-4. EMISSION FACTORS AND RELATED DATA FOR GAS TURBINE ENGINE MILITARY VEHICLES

VEHICLE TYPE	ENGINE HORSEPOWER		POWER SETTING	ESTIMATED FUEL USE (lb/hr)	EMISSION FACTORS (pounds per 1000 lbs fuel) ROG	NOx	CO	SOx	PM10	EMISSION RATE (pounds per hour) ROG	NOx	CO	SOx	PM10	Gross Weight (tons)	Maximum Speed (mph)	Number of Wheels	Fuel Use Rate (gal/hr)
M1A1/A2	1,500	shp	Idle	73	40.91	3.03	139.73	0.40	4.20	2.99	0.22	10.20	0.03	0.31				10.74
ABRAMS			60% torque	334	0.81	8.24	13.55	0.40	4.20	0.27	2.75	4.53	0.13	1.40				49.12
TANK			Maximum	498	1.32	11.60	7.73	0.40	4.20	0.66	5.78	3.85	0.20	2.09	63.0	45	14	73.26

Notes:

shp = shaft horesepower
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Vehicle specifications are from Jane's Tank & Combat Vehicle Regognition Guide (Foss 1996) and Encyclopedia of Modern U.S. Military Weapons (Laur, Llanso, and Boyne 1995).

Number of wheels for tracked vehicles based on road wheels; drive wheels, idlers, and return rollers are not counted.

Gross vehicle weight, number of wheels, and average vehicle speed are used to compute fugitive dust from travel on unpaved surfaces.

Gaseous pollutant emission factors for the M1A1 tank are based on the 1,870 shp T58-GE-16 gas turbine helicopter engine (AESO Memo Report 9820); emission factors for PM10 are based on the 1,250 shp T58-GE-8F gas turbine helicopter engine (AESO Report 6-90).

Fuel use estimates for the M1A1 tank scaled from T58-GE-16 engine fuel use versus % torque (AESO Memo Report 9820), based on fuel tank size (1,907 liters), maximum speed (72.42 km/hour), and maximum range (498 km) for the M1A1 tank (Foss 1996).

M1A1 FUEL CAPACITY DATA:

fuel tank size:	1,907	liters	=	504	gallons
JP-5/8 fuel density:	6.8	lbs/gallon			
maximum road speed:	72.42	km/hour	=	45.0	mph
maximum range:	498	kilometers	=	309.4	miles
est. operating time:	6.9	hours			

T58-GE-16 ENGINE FUEL USE:

Idle:	150	lbs/hour
60% Torque	683	lbs/hour
100% Torqu	1,020	lbs/hour

PM10 entrained from unpaved roads and off-road areas [emission rate equation in AP-42, Volume I, Section 13.2.2 (EPA 1995)]:

PM10 tons/day = 0.36*5.9*((%silt+clay)/12)*(mph/30)*((tons GVW/3)^0.7)*((#wheels/4)^0.5)*((365-precip days)/365)*(VMT/day)/(2000 lbs/ton)

TABLE D3-5. EXHAUST EMISSIONS FROM TACTICAL AND SUPPORT VEHICLES DURING TYPICAL TYPE 1 TRAINING EVENTS

TYPE OF VEHICLE	NUMBER OF VEHICLES	TYPICAL EVENT DURATION (DAYS)	ACTIVE USE DAYS PER EVENT	DAILY USE PATTERN: ENGINE LOAD	DAILY USE PATTERN: HOURS PER DAY	EMISSION RATE (pounds per hour) FOR INDICATED ENGINE LOAD CONDITION: ROG	NOx	CO	SOx	PM10	EMISSIONS (pounds) PER TYPICAL EVENT: ROG	NOx	CO	SOx	PM10
2.5 TON TRUCKS (M1078/1079)	2	2	2	80%	4	0.34	3.81	1.11	0.35	0.32	5.46	60.95	17.78	5.65	5.08

Notes:
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Type 1 events do not entail significant vehicle activity except for transporting troops and equipment to and from the exercise.
Emission rates for tactical and support equipment are documented in Table D3-3.

TABLE D3-6. EXHAUST EMISSIONS FROM TACTICAL AND SUPPORT VEHICLES DURING TYPICAL TYPE 2 TRAINING EVENTS

TYPE OF VEHICLE OR ITEM	NUMBER OF VEHICLES	TYPICAL EVENT DURATION (DAYS)	ACTIVE USE DAYS PER EVENT	DAILY USE PATTERN ENGINE LOAD	DAILY USE PATTERN HOURS PER DAY	EMISSION RATE (pounds per hour) FOR INDICATED ENGINE LOAD CONDITION ROG	NOx	CO	SOx	PM10	EMISSIONS (pounds) PER TYPICAL EVENT ROG	NOx	CO	SOx	PM10
2.5 TON TRUCKS (M1078/1079)	3	5	5	80%	3	0.34	3.81	1.11	0.35	0.32	15.36	171.43	50.00	15.89	14.29
FUEL TRUCK	1	5	5	Idle	2	0.06	0.71	0.21	0.07	0.06	0.63	7.06	2.06	0.65	0.59
(M978)				80%	1	0.67	7.53	2.20	0.70	0.63	3.37	37.67	10.99	3.49	3.14
WATER TRUCK (M978)	1	5	5	80%	1	0.67	7.53	2.20	0.70	0.63	3.37	37.67	10.99	3.49	3.14
HUMVEES	20	5	5	Idle	2	0.02	0.24	0.07	0.02	0.02	4.27	47.62	13.89	4.41	3.97
(M998)				65%	3	0.18	2.06	0.60	0.19	0.17	55.46	619.06	180.56	57.39	51.59
8x8 LAV	25	5	5	Idle	1	0.04	0.44	0.13	0.04	0.04	4.89	54.56	15.91	5.06	4.55
(LAV-25)				65%	2	0.34	3.78	1.10	0.35	0.32	84.73	945.78	275.85	87.68	78.82
75 kW GENERATORS	1	5	5	50%	24	0.13	1.55	0.34	0.10	0.11	15.18	186.51	40.28	12.40	13.29
EVENT TOTALS											187.3	2,107.4	600.5	190.5	173.4

Notes:
LAV = light armored vehicle
kW = kilowatt
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Type 2 events include significant use of tactical vehicles plus support vehicles for transporting personnel, equipment, fuel, and water.
Emission rates for tactical and support equipment are documented in Table D3-3.

TABLE D3-7. EXHAUST EMISSIONS FROM TACTICAL AND SUPPORT VEHICLES DURING TYPICAL TYPE 3 TRAINING EVENTS

				DAILY USE PATTERN		EMISSION RATE (pounds per hour) FOR INDICATED ENGINE LOAD CONDITION					EMISSIONS (pounds) PER TYPICAL EVENT				
TYPE OF VEHICLE OR ITEM	NUMBER OF VEHICLES	TYPICAL EVENT DURATION (DAYS)	ACTIVE USE DAYS PER EVENT	ENGINE LOAD	HOURS PER DAY	ROG	NOx	CO	SOx	PM10	ROG	NOx	CO	SOx	PM10
5-TON TRUCKS	5	10	10	Idle	1	0.04	0.46	0.13	0.04	0.04	2.06	23.02	6.71	2.13	1.92
(M1083/1085)				80%	1	0.44	4.91	1.43	0.46	0.41	21.99	245.51	71.61	22.76	20.46
10-TON TRUCKS	5	10	10	Idle	1	0.06	0.71	0.21	0.07	0.06	3.16	35.32	10.30	3.27	2.94
(M977/983)				80%	1	0.67	7.53	2.20	0.70	0.63	33.75	376.73	109.88	34.93	31.39
FUEL TRUCKS	2	10	10	Idle	2	0.06	0.71	0.21	0.07	0.06	2.53	28.25	8.24	2.62	2.35
(M978)				80%	1.5	0.67	7.53	2.20	0.70	0.63	20.25	226.04	65.93	20.96	18.84
WATER TRUCK	1	10	10	80%	1.5	0.67	7.53	2.20	0.70	0.63	10.12	113.02	32.96	10.48	9.42
(M978)															
TANK TRANSPORTERS	8	10	2	Idle	1	0.07	0.79	0.23	0.07	0.07	1.14	12.70	3.70	1.18	1.06
(M911)				30%	1	0.28	3.17	0.93	0.29	0.26	4.55	50.79	14.82	4.71	4.23
				80%	1	0.76	8.47	2.47	0.78	0.71	12.13	135.45	39.51	12.56	11.29
TANK TRANSPORTERS	6	10	2	Idle	1	0.07	0.79	0.23	0.07	0.07	1.14	12.70	3.70	1.18	1.06
(M911)				30%	1	0.28	3.17	0.93	0.29	0.26	4.55	50.79	14.82	4.71	4.23
				100%	1	0.95	10.58	3.09	0.98	0.88	15.17	169.32	49.38	15.70	14.11
RECOVERY VEHICLES	2	10	3	Idle	1	0.44	2.07	2.55	0.16	0.35	2.61	12.41	15.29	0.97	2.11
(M88A2)				100%	2	5.81	27.57	33.98	2.15	4.70	69.72	330.84	407.78	25.83	56.39
HUMVEES	6	10	10	Idle	2	0.02	0.24	0.07	0.02	0.02	2.56	28.57	8.33	2.65	2.38
(M998)				65%	3	0.18	2.06	0.60	0.19	0.17	33.27	371.43	108.34	34.44	30.95
M60 TANKS	6	10	10	Idle	4	0.42	1.97	2.43	0.15	0.34	99.60	472.63	582.55	36.91	80.56
(M60A3)				65%	1	2.70	12.80	15.78	1.00	2.18	161.86	3072.08	3786.57	239.88	523.62
ABRAMS TANKS	6	10	10	Idle	4	2.99	0.22	10.20	0.03	0.31	716.74	53.09	2448.07	7.01	73.58
(M1A1/M1A2)				60% Q	1	0.27	2.75	4.53	0.13	1.40	16.22	165.13	271.54	8.02	84.17
75 kW GENERATORS	2	10	10	50%	24	0.13	1.55	0.34	0.10	0.11	60.72	746.04	161.11	49.60	53.18
EVENT TOTALS											1,295.9	6,731.8	8,221.1	542.5	1,030.2

Notes:
kW = kilowatt
% Q = percent engine torque
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Type 3 events would include significant use of tactical vehicles plus support vehicles for transporting personnel, equipment, fuel, and water.
Heavy truck requirements split between 5-ton and 10-ton models.
M88 recovery vehicles for towing inoperable or stuck armored vehicles assumed to be the current M88A2 model
Tank requirements split between M60 and M1 Abrams models.
Fuel trucks and water trucks will make periodic trips to and from the exercise area in order to refill the tankers.
Tank transporters will be used primarily to transport tanks and recovery vehicles to and from the exercise area. Transporters carrying M1 Abrams tanks will operate at higher load factors than those carrying M60 tanks or M88 recovery vehicles.
Emission rates for tactical and support equipment are documented in Table D3-3 and D3-4

TABLE D3-8. SUMMARY OF VEHICLE EXHAUST EMISSIONS FOR GROUND TROOP TRAINING EVENTS

ALTERNATIVE	Type of Event	Events Per Year	EMISSIONS PER TYPICAL EVENT (POUNDS) ROG	NOx	CO	SOx	PM10	ANNUAL EMISSIONS (TONS) ROG	NOx	CO	SOx	PM10
No Action												
	Type 1	15	5.46	60.95	17.78	5.65	5.08	0.041	0.457	0.133	0.042	0.038
	Type 2	7	187.26	2,107.38	600.53	190.48	173.37	0.655	7.376	2.102	0.667	0.607
No Action Total								0.696	7.833	2.235	0.709	0.645
Limited Expansion												
	Type 1	27	5.46	60.95	17.78	5.65	5.08	0.074	0.823	0.240	0.076	0.069
	Type 2	14	187.26	2,107.38	600.53	190.48	173.37	1.311	14.752	4.204	1.333	1.214
Limited Expansion Total								1.385	15.575	4.444	1.410	1.282
Moderate Expansion												
	Type 1	27	5.46	60.95	17.78	5.65	5.08	0.074	0.823	0.240	0.076	0.069
	Type 2	14	187.26	2,107.38	600.53	190.48	173.37	1.311	14.752	4.204	1.333	1.214
	Type 3	1	1,295.86	6,731.84	8,221.15	542.48	1,030.25	0.648	3.366	4.111	0.271	0.515
Moderate Expansion Total								2.032	18.940	8.554	1.681	1.797

Notes:
Emissions per event from Tables D3-5 through D3-7

TABLE D3-9. FUGITIVE DUST GENERATED BY VEHICLE USE DURING TYPICAL TYPE 1 GROUND TROOP TRAINING EVENTS

Type of Vehicle or Item	Number of Vehicles	Typical Event Duration (days)	Active Use Days Per Event	Driving Hours Per Day	Gross Vehicle Weight (tons)	Number of Wheels	Average Driving Speed (mph)	VMT Per Vehicle Per Event	Pounds of Figitive Dust Per Event	Annual Number of Events			Fugitive Dust Emissions (TPY)		
										No Action	Limited Expansion	Moderate Expansion	No Action	Limited Expansion	Moderate Expansion
2.5 TON TRUCKS (M1078/1079)	2	2	2	2	5.0	4	15	60	278.7	15	27	27	2.1	3.8	3.8

Notes:
PM10 = inhalable particulate matter

Vehicle numbers and use from Table D3-5, with driving hours reduced to reflect travel on unpaved areas only.
Vehicle characteristics from Table D3-3.
Analysis also assumes that the silt plus clay content of unpaved roads and off-road areas averages 20% (sandy loam or sandy clay loam soils).
Analysis assumes 30 days per year with precipitation events sufficient to preclude fugitive dust emissions.
Fugitive dust PM10 (pounds) = 0.36*5.9*((%silt+clay)/12)*(mph/30)*((tons GVW/3)^0.7)*((#wheels/4)^0.5)*((365-precip days)/365)*(VMT/period or event)

TABLE D3-10. FUGITIVE DUST GENERATED BY VEHICLE USE DURING TYPICAL TYPE 2 GROUND TROOP TRAINING EVENTS

Type of Vehicle or Item	Number of Vehicles	Typical Event Duration (days)	Active Use Days Per Event	Driving Hours Per Day	Gross Vehicle Weight (tons)	Number of Wheels	Average Driving Speed (mph)	VMT Per Vehicle Per Event	Pounds of Figitive Dust Per Event	Annual Number of Events			Fugitive Dust Emissions (TPY)		
										No Action	Limited Expansion	Moderate Expansion	No Action	Limited Expansion	Moderate Expansion
2.5 TON TRUCKS (M1078/1079)	3	5	5	2	5.0	4	15	150	1,045.3	7	14	14	3.7	7.3	7.3
FUEL TRUCK (M978)	1	5	5	1	29.0	8	10	50	374.8	7	14	14	1.3	2.6	2.6
WATER TRUCK (M978)	1	5	5	1	29.0	8	10	50	374.8	7	14	14	1.3	2.6	2.6
HUMVEES (M998)	20	5	5	2	3.9	4	15	150	5,856.1	7	14	14	20.5	41.0	41.0
8x8 LAV (LAV-25)	25	5	5	2	14.1	8	10	100	11,312.5	7	14	14	39.6	79.2	79.2
EVENT TOTALS									18,963.4				66.4	132.7	132.7

Notes:
LAV = light armored vehicle
PM10 = inhalable particulate matter

Vehicle numbers and use from Table D3-6, with driving hours reduced where necessary to reflect travel on unpaved areas only.
Vehicle characteristics from Table D3-3.
Analysis also assumes that the silt plus clay content of unpaved roads and off-road areas averages 20% (sandy loam or sandy clay loam soils).
Analysis assumes 30 days per year with precipitation events sufficient to preclude fugitive dust emissions.
Fugitive dust PM10 (pounds) = 0.36*5.9*((%silt+clay)/12)*(mph/30)*((tons GVW/3)^0.7)*((#wheels/4)^0.5)*((365-precip days)/365)*(VMT/period or event)

TABLE D3-11. FUGITIVE DUST GENERATED BY VEHICLE USE DURING TYPICAL TYPE 3 GROUND TROOP TRAINING EVENTS

Type of Vehicle or Item	Number of Vehicles	Typical Event Duration (days)	Active Use Days Per Event	Driving Hours Per Day	Gross Vehicle Weight (tons)	Number of Wheels	Average Driving Speed (mph)	VMT Per Vehicle Per Event	Pounds of Figitive Dust Per Event	Annual Number of Events			Fugitive Dust Emissions (TPY)		
										No Action	Limited Expansion	Moderate Expansion	No Action	Limited Expansion	Moderate Expansion
5-TON TRUCKS (M1083/1085)	5	10	10	1	9.0	6	10	100	1,431.0	0	0	1	0.0	0.0	0.7
10-TON TRUCKS (M977/983)	5	10	10	1	29.0	8	10	100	3,748.1	0	0	1	0.0	0.0	1.9
FUEL TRUCKS (M978)	2	10	10	1	29.0	8	10	100	1,499.2	0	0	1	0.0	0.0	0.7
WATER TRUCK (M978)	1	10	10	1	29.0	8	10	100	749.6	0	0	1	0.0	0.0	0.4
RECOVERY VEHICLES (M88A2)	2	10	3	2	56.0	12	5	30	436.6	0	0	1	0.0	0.0	0.2
HUMVEES (M998)	6	10	10	2	3.9	4	15	300	3,513.6	0	0	1	0.0	0.0	1.8
M60 TANKS (M60A3)	6	10	10	1	58.0	12	10	100	8,948.7	0	0	1	0.0	0.0	4.5
ABRAMS TANKS (M1A1/M1A2)	6	10	10	1	63.0	14	10	100	10,241.7	0	0	1	0.0	0.0	5.1
EVENT TOTALS									30,568.6				0.0	0.0	15.3

Notes:
PM10 = inhalable particulate matter

Vehicle numbers and use from Table D3-7, with driving hours reduced where necessary to reflect travel on unpaved areas only.
Vehicle characteristics from Table D3-3 and D3-4.
Analysis assumes tank transporter use is limited to paved roads.
Analysis also assumes that the silt plus clay content of unpaved roads and off-road areas averages 20% (sandy loam or sandy clay loam soils).
Analysis assumes 30 days per year with precipitation events sufficient to preclude fugitive dust emissions.
Fugitive dust PM10 (pounds) = 0.36*5.9*((%silt+clay)/12)*(mph/30)*((tons GVW/3)^0.7)*((#wheels/4)^0.5)*((365-precip days)/365)*(VMT/period or event)

TABLE D3-12. FOG OIL EMISSIONS, TYPE 3 GROUND TROOP TRAINING

FOG OIL QUANTITY (gal/day)	DAYS PER YEAR	TOTAL GALLONS USED	FOG OIL DENSITY (lbs/gal)	EMISSIONS, TONS/YEAR	
				ROG	PM10
240	10	2,400	7.66	0.092	9.100

Notes: ROG = reactive organic compounds
PM10 = inhalable particulate matter

Fog oil generators heat a standard grade fuel oil to just below the flash point temperature, and eject the vapor through a nozzle at high velocity. Virtually all of the ejected vapor condenses immediately into very fine aerosol droplets.
Emission estimates assume that 1% of the fog oil mass remains in a gaseous state, with the remaining 99% emitted as aerosol droplets (PM10).

TABLE D3-13. EMISSIONS FROM ORDNANCE USE DURING TYPICAL CATEGORIES OF GROUND TROOP TRAINING EVENTS

EVENT TYPE	SOURCE OF ORDNANCE USE	NUMBER OF ITEMS	ORDNANCE TYPE	PEP CONTENT CATEGORY	ORDNANCE USE PER EVENT	HE ORDNANCE FRACTION	AVE PEP LBS PER ORDNANCE ITEM: PROPELLANT	AVE PEP LBS PER ORDNANCE ITEM: EXPLOSIVE	AVE PEP LBS PER ORDNANCE ITEM: PYROTECH	EMISSIONS (LBS) PER ITEM: ROG	EMISSIONS (LBS) PER ITEM: NOx	EMISSIONS (LBS) PER ITEM: PM10	EMISSIONS (LBS) PER EVENT: ROG	EMISSIONS (LBS) PER EVENT: NOx	EMISSIONS (LBS) PER EVENT: PM10
TYPE 1	Troops	15	small arms	small arms	4,500	0%	0.0082	0	0	2.38E-06	0.00E+00	1.48E-03	0.011	0.000	6.64
TYPE 2	Troops	100	small arms	small arms	30,000	0%	0.0082	0	0	2.38E-06	0.00E+00	1.48E-03	0.071	0.000	44.28
	LAVs	25	25 mm	20-40 mm	7,500	20%	0.25	0.026	0	8.60E-05	0.00E+00	6.24E-02	0.645	0.000	468.15
	Mortars	100	81 mm	> 40 mm	100	0%	8.6	0	2.8	2.77E-03	4.48E-02	2.05E+00	0.277	4.480	205.20
	Totals												0.994	4.480	717.63
TYPE 3	Troops	150	small arms	small arms	45,000	0%	0.0082	0	0	2.38E-06	0.00E+00	1.48E-03	0.107	0.000	66.42
	M1A1 Tanks	6	50 cal	small arms	600	0%	0.0082	0	0	2.38E-06	0.00E+00	1.48E-03	0.001	0.000	0.89
			120 mm	> 40 mm	600	20%	8.6	1.54	2.8	3.57E-03	4.48E-02	3.08E+00	2.145	26.880	1,850.28
	M60 Tanks	6	50 cal	small arms	600	0%	0.0082	0	0	2.38E-06	0.00E+00	1.48E-03	0.001	0.000	0.89
			105 mm	> 40 mm	600	20%	8.6	1.54	2.8	3.57E-03	4.48E-02	3.08E+00	2.145	26.880	1,850.28
	Totals												4.400	53.760	3,768.75

Notes:

HE = high explosive

LAV = light armored vehicle

PEP = propellants, explosives, and pyrotechnics

ROG = reactive organic compounds

NOx = nitrogen oxides

PM10 = inhalable particulate matter

PEP content of ordnance is from Table D-4.6; emission fractions for PEP components are from Table D-4.9.

PM10 emission factors include crater ejecta from HE items.

TABLE D3-14. ANNUAL EMISSIONS FROM ORDNANCE USE DURING GROUND TROOP TRAINING EVENTS (TONS PER YEAR)

EVENT TYPE	EMISSIONS (POUNDS) PER EVENT			ANNUAL NUMBER OF TRAINING EVENTS			ANNUAL EMISSIONS (TPY) NO ACTION ALTERNATIVE			ANNUAL EMISSIONS (TPY) LIMITED EXPANSION			ANNUAL EMISSIONS (TPY) MODERATE EXPANSION		
	ROG	NOx	PM10	NO ACTION	LIMITED EXPANSION	MODERATE EXPANSION	ROG	NOx	PM10	ROG	NOx	PM10	ROG	NOx	PM10
TYPE 1	0.011	0.000	6.64	15	27	27	0.0001	0.0000	0.0498	0.0001	0.0000	0.0897	0.0001	0.0000	0.0897
TYPE 2	0.994	4.480	717.63	7	14	14	0.0035	0.0157	2.5117	0.0070	0.0314	5.0234	0.0070	0.0314	5.0234
TYPE 3	4.400	53.760	3,768.75	0	0	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0269	1.8844
NAWS CHINA LAKE TOTALS							0.0036	0.0157	2.5615	0.0071	0.0314	5.1131	0.0093	0.0582	6.9975

Notes:

Emissions per event from Table D3-13

HE = high explosive

LAV = light armored vehicle

PEP = propellants, explosives, and pyrotechnics

ROG = reactive organic compounds

NOx = nitrogen oxides

PM10 = inhalable particulate matter

PEP content of ordnance is from Table D-4.6; emission fractions for PEP components are from Table D-4.9.

PM10 emission factors include crater ejecta from HE items.

TABLE D3-15. SUMMARY OF GROUND TROOP TRAINING EQUIPMENT EMISSIONS: NO ACTION ALTERNATIVE

		ANNUAL EMISSIONS, TONS PER YEAR				
Source	Nonattainment Area	ROG	NOx	CO	SOx	PM10
Vehicle Emissions From Ground Troop Training	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.352	3.964	1.131	0.359	0.326
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.344	3.869	1.104	0.350	0.319
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.696	7.833	2.235	0.709	0.645
Fugitive Dust PM10 From Ground Troop Training Vehicle Activity	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.000	0.000	0.000	0.000	34.778
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.000	0.000	0.000	0.000	33.722
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.00	0.00	0.00	0.00	68.500
Fog Oil Generators	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.000	0.000	0.000	0.000	0.000
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.000	0.000	0.000	0.000	0.000
Ordnance Use	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.002	0.008	0.000	0.000	1.301
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.002	0.008	0.000	0.000	1.261
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.004	0.016	0.000	0.000	2.562
AreaTotals	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.354	3.972	1.131	0.359	36.405
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.346	3.876	1.104	0.350	35.301
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
NAWS China Lake Total		0.700	7.849	2.235	0.709	71.706

Notes:

ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Emissions in the Kern County ozone area are also included in subtotals for Searles Valley PM10 area.
Analysis assumes 15 Type 1 events per year, 7 Type 2 events per year, and no Type 3 events.
Event distribution is summarized in Table D3-2.
Vehicle exhaust emissions are based on data in Tables D3-5 through D3-8.
Fugitive dust emissions are based on data in Tables D3-9, D3-10, and D3-11.
Fog oil generators are not used in ground troop training events under the No Action Alternative.
Ordnance use emissions are based on data in Tables D3-13 and D3-14.

TABLE D3-16. SUMMARY OF GROUND TROOP TRAINING EQUIPMENT EMISSIONS: LIMITED EXPANSION ALTERNATIVE

		ANNUAL EMISSIONS, TONS PER YEAR				
Source	Nonattainment Area	ROG	NOx	CO	SOx	PM10
Vehicle Emissions From Ground Troop Training	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.697	7.838	2.236	0.709	0.645
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.688	7.737	2.208	0.700	0.637
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	1.385	15.575	4.444	1.410	1.282
Fugitive Dust PM10 From Ground Troop Training Vehicle Activity	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.000	0.000	0.000	0.000	69.091
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.000	0.000	0.000	0.000	67.409
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.000	0.000	0.000	0.000	136.500
Fog Oil Generators	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.000	0.000	0.000	0.000	0.000
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.000	0.000	0.000	0.000	0.000
Ordnance Use	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.004	0.016	0.000	0.000	2.591
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.004	0.015	0.000	0.000	2.522
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.007	0.031	0.000	0.000	5.113
Area Totals	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.700	7.853	2.236	0.709	72.327
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.691	7.752	2.208	0.700	70.568
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
NAWS China Lake Total		1.392	15.606	4.444	1.410	142.895

Notes:

ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Emissions in the Kern County ozone area are also included in subtotals for Searles Valley PM10 area.
Analysis assumes 27 Type 1 events per year, 14 Type 2 events per year, and no Type 3 events.
Event distribution is summarized in Table D3-2.
Vehicle exhaust emissions are based on data in Tables D3-5through D3-8.
Fugitive dust emissions are based on data in Tables D3-9, D3-10, and D3-11.
Fog oil generators are not used in ground troop training events under the Limited Expansion Alternative.
Ordnance use emissions are based on data in Tables D3-13 and D3-14.

TABLE D3-17. SUMMARY OF GROUND TROOP TRAINING EQUIPMENT EMISSIONS: MODERATE EXPANSION ALTERNATI

		ANNUAL EMISSIONS, TONS PER YEAR				
Source	Nonattainment Area	ROG	NOx	CO	SOx	PM10
Vehicle Emissions From Ground Troop Training	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	1.339	11.144	6.329	0.975	1.155
	Owens Valley PM10 area	0.004	0.047	0.014	0.004	0.004
	Mojave Desert PM10 area	0.688	7.737	2.208	0.700	0.637
	Inyo County attainment area	0.001	0.013	0.004	0.001	0.001
	Subtotal:	2.032	18.940	8.554	1.681	1.797
Fugitive Dust PM10 From Ground Troop Training Vehicle Activity	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.000	0.000	0.000	0.000	84.117
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.217
	Mojave Desert PM10 area	0.000	0.000	0.000	0.000	67.409
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.061
	Subtotal:	0.000	0.000	0.000	0.000	151.804
Fog Oil Generators	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.092	0.000	0.000	0.000	9.100
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
	Mojave Desert PM10 area	0.000	0.000	0.000	0.000	0.000
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
	Subtotal:	0.092	0.000	0.000	0.000	9.100
Ordnance Use	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	0.006	0.043	0.000	0.000	4.469
	Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.005
	Mojave Desert PM10 area	0.004	0.015	0.000	0.000	2.522
	Inyo County attainment area	0.000	0.000	0.000	0.000	0.001
	Subtotal:	0.009	0.058	0.000	0.000	6.997
Area Totals	Kern County ozone area	0.000	0.000	0.000	0.000	0.000
	Searles Valley PM10 area	1.437	11.187	6.329	0.975	98.842
	Owens Valley PM10 area	0.004	0.047	0.014	0.004	0.226
	Mojave Desert PM10 area	0.691	7.752	2.208	0.700	70.568
	Inyo County attainment area	0.001	0.013	0.004	0.001	0.063
NAWS China Lake Total		2.134	18.999	8.554	1.681	169.699

Notes:

ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter

Emissions in the Kern County ozone area are also included in subtotals for Searles Valley PM10 area.
Analysis assumes 27 Type 1 events per year, 14 Type 2 events per year, and 1 Type 3 event.
Event distribution is summarized in Table D3-2.
Vehicle exhaust emissions are based on data in Tables D3-5 through D3-8.
Fugitive dust emissions are based on data in Tables D3-9, D3-10 and D3-11.
Fog oil generator emissions are based on Table D3-12.
Ordnance use emissions are based on data in Tables D3-13 and D3-14.

APPENDIX D4 – EMISSIONS ASSOCIATED WITH ORDNANCE USE AT TEST AND TRAINING SITES

D-4.1 INTRODUCTION

Ordnance is used at NAWS for testing and training purposes. Expansion alternatives being considered by NAWS for the Comprehensive Land Use Management Plan (CLUMP) would result in increased ordnance expenditures. Air emissions associated with ordnance use would also increase. These potential air emission increases must be considered under Clean Air Act conformity regulations relevant to applicable State Implementation Plans (SIPs).

D-4.1.1 Purpose

This appendix provides an inventory of estimated air emissions associated with alternative CLUMP ordnance expenditure scenarios at NAWS. Annual emission quantities have been estimated for the No Action, Limited Expansion, and Moderate Expansion alternative scenarios being considered for the CLUMP. These ordnance emission estimates provide input to a site-wide air emissions inventory (which include other applicable CLUMP sources) for the SIP conformity determination.

D-4.1.2 Technical Approach Overview

Air emission factors (applicable to ordnance) along with ordnance expenditure quantities provide the basis for the estimation of annual emission quantities for pollutants of concern. Representative emission factors and ordnance expenditure quantities were used to calculate annual emission quantity estimates.

Clean Air Act conformity requirements apply to the nonattainment portions of NAWS. Some of the land use management units at the site are within more than one nonattainment area. Therefore, the ordnance emission inventory was developed separately for the following air quality planning areas to support the conformity determination:

- Owens Valley PM_{10} serious nonattainment area
- Searles Valley PM_{10} moderate nonattainment area
- Mojave Desert PM_{10} moderate nonattainment area
- Kern County ozone nonattainment area
- Inyo County attainment area

The emissions estimate for the No Action Alternative was estimated based on available ordnance use data. These results were considered as baseline inventory data. Air emissions for the Limited Expansion and Moderate Expansion Alternatives were obtained by adjusting the baseline data according to potential increases in ordnance use.

D-4.2 ORDNANCE PEP DATA

The propellant, explosive and pyrotechnic (PEP) weight content for a variety of items have been compiled. These data are presented in Tables D4-1 through D4-5 as a function of the following ordnance types:

- Gun ammunition
  - + Small arms
  - + 20-40 mm
  - + Greater than 40 mm
- Missiles

- Rockets
- Bombs
  - Guided bombs
  - Cluster bombs
  - Practice bombs
  - Other bombs
- Miscellaneous
  - Chaff
  - Flares

A summary of the PEP composition data is presented in Table D4-6.

The specific list of items for each ordnance type included in the database represents ordnance typically used at NAWS. However, additional ordnance items may also be candidates for target/test sites and ground troop training.

The PEP composition data have been primarily based on NAVSEA OP 5, Vol. 2 – Ammunition and Explosives Ashore Storage Data (U.S. Navy 1995). However, PEP composition data were not readily available for all ordnance items. Also, frequently there was a range of PEP composition weights for specific ordnance items.

The average minimum, average maximum, and arithmetical average PEP content values have been calculated for each ordnance type (i.e., family). These statistical data are included in Tables D4-1 through D4-6. The subsequent emission calculations presented in this appendix have been based on the average PEP content data. This approach accounts for the variability of ordnance used at NAWS.

Approximately 80 percent of the ordnance expenditures at NAWS for target/test sites and ground troop training are inert (i.e., no or insignificant high explosive content). Therefore, the explosive expenditure quantities were reduced accordingly.

D-4.3 EMISSION FACTORS FOR ORDNANCE EXPENDITURES

The nonattainment pollutants for NAWS are PM_{10} and ozone precursors (i.e., nitrogen oxides, NOx, and reactive organic compounds, ROCs). Therefore, emission factors for these pollutants have been identified applicable to ordnance expenditures. These emissions factors are based on open-burning/open-detonation bangbox tests, for various ordnance items, conducted by the U.S. Department of Defense with oversight by the U.S. Environmental Protection Agency.

Table D4-7 identifies representative emission factor categories for each ordnance type and PEP category. These emission factor categories are defined in Table D4-8 and corresponding emission factor values are summarized in Table D4-9. These tables are base on the Final Air Quality Environmental Assessment Burro Canyon Open Burn/Open Detonations Site NAWS (U.S. Navy, September 1996e). PM_{10} emission factors for the explosives category also include contributions from crater ejecta based on Air Toxic and Criteria Pollutant Emissions Inventory for 1996: Great Basin Unified APCD (U.S. Navy, October 1998).

D-4.4 TARGET/TEST SITES EMISSIONS

A summary of the estimated number of ordnance item expenditures per fiscal year for target/test sites is presented in Table D4-10. These data span the period of 1990-2001. Annual emission quantities for each year were calculated based on ordnance expenditures, average PEP content for the ordnance type, and appropriate emission factors. These results are presented by year in Tables D4-11 through D4-19.

A summary of total PM_{10}, NOx and ROC emission quantities by year and the associated maximum annual quantity is provided in Table D4-20. The maximum annual emissions quantity for each pollutant was selected to conservatively represent ordnance expenditures at target/test sites for the No Action Alternative. This approach accounts for the significant variability in annual ordnance expenditures and facilitates future flexibility for range operations at NAWS.

Table D4-21 presents the total acreage for the target/test sites within each management unit and air quality planning area combination. This information is applicable to the No Action Alternative. The fraction of total target/test site acreage for each management unit as a function of air quality planning area is denoted in Table D4-22. These data were used to determine the total annual emission quantities for each air quality planning area. The results for the No Action Alternative are indicated in Tables D4-23 through D4-25.

The No Action Alternative emission quantity results were scaled to represent increased ordnance expenditures for CLUMP expansion alternatives. Specifically, the emissions were increased by 15 percent for the Limited Action Alternative (see Tables D4-26 through D4-28). For the Moderate Expansion Alternative the emissions were increased by 25 percent (see Tables D4-29 through D4-31).

D-4.5 GROUND TROOP TRAINING EMISSIONS

Emissions associated with ordnance use for ground troop training are discussed in Appendix D3.

TABLE D4-1. PEP WEIGHT COMPOSITION - GUN AMMUNITION

TYPE OF AMMUNITION	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
SMAIL ARMS AMMUNITION (all smokeless powder)									
5 Types of .22 Caliber	2.0E-04	1.9E-03	5.4E-04						
5 Types of 5.56 mm	1.0E-03	4.3E-03	3.1E-03						
12 Types of .30 Caliber	1.8E-03	9.6E-03	6.2E-03						
2 Types of .32 Caliber	2.6E-04	2.6E-04	2.6E-04						
2 Types of .300 Caliber	9.5E-03	9.5E-03	9.5E-03						
1 Type of .30/338 Match	9.5E-03	9.5E-03	9.5E-03						
7 Types of 7.62 mm	2.8E-03	7.9E-03	6.2E-03						
3 Types of 9 mm	2.4E-04	9.0E-04	6.0E-04						
5 Types of .38 Caliber	1.8E-04	1.0E-03	6.4E-04						
1 Type of .380 Caliber	4.1E-04	4.1E-04	4.1E-04						
1 Type of .410 Gauge Shotgun	2.4E-03	2.4E-03	2.4E-03						
6 Types of .45 Caliber	7.8E-04	1.6E-03	1.1E-03						
12 Types of .50 Caliber	6.9E-03	1.0E-01	4.1E-02						
4 Types of 12 Gauge Shotgun	2.7E-03	1.1E-01	2.2E-02						
2 Types of 20 Gauge Shotgun	1.7E-02	2.1E-02	1.9E-02						
Small Arms Average	3.7E-03	1.9E-02	8.2E-03						
20-40 MM CARTRIDGES									
21 Types of 20 mm - SP	8.4E-03	1.3E-01	8.7E-02						
10 Types of 20 mm Target Practice - SP	8.4E-03	9.3E-02	7.1E-02						
9 Types of 20 mm - HE				8.1E-02	1.3E-01	1.1E-01			
6 Types of 25 mm - SP	2.0E-01	2.5E-01	2.2E-01						
2 Types of 25 mm Target Practice - SP	2.1E-01	2.2E-01	2.2E-01						
1 Type of 25 mm - "Propellant"	2.1E-01	2.1E-01	2.1E-01						
1 Type of 25 mm - Alum PBXN				6.6E-02	6.6E-02	6.6E-02			
1 Type of 25 mm - HE				5.5E-02	5.5E-02	5.5E-02			
2 Types of 30 mm Target Practice - SP	1.0E-01	1.1E-01	1.1E-01						
3 Types of 30 mm - Pentolite				2.1E-01	2.9E-01	2.4E-01			
2 Types of 40 mm - SP	6.6E-01	6.7E-01	6.7E-01						
2 Types of 40 mm BP - Saluting	1.2E-01	7.7E-01	4.4E-01						
1 Type of 40 mm - TNT				2.0E-01	2.0E-01	2.0E-01			
20-40 mm Cartridge Average	1.9E-01	3.1E-01	2.5E-01	1.2E-01	1.5E-01	1.3E-01			

TABLE D4-1. PEP WEIGHT COMPOSITION - GUN AMMUNITION

TYPE OF AMMUNITION	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
GREATER THAN 40 MM CARTRIDGES									
3 Types of 81 mm - SP	1.4E-01	2.8E-01	2.1E-01						
3 Types of 81 mm - Black Powder	3.6E-01	4.4E-01	3.9E-01						
1 Type of 81 mm - Target Practice - BP	4.4E-01	4.4E-01	4.4E-01						
3 Types of 81 mm - Composition B				1.7E+00	4.3E+00	2.8E+00			
1 Type of 81 mm - TNT				1.7E+00	1.7E+00	1.7E+00			
2 Types of 81 mm - Illuminating				2.8E-02	2.8E-02	2.8E-02	3.0E-01	1.8E+00	1.0E+00
2 Types of 81 mm - White Phosphorous							1.8E+00	4.1E+00	2.6E+00
1 Type of 81 mm - Unknown (M362 series) - HE				2.4E+00	2.4E+00	2.4E+00			
9 Types of 105 mm - SP	2.8E+00	1.2E+01	7.7E+00						
2 Types of 105 mm - Target Practice - SP	1.0E+01	1.2E+01	1.1E+01						
1 Type of 105 mm - RDX				1.0E+01	1.0E+01	1.0E+01			
4 Types of 105 mm - Black Powder	1.1E-01	1.7E+00	5.3E-01						
2 Types of 105 mm - HE				5.6E+00	7.5E+00	6.5E+00			
1 Type of 105 mm - Illuminating							4.8E+00	4.8E+00	4.8E+00
2 Types of 105 mm - White Phosphorous							6.1E+00	8.8E+00	7.4E+00
1 Type of 105 mm - HC							1.0E+01	1.0E+01	1.0E+01
1 Type of 105 mm - Composition B				1.2E+01	1.2E+01	1.2E+01			
2 Types of 105 mm - Composition A-3				1.2E+01	1.6E+01	1.4E+01			
1 Type of 105 mm - Pyrotechnic							1.2E+01	1.2E+01	1.2E+01
1 Type of 105 mm - Color							8.0E+00	8.0E+00	8.0E+00
7 Types of 120 mm - Propellant	1.4E+01	1.9E+01	1.7E+01						
4 Types of 120 mm - Target Practice	1.4E+01	1.9E+01	1.6E+01						
1 Type of 120 mm - HE	1.4E+01	1.4E+01	1.4E+01	4.2E+00	4.2E+00	4.2E+00	1.5E-02	1.5E-02	1.5E-02
5 Types of 155 mm SP Cartridges	5.7E+00	3.1E+01	1.9E+01						
5 Types of 155 mm Projectiles - HE				1.7E+00	1.6E+01	1.2E+01			
1 Type of 155 mm Projectile - RDX				2.3E+00	2.3E+00	2.3E+00			
2 Types of 155 mm Projectiles - TNT				1.5E+01	2.3E+01	1.9E+01			
1 Type of 155 mm Projectile - Comp B				1.5E+01	1.5E+01	1.5E+01			
1 Type of 155 mm Projectile - Comp A				6.0E+00	6.0E+00	6.0E+00			
2 Types of 155 mm Projectiles - Illuminating							5.8E+00	6.1E+00	6.0E+00
1 Type of 155 mm Projectile - White Phos							1.6E+01	1.6E+01	1.6E+01
2 Types of 155 mm Projectiles - Smoke							1.7E+01	2.6E+01	2.2E+01
Greater than 40 mm average	6.1E+00	1.1E+01	8.6E+00	6.4E+00	8.5E+00	7.7E+00	2.6E+00	3.1E+00	2.8E+00

Source: NAVSEA OP5, Vol 2 - *Ammunition and Explosives Ahore Storage Data* (U.S. Navy) and other DOD ordnance data

TABLE D4-2. PEP WEIGHT COMPOSITION - ROCKETS

TYPE OF ROCKET	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
2.75" Launcher and Rocket									
3 Types HE				1.6E+01	1.6E+02	6.8E+01			
3 Types Practice Rockets	4.1E+01	1.1E+02	7.1E+01						
2.75" Rockets									
2 Types HE	6.0E+00	6.6E+00	6.3E+00	8.4E+00	1.1E+01	9.6E+00			
1 Type Practice	5.9E+00	5.9E+00	5.9E+00						
1 Type White Phosphorous							8.4E+00	8.4E+00	8.4E+00
5 Types Warheads for 2.75"				8.9E-01	4.8E+00	2.3E+00			
3 Types WP Warheads							1.3E+00	2.6E+00	2.0E+00
1 Type Zuni - Comp A	6.0E+00	6.0E+00	6.0E+00	2.3E+00	2.3E+00	2.3E+00			
2.75" Rocket Motors									
2 Types	6.0E+00	6.6E+00	6.3E+00						
Rockets Average	1.3E+01	2.8E+01	1.9E+01	6.9E+00	4.4E+01	2.0E+01	1.1E+00	1.2E+00	1.2E+00

Source: NAVSEA OP5, Vol 2 - *Ammunition and Explosives Ahore Storage Data* (U.S. Navy) and other DOD ordnance data

TABLE D4-3. PEP WEIGHT COMPOSITION - MISSILES

TYPE OF MISSILE	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
Guided Missiles									
2 Types AGM-88, HARM	2.8E+02	2.8E+02	2.8E+02	4.6E+01	4.6E+01	4.6E+01	4.1E-01	4.1E-01	4.1E-01
1 Type TOW Missile - Practice	7.0E+00	8.2E+00	7.6E+00						
2 Types TOW Missile - HE	5.7E+00	7.0E+00	6.4E+00	5.7E+00	6.8E+00	6.3E+00			
1 Guided Round - STINGER	6.2E+00	6.2E+00	6.2E+00	8.6E-01	8.6E-01	8.6E-01			
2 Guided Systems - STINGER	5.5E-01	1.0E+01	5.3E+00	8.7E-01	8.7E-01	8.7E-01			
1 Type HELLFIRE, AGM-114B s/S&A device				3.4E+01	3.4E+01	3.4E+01			
1 Type MAVERICK, AGM-65E - Comp B	6.5E+01	6.5E+01	6.5E+01	8.5E+01	8.5E+01	8.5E+01			
2 Types REDEYE w/launcher, 1 missile HE, 3 battery/gas units	6.2E+00	6.2E+00	6.2E+00	1.0E+00	1.0E+00	1.0E+00			
2 Types AGM-45A, PBXN-101	9.2E+01	9.2E+01	9.2E+01	5.0E+01	5.1E+01	5.1E+01			
1 Type AGM-45A - WP	9.2E+01	9.2E+01	9.2E+01				5.5E+01	5.5E+01	5.5E+01
2 Types AGM-45A, Training/Exercise	9.2E+01	9.2E+01	9.2E+01	3.7E-01	3.7E-01	3.7E-01			
1 Type AGM-45B - HE	9.2E+01	9.2E+01	9.2E+01	5.1E+01	5.1E+01	5.1E+01			
2 Types AGM-45B - Exercise	9.4E+01	1.1E+02	1.0E+02						
1 Type SIDEARM 1, AGM-122A				8.2E+01	8.2E+01	8.2E+01			
6 Types SIDEWINDER AIM-9 w/warhead	6.0E+01	6.0E+01	6.0E+01	7.7E+00	7.7E+00	7.7E+00			
1 Type AIM-9 - Training	6.9E+01	6.9E+01	6.9E+01						
2 Exercise Heads w/photoflash powder							8.5E+00	9.8E+00	9.1E+00
2 Types AIM-7D - one warhead HE, one inert	7.0E+01	9.3E+01	8.2E+01	1.5E+01	1.5E+01	1.5E+01			
2 Types AIM-7F mk 58 w/whd, HE & PBXN-4	1.3E+02	1.4E+02	1.4E+02	2.6E+01	2.6E+01	2.6E+01			
2 Types AIM-7E - HE	9.1E+01	9.3E+01	9.2E+01	2.0E+01	2.0E+01	2.0E+01			
AIM-7G w/HE warhead, f/BPDSMS	9.9E+01	9.9E+01	9.9E+01	2.0E+01	2.0E+01	2.0E+01			
2 Types AIM-7M w/HE warhead	1.3E+02	1.3E+02	1.3E+02	0.0E+00	3.6E+01	1.8E+01			
Exercise Head - Mag Powder							2.0E+00	2.0E+00	2.0E+00
AIM-123 Missile - Tritonol or H-6	1.1E+02	1.1E+02	1.1E+02	4.5E+02	4.5E+02	4.5E+02			
AIM-154 Missile - PBX				1.1E+02	1.1E+02	1.1E+02			
AIM-120 Missile - PBX(AF)-108	1.0E+02	1.0E+02	1.0E+02	1.5E+01	1.5E+01	1.5E+01			
54 Types Tomahawk - Rocket Propellant *h	3.0E+02	3.0E+00	3.0E+02						
12 Types Tomahawk - Propellant *h	3.0E+02	3.0E+02	3.0E+02						
39 Types Tomahawk - HE				5.3E+01	3.8E+02	2.6E+02			
Guided Missiles Average	1.0E+02	1.0E+02	1.0E+02	5.1E+01	6.8E+01	6.2E+01	2.3E+00	2.3E+00	2.3E+00

Source: NAVSEA OP5, Vol 2 - *Ammunition and Explosives Ahore Storage Data* (U.S. Navy) and other DOD ordnance data

TABLE D4-4. PEP WEIGHT COMPOSITION - BOMBS

TYPE OF AMMUNITION	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
Guided Bombs									
1 Type WALLEYE, Tactical - HE				4.4E+02	4.4E+02	4.4E+02			
2 Types WALLEYE, Practice				0.0E+00	3.7E-01	1.9E-01			
2 Types Mk 77 Fire Bombs				5.0E+02	7.5E+02	6.3E+02			
Guided Bomb Average				3.1E+02	4.0E+02	3.5E+02			
Cluster Bombs									
2 Types of ROCKEYE, Mk 118				4.0E-01	4.0E-01	4.0E-01			
CBU-8813, Smoke				8.1E-01	8.1E-01	8.1E-01	2.2E+02	2.2E+02	2.2E+02
Cluster Bomb Average				6.1E-01	6.1E-01	6.1E-01	1.1E+02	1.1E+02	1.1E+02
Practice Bombs									
BDU Mk76 Practice Bombs									
3 Types w/expl or pyro				4.4E-01	4.4E-01	4.4E-01	2.2E-02	2.2E-02	2.2E-02
Mk 5 - 3 lb size							5.5E-02	5.5E-02	5.5E-02
Mk 23, Miniature							5.3E-02	5.3E-02	5.3E-02
4 Types Signal Cartridge									
CXU-3, 4/b, Mk4, Mk11							5.5E-02	1.4E-01	9.0E-02
Practice Bombs Average				4.4E-01	4.4E-01	4.4E-01	4.6E-02	6.8E-02	5.5E-02
Other Bombs									
2 Types Mk 81				1.0E+02	1.0E+02	1.0E+02			
3 Types Mk 82				1.8E+02	1.9E+02	1.9E+02			
3 Types Mk 83				3.8E+02	4.5E+02	4.2E+02			
5 Types Mk 84				9.4E+02	9.7E+02	9.5E+02			
4 Types BDU Mk 76				5.0E+02	7.5E+02	6.3E+02			
Other Bombs Average				4.2E+02	4.9E+02	4.6E+02			

Source: NAVSEA OP5, Vol 2 - *Ammunition and Explosives Ahore Storage Data* (U.S. Navy) and other DOD ordnance data

TABLE D4-5. PEP WEIGHT COMPOSITION - MISCELLANEOUS ITEMS

TYPE OF AMMUNITION	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
CHAFF									
2 Types of Chaff				4.0E-04	4.2E-02	2.1E-02			
FLARES									
4 Types with Parachutes							1.6E+01	2.1E+01	1.8E+01
2 Types Decoy w/Chaff Dispenser							4.4E-01	5.1E-01	4.7E-01
3 Types Guided Missile Tracking							2.7E-01	5.9E-01	3.9E-01
5 Types of Surface							7.0E-01	2.8E+01	1.4E+00
2 Types of Target							7.9E-01	7.0E+00	3.9E+00
Flares Average							3.6E+00	6.3E+00	4.8E+00

Source: NAVSEA OP5, Vol 2 - *Ammunition and Explosives Ahore Storage Data* (U.S. Navy) and other DOD ordnance data

TABLE D4-6. SUMMARY OF PEP WEIGHT COMPOSITION (LBS) PER ITEM

TYPE OF AMMUNITION	Propellant Weight (lbs)			Explosive Weight (lbs)			Pyrotechnic Weight (lbs)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
Gun Ammunition									
Small Arms Average	3.7E-03	1.9E-02	8.2E-03						
20-40 mm Cartridge Average	1.9E-01	3.1E-01	2.5E-01	1.2E-01	1.5E-01	1.3E-01			
Greater than 40 mm average	6.1E+00	1.1E+01	8.6E+00	6.4E+00	8.5E+00	7.7E+00	2.6E+00	3.1E+00	2.8E+00
Rockets	1.3E+01	2.8E+01	1.9E+01	6.9E+00	4.4E+01	2.0E+01	1.1E+00	1.2E+00	1.2E+00
Missiles	1.0E+02	1.0E+02	1.0E+02	5.1E+01	6.8E+01	6.2E+01	2.3E+00	2.3E+00	2.3E+00
Bombs									
Guided Bombs				3.1E+02	4.0E+02	3.5E+02			
Cluster Bombs				6.1E-01	6.1E-01	6.1E-01	1.1E+02	1.1E+02	1.1E+02
Practice Bombs				4.4E-01	4.4E-01	4.4E-01	4.6E-02	6.8E-02	5.5E-02
Other Bombs				4.2E+02	4.9E+02	4.6E+02			
Miscellaneous Items									
Chaff				4.0E-04	4.2E-02	2.1E-02			
Flares							3.6E+00	6.3E+00	4.8E+00

Source: Based on average, minimum, and arithmetical average for each ordnance type group as presented in Tables D4-1 through D4-5.

TABLE D4-7. IDENTIFICATION OF REPRESENTATIVE PEP EMISSION FACTOR CATEGORIES

ORDNANCE TYPE	PROPELLANTS	EXPLOSIVES	PYROTECHNICS
Gun Ammunition			
Small Arms	DB	-	-
20 - 40 mm	DB	TR	-
Great than 40 mm	DB	TR	OBM
Rockets	DB	TR	OBM
Missiles	PBAN	RDX	OBM
Bombs			
Guided Bombs	-	TNT	-
Cluster Bombs	-	ODM	OBM
Practice Bombs	-	ODM	OBM
Other Bombs	-	ODM	-
Miscellaneous			
Chaff	-	ODM	-
Flares	-	-	OBM

Source: Based on PEP emission factor categories identified in *Final Air Quality Environmental Assessment Burro Canyon Open Burn/Open Detonation Site NAWS China Lake* (U.S. Navy, September 1996). Representative emission factor categories were selected considering typical PEP composition for each ordnance type based on professional judgement.

TABLE D4-8. SUMMARY OF PEP EMISSION FACTOR CATEGORIES

Burn PEP Category

PEP Description	Mixture of any energetic waste material excluding casings
Treatment Method:	OB
Tested Material:	All propellants and explosives included in bangbox studies

C4 PEP Category

PEP Description	Primarily C4 plastic explosive with high RDX content
Treatment Method:	OD
Tested Material:	M18A1 (Claymore) Antipersonnel Mine

CB PEP Category

PEP Description	Composite-based propellant dominated by ammonium perchlorate and carboxyl-terminated polybutadiene
Treatment Method:	OD
Tested Material:	Composite propellant

CTPB PEP Category

PEP Description	Propellant dominated by ammonium perchlorate and carboxyl terminated polybutadiene binder
Treatment Method:	OD
Tested Material:	ANB-3006 (Minuteman III Stage III propellant)

CTPB-C PEP Category

PEP Description	Propellant dominated by ammonium perchlorate and carboxyl-terminated polybutadiene binder with a copper chromite catalyst
Treatment Method:	OD
Tested Material:	ANB-3006 *Minuteman III Stage III propellant)

DB PEP Category

PEP Description	Double-based propellant dominated by nitrocellulose and nitroglycerine
Treatment Method:	OD
Tested Material:	Double-based propellant

Non-PEPB and Non-PEPD Categories

PEP Description	Non-energetic waste material
Treatment Method:	OB and OD
Tested Material:	Hospital waste

OBM PEP Category

PEP Description	Propellant of unknown composition or PEP category
Treatment Method:	OD
Tested Material:	All propellant included in bangbox studies

ODM PEP Category

PEP Description	Explosive of unknown composition or PEP category
Treatment Method:	OD
Tested Material:	All explosives included in bangbox studies

PBAN PEP Category

PEP Description	Propellant dominstaed by ammonium perchlorate with polybutadiene acrylonitrile polymer binder
Treatment Method:	OD
Tested Material:	UTP-3001B (Tital Missile Propellant)

RDX PEP Category

PEP Description	RDX/HMX dominated explosive without aluminum
Treatment Method:	OD
Tested Material:	M384 40 mm High Exlosive (HE) Cartridges

TABLE D4-8. SUMMARY OF PEP EMISSION FACTOR CATEGORIES

	RDX/Al PEP Category
PEP Description	RDX/HMX dominated explosive with aluminum
Treatment Method:	OD
Tested Material:	M56A4 20 mm High Explosive Indendiary Cartridges
	TET PEP Caegory
PEP Description	Tetryl-based explosive
Treatment Method:	OD
Tested Material:	T45E7 Adapter-Booster
	TNT PEP Category
PEP Description	Trinitrotoluene based explosive
Treatment Method:	OD
Tested Material:	Bulk TNT
	TR PEP Category
PEP Description	Mixture of TNT and RDX explosives
Treatment Method:	OD
Tested Material:	M384 40 mm HE cartridges and bulk TNT

Source: Based on PEP emission factor categories identified in *Final Air Quality Environmental Assessment Burro Canyon Open Burn/Open Detonation Site NAWS China Lake* (U.S. Navy, September 1996).

TABLE D4-9. SUMMARY OF PM10, NOX AND ROG EMISSION FACTORS FOR ORDNANCE USE (DIMENSIONLESS)

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG
Gun Ammunition									
Small Arms	1.8E-01	0.0E+00	2.9E-04						
20-40 mm	1.8E-01	0.0E+00	2.9E-04	6.7E-01	0.0E+00	5.2E-04			
Greater than 40 mm	1.8E-01	0.0E+00	2.9E-04	6.7E-01	0.0E+00	5.2E-04	1.8E-01	1.6E-02	1.0E-04
Rockets	1.8E-01	0.0E+00	2.9E-04	6.7E-01	0.0E+00	5.2E-04	1.8E-01	1.6E-02	1.0E-04
Missiles	1.4E-01	7.0E-03	1.0E-04	6.7E-01	0.0E+00	4.9E-04	1.8E-01	1.6E-02	1.0E-04
Bombs									
Guided Bombs				1.0E-01	0.0E+00	5.2E-04			
Cluster Bombs				6.7E-01	0.0E+00	5.2E-04	1.8E-01	1.6E-02	1.0E-04
Practice Bombs				6.7E-01	0.0E+00	5.2E-04	1.8E-01	1.6E-02	1.0E-04
Other Bombs				6.7E-01	0.0E+00	5.2E-04			
Miscellaneous Items									
Chaff				6.7E-01	0.0E+00	5.2E-04			
Flares							1.8E-01	1.6E-02	1.0E-04

[a] PM10 emission factor for explosives includes a crater ejecta emission factor of 2.5E-02 (based on 380.97 lb PM10/15,000 lb TNT presented in the Great Basin Air Toxics Inventory for NAWS China Lake).

Source: *Final Air Quality Environmental Assessment Burro Canyon Open Burn/Open Detonation Site, NAWS China Lake* (U.S. Navy, Sep 96).

TABLE D4-10. SUMMARY OF THE NUMBER OF ORDNANCE ITEMS USED PER FISCAL YEAR FOR TARGET/TEST SITES

ORDNANCE TYPE	1990[a]	1991[a]	1992	1993	1994	1995	1996	1997	1997-2001[b]
Gun Ammunition									
Small Arms			298		1,000	600	200	120	1,300
20-40 mm	5,300	4,711	40,907	30,879	84,642	65,819	23,944	39,887	54,600
Greater than 40 mm			807	2,553	3,167	1,364	915	934	2,900
Rockets	935	345	184	195	167	33	143	91	150
Missiles	69	90	160	79	77	79	56	58	129
Bombs									
Guided Bombs	6	20	19	35	15	30	39	94	25
Cluster Bombs	183	221	12	92	108	47	95	326	65
Practice Bombs	2,419	2,120	3,149	4,313	5,140	2,901	3,111	2,575	5,600
Other Bombs	724	659							500
Miscellaneous Items									
Chaff				15		17			8
Flares	1,214	1,059	4,132	3,366	1,108	302	1,535	2,552	2,240

[a] Data incomplete for FY90 and FY91

[b] Projections per year averaged over the FY97 - FY01 period

Source: U.S. Navy, 1998

TABLE D4-11. ANNUAL EMISSIONS (TONS) - 1990 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
20-40 mm	1.2E-01	0.0E+00	1.9E-04	4.8E-02	0.0E+00	3.7E-05	0.0E+00	0.0E+00	0.0E+00	1.7E-01	0.0E+00	2.3E-04
Greater than 40 mm	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Rockets	1.6E+00	0.0E+00	2.5E-03	1.3E+00	0.0E+00	9.9E-04	9.5E-02	8.6E-03	5.4E-05	3.0E+00	8.6E-03	3.6E-03
Missiles	4.9E-01	2.4E-02	3.5E-04	2.8E-01	0.0E+00	2.1E-04	1.4E-02	1.3E-03	8.0E-06	7.8E-01	2.5E-02	5.6E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	2.1E-02	0.0E+00	1.1E-04	0.0E+00	0.0E+00	0.0E+00	2.1E-02	0.0E+00	1.1E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	7.4E-03	0.0E+00	5.8E-06	1.8E+00	1.6E-01	1.0E-03	1.8E+00	1.6E-01	1.0E-03
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	3.5E-01	0.0E+00	2.8E-04	1.2E-02	1.1E-03	6.7E-06	3.7E-01	1.1E-03	2.8E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	2.2E+01	0.0E+00	1.7E-02	0.0E+00	0.0E+00	0.0E+00	2.2E+01	0.0E+00	1.7E-02
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.1E-01	4.6E-02	2.9E-04	5.1E-01	4.6E-02	2.9E-04
TOTAL	2.2E+00	2.4E-02	3.1E-03	2.4E+01	0.0E+00	1.9E-02	2.4E+00	2.2E-01	1.4E-03	2.9E+01	2.4E-01	2.3E-02

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-12. ANNUAL EMISSIONS (TONS) - 1991 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
20-40 mm	1.0E-01	0.0E+00	1.7E-04	4.2E-02	0.0E+00	3.3E-05	0.0E+00	0.0E+00	0.0E+00	1.5E-01	0.0E+00	2.0E-04
Greater than 40 mm	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Rockets	5.8E-01	0.0E+00	9.4E-04	4.7E-01	0.0E+00	3.7E-04	3.5E-02	3.2E-03	2.0E-05	1.1E+00	3.2E-03	1.3E-03
Missiles	6.3E-01	3.2E-02	4.5E-04	3.7E-01	0.0E+00	2.7E-04	1.8E-02	1.7E-03	1.0E-05	1.0E+00	3.3E-02	7.3E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	7.1E-02	0.0E+00	3.7E-04	0.0E+00	0.0E+00	0.0E+00	7.1E-02	0.0E+00	3.7E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	9.0E-03	0.0E+00	7.0E-06	2.1E+00	1.9E-01	1.2E-03	2.1E+00	1.9E-01	1.2E-03
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	3.1E-01	0.0E+00	2.4E-04	1.0E-02	9.3E-04	5.8E-06	3.2E-01	9.3E-04	2.5E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	2.0E+01	0.0E+00	1.6E-02	0.0E+00	0.0E+00	0.0E+00	2.0E+01	0.0E+00	1.6E-02
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.4E-01	4.0E-02	2.5E-04	4.4E-01	4.0E-02	2.5E-04
TOTAL	1.3E+00	3.2E-02	1.6E-03	2.1E+01	0.0E+00	1.7E-02	2.6E+00	2.4E-01	1.5E-03	2.5E+01	2.7E-01	2.0E-02

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-13. ANNUAL EMISSIONS (TONS) - 1992 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	2.1E-04	0.0E+00	3.5E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E-04	0.0E+00	3.5E-07
20-40 mm	9.1E-01	0.0E+00	1.5E-03	3.7E-01	0.0E+00	2.9E-04	0.0E+00	0.0E+00	0.0E+00	1.3E+00	0.0E+00	1.8E-03
Greater than 40 mm	6.1E-01	0.0E+00	9.9E-04	4.2E-01	0.0E+00	3.2E-04	2.0E-01	1.8E-02	1.1E-04	1.2E+00	1.8E-02	1.4E-03
Rockets	3.1E-01	0.0E+00	5.0E-04	2.5E-01	0.0E+00	2.0E-04	1.9E-02	1.7E-03	1.1E-05	5.8E-01	1.7E-03	7.1E-04
Missiles	1.1E+00	5.6E-02	8.0E-04	6.6E-01	0.0E+00	4.8E-04	3.2E-02	2.9E-03	1.8E-05	1.8E+00	5.9E-02	1.3E-03
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	6.7E-02	0.0E+00	3.5E-04	0.0E+00	0.0E+00	0.0E+00	6.7E-02	0.0E+00	3.5E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	4.9E-04	0.0E+00	3.8E-07	1.2E-01	1.1E-02	6.6E-05	1.2E-01	1.1E-02	6.6E-05
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	4.6E-01	0.0E+00	3.6E-04	1.5E-02	1.4E-03	8.7E-06	4.8E-01	1.4E-03	3.7E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.7E+00	1.6E-01	9.9E-04	1.7E+00	1.6E-01	9.9E-04
TOTAL	2.9E+00	5.6E-02	3.8E-03	2.2E+00	0.0E+00	2.0E-03	2.1E+00	2.0E-01	1.2E-03	7.2E+00	2.5E-01	7.0E-03

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-14. ANNUAL EMISSIONS (TONS) - 1993 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
20-40 mm	6.8E-01	0.0E+00	1.1E-03	2.8E-01	0.0E+00	2.2E-04	0.0E+00	0.0E+00	0.0E+00	9.6E-01	0.0E+00	1.3E-03
Greater than 40 mm	1.9E+00	0.0E+00	3.1E-03	1.3E+00	0.0E+00	1.0E-03	6.3E-01	5.7E-02	3.6E-04	3.9E+00	5.7E-02	4.5E-03
Rockets	3.3E-01	0.0E+00	5.3E-04	2.7E-01	0.0E+00	2.1E-04	2.0E-02	1.8E-03	1.1E-05	6.2E-01	1.8E-03	7.5E-04
Missiles	5.6E-01	2.8E-02	4.0E-04	3.3E-01	0.0E+00	2.4E-04	1.6E-02	1.5E-03	9.1E-06	9.0E-01	2.9E-02	6.4E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	1.2E-01	0.0E+00	6.4E-04	0.0E+00	0.0E+00	0.0E+00	1.2E-01	0.0E+00	6.4E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	3.7E-03	0.0E+00	2.9E-06	8.9E-01	8.1E-02	5.0E-04	8.9E-01	8.1E-02	5.1E-04
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	6.3E-01	0.0E+00	4.9E-04	2.1E-02	1.9E-03	1.2E-05	6.5E-01	1.9E-03	5.0E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	2.1E-05	0.0E+00	1.6E-08	0.0E+00	0.0E+00	0.0E+00	2.1E-05	0.0E+00	1.6E-08
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+00	1.3E-01	8.0E-04	1.4E+00	1.3E-01	8.0E-04
TOTAL	3.5E+00	2.8E-02	5.1E-03	2.9E+00	0.0E+00	2.8E-03	3.0E+00	2.7E-01	1.7E-03	9.4E+00	3.0E-01	9.6E-03

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-15. ANNUAL EMISSIONS (TONS) - 1994 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	7.2E-04	0.0E+00	1.2E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.2E-04	0.0E+00	1.2E-06
20-40 mm	1.9E+00	0.0E+00	3.0E-03	7.6E-01	0.0E+00	5.9E-04	0.0E+00	0.0E+00	0.0E+00	2.6E+00	0.0E+00	3.6E-03
Greater than 40 mm	2.4E+00	0.0E+00	3.9E-03	1.6E+00	0.0E+00	1.3E-03	7.8E-01	7.1E-02	4.4E-04	4.8E+00	7.1E-02	5.6E-03
Rockets	2.8E-01	0.0E+00	4.5E-04	2.3E-01	0.0E+00	1.8E-04	1.7E-02	1.5E-03	9.6E-06	5.3E-01	1.5E-03	6.4E-04
Missiles	5.4E-01	2.7E-02	3.9E-04	3.2E-01	0.0E+00	2.3E-04	1.6E-02	1.4E-03	8.9E-06	8.8E-01	2.8E-02	6.3E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	5.3E-02	0.0E+00	2.8E-04	0.0E+00	0.0E+00	0.0E+00	5.3E-02	0.0E+00	2.8E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	4.4E-03	0.0E+00	3.4E-06	1.0E+00	9.5E-02	5.9E-04	1.0E+00	9.5E-02	5.9E-04
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	7.5E-01	0.0E+00	5.8E-04	2.5E-02	2.3E-03	1.4E-05	7.8E-01	2.3E-03	6.0E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.7E-01	4.2E-02	2.6E-04	4.7E-01	4.2E-02	2.6E-04
TOTAL	5.1E+00	2.7E-02	7.7E-03	3.7E+00	0.0E+00	3.2E-03	2.3E+00	2.1E-01	1.3E-03	1.1E+01	2.4E-01	1.2E-02

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-16. ANNUAL EMISSIONS (TONS) - 1995 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	4.3E-04	0.0E+00	7.0E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.3E-04	0.0E+00	7.0E-07
20-40 mm	1.5E+00	0.0E+00	2.4E-03	5.9E-01	0.0E+00	4.6E-04	0.0E+00	0.0E+00	0.0E+00	2.1E+00	0.0E+00	2.8E-03
Greater than 40 mm	1.0E+00	0.0E+00	1.7E-03	7.0E-01	0.0E+00	5.4E-04	3.4E-01	3.1E-02	1.9E-04	2.1E+00	3.1E-02	2.4E-03
Rockets	5.6E-02	0.0E+00	9.0E-05	4.5E-02	0.0E+00	3.5E-05	3.3E-03	3.0E-04	1.9E-06	1.0E-01	3.0E-04	1.3E-04
Missiles	5.6E-01	2.8E-02	4.0E-04	3.3E-01	0.0E+00	2.4E-04	1.6E-02	1.5E-03	9.1E-06	9.0E-01	2.9E-02	6.4E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	1.1E-01	0.0E+00	5.5E-04	0.0E+00	0.0E+00	0.0E+00	1.1E-01	0.0E+00	5.5E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	1.9E-03	0.0E+00	1.5E-06	4.5E-01	4.1E-02	2.6E-04	4.5E-01	4.1E-02	2.6E-04
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	4.3E-01	0.0E+00	3.3E-04	1.4E-02	1.3E-03	8.0E-06	4.4E-01	1.3E-03	3.4E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	2.4E-05	0.0E+00	1.9E-08	0.0E+00	0.0E+00	0.0E+00	2.4E-05	0.0E+00	1.9E-08
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E-01	1.2E-02	7.2E-05	1.3E-01	1.2E-02	7.2E-05
TOTAL	3.1E+00	2.8E-02	4.6E-03	2.2E+00	0.0E+00	2.2E-03	9.5E-01	8.7E-02	5.4E-04	6.3E+00	1.1E-01	7.2E-03

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-17 ANNUAL EMISSIONS (TONS) - 1996 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	1.4E-04	0.0E+00	2.3E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-04	0.0E+00	2.3E-07
20-40 mm	5.3E-01	0.0E+00	8.6E-04	2.2E-01	0.0E+00	1.7E-04	0.0E+00	0.0E+00	0.0E+00	7.5E-01	0.0E+00	1.0E-03
Greater than 40 mm	6.9E-01	0.0E+00	1.1E-03	4.7E-01	0.0E+00	3.7E-04	2.3E-01	2.1E-02	1.3E-04	1.4E+00	2.1E-02	1.6E-03
Rockets	2.4E-01	0.0E+00	3.9E-04	2.0E-01	0.0E+00	1.5E-04	1.4E-02	1.3E-03	8.2E-06	4.5E-01	1.3E-03	5.5E-04
Missiles	3.9E-01	2.0E-02	2.8E-04	2.3E-01	0.0E+00	1.7E-04	1.1E-02	1.0E-03	6.5E-06	6.4E-01	2.1E-02	4.6E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	1.4E-01	0.0E+00	7.2E-04	0.0E+00	0.0E+00	0.0E+00	1.4E-01	0.0E+00	7.2E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	3.9E-03	0.0E+00	3.0E-06	9.2E-01	8.3E-02	5.2E-04	9.2E-01	8.3E-02	5.2E-04
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	4.6E-01	0.0E+00	3.5E-04	1.5E-02	1.4E-03	8.6E-06	4.7E-01	1.4E-03	3.6E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.4E-01	5.9E-02	3.7E-04	6.4E-01	5.9E-02	3.7E-04
TOTAL	1.9E+00	2.0E-02	2.6E-03	1.7E+00	0.0E+00	1.9E-03	1.8E+00	1.7E-01	1.0E-03	5.4E+00	1.9E-01	5.6E-03

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-18. ANNUAL EMISSIONS (TONS) - 1997 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	8.6E-05	0.0E+00	1.4E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.6E-05	0.0E+00	1.4E-07
20-40 mm	8.8E-01	0.0E+00	1.4E-03	3.6E-01	0.0E+00	2.8E-04	0.0E+00	0.0E+00	0.0E+00	1.2E+00	0.0E+00	1.7E-03
Greater than 40 mm	7.1E-01	0.0E+00	1.1E-03	4.8E-01	0.0E+00	3.7E-04	2.3E-01	2.1E-02	1.3E-04	1.4E+00	2.1E-02	1.7E-03
Rockets	1.5E-01	0.0E+00	2.5E-04	1.2E-01	0.0E+00	9.7E-05	9.2E-03	8.4E-04	5.2E-06	2.8E-01	8.4E-04	3.5E-04
Missiles	4.1E-01	2.0E-02	2.9E-04	2.4E-01	0.0E+00	1.8E-04	1.2E-02	1.1E-03	6.7E-06	6.6E-01	2.1E-02	4.7E-04
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	3.3E-01	0.0E+00	1.7E-03	0.0E+00	0.0E+00	0.0E+00	3.3E-01	0.0E+00	1.7E-03
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	1.3E-02	0.0E+00	1.0E-05	3.1E+00	2.9E-01	1.8E-03	3.2E+00	2.9E-01	1.8E-03
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	3.8E-01	0.0E+00	2.9E-04	1.2E-02	1.1E-03	7.1E-06	3.9E-01	1.1E-03	3.0E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E+00	9.7E-02	6.1E-04	1.1E+00	9.7E-02	6.1E-04
TOTAL	2.2E+00	2.0E-02	3.0E-03	1.9E+00	0.0E+00	2.9E-03	4.5E+00	4.1E-01	2.6E-03	8.6E+00	4.3E-01	8.6E-03

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-19. ANNUAL EMISSIONS (TONS) - 1997-2001 ORDNANCE USE FOR TARGET/TEST SITES

	PROPELLANTS			EXPLOSIVES			PYROTECHNICS			TOTAL		
ORDNANCE TYPE	PM10	NOx	ROG	PM10[a]	NOx	ROG	PM10	NOx	ROG	PM10	NOx	ROG
Gun Ammunition												
Small Arms	9.4E-04	0.0E+00	1.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.4E-04	0.0E+00	1.5E-06
20-40 mm	1.2E+00	0.0E+00	2.0E-03	4.9E-01	0.0E+00	3.8E-04	0.0E+00	0.0E+00	0.0E+00	1.7E+00	0.0E+00	2.3E-03
Greater than 40 mm	2.2E+00	0.0E+00	3.6E-03	1.5E+00	0.0E+00	1.2E-03	7.2E-01	6.5E-02	4.1E-04	4.4E+00	6.5E-02	5.1E-03
Rockets	2.5E-01	0.0E+00	4.1E-04	2.1E-01	0.0E+00	1.6E-04	1.5E-02	1.4E-03	8.6E-06	4.8E-01	1.4E-03	5.8E-04
Missiles	9.1E-01	4.5E-02	6.5E-04	5.3E-01	0.0E+00	3.9E-04	2.6E-02	2.4E-03	1.5E-05	1.5E+00	4.8E-02	1.1E-03
Bombs												
Guided Bombs	0.0E+00	0.0E+00	0.0E+00	8.8E-02	0.0E+00	4.6E-04	0.0E+00	0.0E+00	0.0E+00	8.8E-02	0.0E+00	4.6E-04
Cluster Bombs	0.0E+00	0.0E+00	0.0E+00	2.6E-03	0.0E+00	2.0E-06	6.3E-01	5.7E-02	3.6E-04	6.3E-01	5.7E-02	3.6E-04
Practice Bombs [c]	0.0E+00	0.0E+00	0.0E+00	8.2E-01	0.0E+00	6.4E-04	2.7E-02	2.5E-03	1.5E-05	8.5E-01	2.5E-03	6.5E-04
Other Bombs	0.0E+00	0.0E+00	0.0E+00	1.5E+01	0.0E+00	1.2E-02	0.0E+00	0.0E+00	0.0E+00	1.5E+01	0.0E+00	1.2E-02
Miscellaneous Items												
Chaff	0.0E+00	0.0E+00	0.0E+00	1.1E-05	0.0E+00	8.7E-09	0.0E+00	0.0E+00	0.0E+00	1.1E-05	0.0E+00	8.7E-09
Flares	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.4E-01	8.6E-02	5.3E-04	9.4E-01	8.6E-02	5.3E-04
TOTAL	4.6E+00	4.5E-02	6.7E-03	1.9E+01	0.0E+00	1.5E-02	2.4E+00	2.1E-01	1.3E-03	2.6E+01	2.6E-01	2.3E-02

[a] Based on: (Average PEP weight per ordnance type, lb/item) X (Number of items per year) X (Emission factors)/(2,000 lbs/ton) = Annual emissions, tons/year

[b] Based on: (Average PEP weight per ornance type, lb/item) X (Number of items per year) X (Emission factors) X (0.2 / (2000 lbs/ton) = Annual emissions, tons/year
Where 0.2 is the ratio of non-inert explosive items to total number of explosive items

[c] Practice bombs are all inert except for minimal high explosive content.

TABLE D4-20. SUMMARY OF TOTAL ANNUAL EMISSIONS (TONS) FOR TARGET/TEST SITES

POLLUTANT	1990[a]	1991[a]	1992	1993	1994	1995	1996	1997	1997-2001[b]	MAXIMUM
PM10	2.9E+01	2.5E+01	7.2E+00	9.4E+00	1.1E+01	6.3E+00	5.4E+00	8.6E+00	2.6E+01	2.9E+01
NOx	2.4E-01	2.7E-01	2.5E-01	3.0E-01	2.4E-01	1.1E-01	1.9E-01	4.3E-01	2.6E-01	4.3E-01
ROG	2.3E-02	2.0E-02	7.0E-03	9.6E-03	1.2E-02	7.2E-03	5.6E-03	8.6E-03	2.3E-02	2.3E-02

[a] Data incomplete for FY90 and FY91
[b] Projections per year averaged over the FY97 - FY01 period

Source: Tables D4-1 through D4-19

TABLE D4-21. SUMMARY OF TARGET/TEST SITE AREAS (ACRES) - NO ACTION ALTERNATIVE

Range	Management Unit	PM10 Nonattainment			Kern County	Inyo County	Total
		Owens	Searles	Mojave	Ozone	Attainment	
North	Baker Range		776		769		776
	Charlie Range		560		560		560
	Airport Lake		1987				1987
	George Range		1853		197		1853
	Coso Military	152	343			481	976
South	Randsburg Wash			244			244
	Mojave B North			148			148
	Mojave B South			0			0
	Superior Valley			444			444
TOTAL		152	5519	836	1526	481	6988

TABLE D4-22. FRACTION OF TOTAL TARGET/TEST SITE ACREAGE BY MANAGEMENT UNIT AND AIR QUALITY MANAGEMENT AREA

Range	Management Unit	PM10 Nonattainment			Kern County	Inyo County	Total
		Owens	Searles	Mojave	Ozone	Attainment	
North	Baker Range		0.11105		0.11005		0.11105
	Charlie Range		0.08014		0.08014		0.08014
	Airport Lake		0.28434				0.28434
	George Range		0.26517		0.02819		0.26517
	Coso Military	0.02175	0.04908			0.06883	0.13967
South	Randsburg Wash			0.03492			0.03492
	Mojave B North			0.02118			0.02118
	Mojave B South			0.00000			0.00000
	Superior Valley			0.06354			0.06354
TOTAL		0.02175	0.78978	0.11963	0.21837	0.06883	1.00000

Based on: (target/test site acreage by management unit and air quality management area) divided by (total target/test site acreage) = (fraction of total target/test site acreage)

TABLE D4-23. ANNUAL PM10 EMISSIONS FOR TARGET/TEST SITES - NO ACTION ALTERNATIVE

		PM10 Nonattainment			Kern County	Inyo County	
Range	Management Unit	Owens	Searles	Mojave	Ozone	Attainment	Total
North	Baker Range		3.2E+00		3.2E+00		3.2E+00
	Charlie Range		2.3E+00		2.3E+00		2.3E+00
	Airport Lake		8.2E+00				8.2E+00
	George Range		7.7E+00		8.2E-01		7.7E+00
	Coso Military	6.3E-01	1.4E+00			2.0E+00	4.1E+00
South	Randsburg Wash			1.0E+00			1.0E+00
	Mojave B North			6.1E-01			6.1E-01
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			1.8E+00			1.8E+00
TOTAL		6.3E-01	2.3E+01	3.5E+00	6.3E+00	2.0E+00	2.9E+01

TABLE D4-24. ANNUAL NOX EMISSIONS FOR TARGET/TEST SITES - NO ACTION ALTERNATIVE

		PM10 Nonattainment			Kern County	Inyo County	
Range	Management Unit	Owens	Searles	Mojave	Ozone	Attainment	Total
North	Baker Range		4.8E-02		4.7E-02		4.8E-02
	Charlie Range		3.4E-02		3.4E-02		3.4E-02
	Airport Lake		1.2E-01				1.2E-01
	George Range		1.1E-01		1.2E-02		1.1E-01
	Coso Military	9.4E-03	2.1E-02			3.0E-02	6.0E-02
South	Randsburg Wash			1.5E-02			1.5E-02
	Mojave B North			9.1E-03			9.1E-03
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			2.7E-02			2.7E-02
TOTAL		9.4E-03	3.4E-01	5.1E-02	9.4E-02	3.0E-02	4.3E-01

TABLE D4-25. ANNUAL ROG EMISSIONS FOR TARGET/TEST SITES - NO ACTION ALTERNATIVE

TOTAL ROG EMISSIONS BY MANAGEMENT AREA AND AIR QUALITY PLANNING AREA							
		PM10 Nonattainment			Kern County	Inyo County	
Range	Management Unit	Owens	Searles	Mojave	Ozone	Attainment	Total
North	Baker Range		2.6E-03		2.5E-03		2.6E-03
	Charlie Range		1.8E-03		1.8E-03		1.8E-03
	Airport Lake		6.5E-03				6.5E-03
	George Range		6.1E-03		6.5E-04		6.1E-03
	Coso Military	5.0E-04	1.1E-03			1.6E-03	3.2E-03
South	Randsburg Wash			8.0E-04			8.0E-04
	Mojave B North			4.9E-04			4.9E-04
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			1.5E-03			1.5E-03
TOTAL		5.0E-04	1.8E-02	2.8E-03	5.0E-03	1.6E-03	2.3E-02

Based on: (Total NAWS China Lake CLUMP target/test sites ordnance emission sources, tons/year) X
(Management units acreage fractions by air quality area) = (Emissions by air quality area)

Note: The Kern County Ozone Nonattainment Area is also within the Searles Valley PM10 Nonattainment Area.

TABLE D4-26. ANNUAL PM10 EMISSIONS FOR TARGET/TEST SITES - LIMITED EXPANSION ALTERNATIVE

		PM10 Nonattainment			Kern County	Inyo County	
Range	Management Unit	Owens	Searles	Mojave	Ozone	Attainment	Total
North	Baker Range		3.7E+00		3.6E+00		3.7E+00
	Charlie Range		2.6E+00		2.6E+00		2.6E+00
	Airport Lake		9.4E+00				9.4E+00
	George Range		8.8E+00		9.3E-01		8.8E+00
	Coso Military	7.2E-01	1.6E+00			2.3E+00	4.6E+00
South	Randsburg Wash			1.2E+00			1.2E+00
	Mojave B North			7.0E-01			7.0E-01
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			2.1E+00			2.1E+00
TOTAL		7.2E-01	2.6E+01	3.9E+00	7.2E+00	2.3E+00	3.3E+01

TABLE D4-27. ANNUAL NOX EMISSIONS FOR TARGET/TEST SITES - LIMITED EXPANSION ALTERNATIVE

		PM10 Nonattainment			Kern County	Inyo County	
Range	Management Unit	Owens	Searles	Mojave	Ozone	Attainment	Total
North	Baker Range		5.5E-02		5.4E-02		5.5E-02
	Charlie Range		4.0E-02		4.0E-02		4.0E-02
	Airport Lake		1.4E-01				1.4E-01
	George Range		1.3E-01		1.4E-02		1.3E-01
	Coso Military	1.1E-02	2.4E-02			3.4E-02	6.9E-02
South	Randsburg Wash			1.7E-02			1.7E-02
	Mojave B North			1.0E-02			1.0E-02
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			3.1E-02			3.1E-02
TOTAL		1.1E-02	3.9E-01	5.9E-02	1.1E-01	3.4E-02	4.9E-01

TABLE D4-28. ANNUAL ROG EMISSIONS FOR TARGET/TEST SITES - LIMITED EXPANSION ALTERNATIVE

TOTAL ROG EMISSIONS BY MANAGEMENT AREA AND AIR QUALITY PLANNING AREA							
		PM10 Nonattainment			Kern County	Inyo County	
Range	Management Unit	Owens	Searles	Mojave	Ozone	Attainment	Total
North	Baker Range		2.9E-03		2.9E-03		2.9E-03
	Charlie Range		2.1E-03		2.1E-03		2.1E-03
	Airport Lake		7.4E-03				7.4E-03
	George Range		6.9E-03		7.3E-04		6.9E-03
	Coso Military	5.7E-04	1.3E-03			1.8E-03	3.6E-03
South	Randsburg Wash			9.1E-04			9.1E-04
	Mojave B North			5.5E-04			5.5E-04
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			1.7E-03			1.7E-03
TOTAL		5.7E-04	2.1E-02	3.1E-03	5.7E-03	1.8E-03	2.6E-02

Based on: 15% increase in emissions from No Action Alternative

Note: The Kern County Ozone Nonattainment Area is also within the Searles Valley PM10 Nonattainment Area.

TABLE D4-29. ANNUAL PM10 EMISSIONS FOR TARGET/TEST SITES - MODERATE EXPANSION ALTERNATIVE

Range	Management Unit	PM10 Nonattainment Owens	PM10 Nonattainment Searles	PM10 Nonattainment Mojave	Kern County Ozone	Inyo County Attainment	Total
North	Baker Range		4.0E+00		4.0E+00		4.0E+00
	Charlie Range		2.9E+00		2.9E+00		2.9E+00
	Airport Lake		1.0E+01				1.0E+01
	George Range		9.5E+00		1.0E+00		9.5E+00
	Coso Military	7.8E-01	1.8E+00			2.5E+00	5.0E+00
South	Randsburg Wash			1.3E+00			1.3E+00
	Mojave B North			7.6E-01			7.6E-01
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			2.3E+00			2.3E+00
TOTAL		7.8E-01	2.8E+01	4.3E+00	7.9E+00	2.5E+00	3.6E+01

TABLE D4-30. ANNUAL NOX EMISSIONS FOR TARGET/TEST SITES - MODERATE EXPANSION ALTERNATIVE

Range	Management Unit	PM10 Nonattainment Owens	PM10 Nonattainment Searles	PM10 Nonattainment Mojave	Kern County Ozone	Inyo County Attainment	Total
North	Baker Range		6.0E-02		5.9E-02		6.0E-02
	Charlie Range		4.3E-02		4.3E-02		4.3E-02
	Airport Lake		1.5E-01				1.5E-01
	George Range		1.4E-01		1.5E-02		1.4E-01
	Coso Military	1.2E-02	2.6E-02			3.7E-02	7.5E-02
South	Randsburg Wash			1.9E-02			1.9E-02
	Mojave B North			1.1E-02			1.1E-02
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			3.4E-02			3.4E-02
TOTAL		1.2E-02	4.2E-01	6.4E-02	1.2E-01	3.7E-02	5.4E-01

TABLE D4-31. ANNUAL ROG EMISSIONS FOR TARGET/TEST SITES - MODERATE EXPANSION ALTERNATIVE

TOTAL ROG EMISSIONS BY MANAGEMENT AREA AND AIR QUALITY PLANNING AREA							
Range	Management Unit	PM10 Nonattainment Owens	PM10 Nonattainment Searles	PM10 Nonattainment Mojave	Kern County Ozone	Inyo County Attainment	Total
North	Baker Range		3.1E-03		3.1E-03		3.1E-03
	Charlie Range		2.2E-03		2.2E-03		2.2E-03
	Airport Lake		8.0E-03				8.0E-03
	George Range		7.4E-03		7.9E-04		7.4E-03
	Coso Military	6.1E-04	1.4E-03			1.9E-03	3.9E-03
South	Randsburg Wash			9.8E-04			9.8E-04
	Mojave B North			5.9E-04			5.9E-04
	Mojave B South			0.0E+00			0.0E+00
	Superior Valley			1.8E-03			1.8E-03
TOTAL		6.1E-04	2.2E-02	3.3E-03	6.1E-03	1.9E-03	2.8E-02

Based on: 25% increase in emissions from the No Action Alternative

Note: The Kern County Ozone Nonattainment Area is also within the Searles Valley PM10 Nonattainment Area.

APPENDIX D5 - CLEAN AIR ACT CONFORMITY ANALYSIS

D5.1 CLEAN AIR ACT CONFORMITY REQUIREMENTS

Section 176(c) of the Clean Air Act requires that federal agency actions be consistent with the Clean Air Act and with any approved air quality management plan (state implementation plan [SIP]). EPA adopted Clean Air Act conformity requirements in two stages: one rule for regional transportation plans, highway projects, and transit projects; and a second rule for other federal agency actions.

The conformity rule for highway and mass transit plans and projects was promulgated in the November 24, 1993 Federal Register (58 FR 62188-62216). The transportation conformity rule (40 CFR Part 93 Subpart A) applies to transportation plans and transportation projects that require action by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) under Title 23 U.S.C. or the Federal Transit Act. The transportation conformity rule defines a “transportation project” as a highway project or mass transit project. Federal agency actions affecting airports, harbors, or freight rail facilities would normally be subject to the general conformity rule, not the transportation conformity rule.

The conformity rule for general federal actions was promulgated in the November 30, 1993 Federal Register (58 FR 63214-63259), and became effective on January 31, 1994. The Navy’s actions to implement the CLUMP are subject to the general conformity rule (40 CFR Part 93 Subpart B). Most air pollution control districts have adopted the EPA conformity rules verbatim, often by direct reference to the relevant 40 CFR parts.

Purpose of the General Conformity Rule. The EPA general conformity rule requires federal agencies to analyze proposed actions according to standardized procedures and to provide a public review and comment process. The conformity determination process is intended to demonstrate that the proposed federal action:

- Will not cause or contribute to new violations of federal air quality standards;
- Will not increase the frequency or severity of existing violations of federal air quality standards; and
- Will not delay the timely attainment of federal air quality standards.

Applicability of the General Conformity Rule. The EPA general conformity rule applies to general federal actions affecting nonattainment areas and designated maintenance areas (attainment areas that were previously designated as nonattainment areas). As noted previously, highway or mass-transit projects that require FHWA or FTA funding or approval will be subject to transportation conformity rule requirements rather than the EPA general conformity rule requirements. Analyses required by the general conformity rule must be performed for each nonattainment or maintenance pollutant and its relevant precursors.

Five categories of actions and projects are excluded from the general conformity rule requirements (40 CFR 93.153(d)):

- Stationary sources requiring air quality permits under the new source review (NSR) program or the prevention of significant deterioration (PSD) program;
- Direct emissions from remedial actions at Superfund (CERCLA) sites when the substantive requirements of NSR/PSD programs are met or when the action is otherwise exempted under provisions of CERCLA;
- Initial and continuing actions in response to emergencies or disasters;

- Alterations and additions to existing structures as specifically required by applicable environmental legislation or regulations; and
- Various special studies and research investigation actions.

Conformity analyses are limited to those emissions that are the responsibility of the federal agency or that will remain subject to an on-going program of federal agency control. Conformity determinations are not required to address the emissions consequences of those portions of an action that are not reasonably foreseeable or that are not quantifiable.

In addition, conformity determinations are not required when the annual direct and indirect emissions from the action will be less than the applicable *de minimis* thresholds (40 CFR 93.153(c)). Applicable *de mimimis* levels vary by pollutant and the severity of nonattainment conditions (40 CFR 93.153(b)). The *de minimis* thresholds in carbon monoxide, sulfur dioxide, or nitrogen dioxide nonattainment areas are 100 tons per year of each relevant pollutant. The *de minimis* threshold in lead nonattainment areas is 25 tons per year.

The *de minimis* thresholds in ozone nonattainment areas apply separately to each of the major ozone precursor groups (reactive organic compound and nitrogen oxide emissions). The *de minimis* level varies according to severity of nonattainment: 100 tons per year in marginal or moderate nonattainment areas, 50 tons per year in serious nonattainment areas, 25 tons per year in severe nonattainment areas, and 10 tons per year in extreme nonattainment areas.

The *de minimis* threshold in PM_{10} nonattainment areas applies to identified PM_{10} precursors as well as to directly emitted PM_{10}. No PM_{10} precursors are identified in the PM_{10} SIPs affecting NAWS. The PM_{10} *de minimis* level is 100 tons per year in moderate nonattainment areas and 70 tons per year in serious nonattainment areas.

The EPA conformity rule (40 CFR 93.153(c)(2)) identifies several categories of actions that are presumed to result in no net emissions increase or in an emissions increase that will clearly be less than any applicable *de minimis* level. These types of activities are primarily routine administrative, planning, financial, property disposal, or property maintenance actions. While planning activities per se are excluded from analysis under the general conformity rule, implementation of plans is potentially subject to conformity determination requirements.

Regardless of the applicable *de minimis* level, conformity assessments are required for non-exempt "regionally significant" actions: those actions for which direct and indirect emissions exceed 10% of the applicable SIP emissions inventory, regardless of numerical value. No nonattainment areas in California, and possibly none nationwide, have emission inventories that are less than 10 times the relevant *de minimis* level. Thus, this provision of the EPA conformity rule is rarely if ever applicable.

Responsibility for Conformity Determinations. The federal agency undertaking the action is responsible for preparing and issuing the conformity determination under the EPA conformity rules. Other federal, state, and local agencies have review and comment responsibility.

Options for Demonstrating Conformity. If estimated emissions for a federal project exceed an applicable *de minimis* threshold, two types of technical analyses can be used to demonstrate clean air act conformity:

- Dispersion modeling demonstrations for primary (i.e., directly emitted) pollutants to show that there will be no violations of federal ambient air quality standards; or

- Emissions analyses that demonstrate that there will be no net emissions increase and that emissions will not interfere with the timely attainment and maintenance of federal ambient air quality standards.

Dispersion modeling demonstrations of conformity are not allowed for ozone nonattainment areas, and will seldom be feasible for other secondary pollutants (nitrogen dioxide and particulate matter). In addition, modeling may not be possible for some types of emission sources due to the lack of appropriate dispersion models. In general, dispersion modeling is most useful for carbon monoxide, lead, and sulfur dioxide nonattainment areas. Dispersion modeling may be useful in some PM_{10} nonattainment areas if secondary PM_{10} is not a significant contributor to nonattainment conditions.

If dispersion modeling is not used for the conformity demonstration, then the conformity demonstration requires either consistency with emission forecasts in SIP documents or identification of concurrent or prior emission reductions that will compensate for emission increases associated with a proposed action.

If EPA has not yet approved a SIP document submitted pursuant to the Clean Air Act Amendments of 1990, there are two basic options for demonstrating conformity.

- Conformity will be demonstrated if direct and indirect emissions from the action are fully offset through compensating emission reductions implemented through a federally enforceable mechanism (40 CFR 93.158(a)(2)).
- Alternatively, conformity can be demonstrated by showing that total direct and indirect emissions with the federal action do not exceed estimated future baseline scenario emissions. Future baseline scenario emissions are total direct and indirect emissions that would occur in future years if baseline (1990 or the nonattainment designation year) emission source activity levels remain constant in the geographic area affected by the federal action. The future baseline scenario represents a “no action” scenario projected to the maximum emissions year for the proposed action, to the attainment year mandated by the Clean Air Act, and to any other “milestone” years identified in the existing SIP (40 CFR 93.158(a)(5)(iv)(A)).

If EPA has approved SIP revisions pursuant to the 1990 Clean Air Act Amendments, any one of several options can be used for demonstrating conformity.

- Conformity is presumed if direct and indirect emissions from the activity are specifically identified and accounted for in the attainment or maintenance demonstration of a SIP approved after 1990 (40 CFR 93.158(a)(1)).
- Conformity will be demonstrated if direct and indirect emissions from the action are fully offset through compensating emission reductions implemented through a federally enforceable mechanism (40 CFR 93.158(a)(2) and 40 CFR 93.158(a)(5)(iii)).
- Conformity also can be demonstrated if the agency responsible for SIP preparation provides documentation that direct and indirect emissions associated with the federal agency action are accommodated within the emission forecasts contained in an approved SIP (40 CFR 93.158(a)(5)(i)(A)).
- Finally, if SIP conformity cannot be demonstrated by the procedures noted above, a conformity determination is possible only if the relevant air quality management agency notifies EPA that appropriate changes will be made in the applicable SIP documents. The air quality management agency must commit to a schedule for preparing an acceptable SIP amendment that accommodates the net increase in direct and indirect emissions from the federal action without causing any delay in the schedule for attaining the relevant federal ambient air quality standard (40 CFR 93.158(a)(5)(i)(B)).

Conformity determinations also must demonstrate that total direct and indirect emissions are consistent with all relevant requirements and milestones in the applicable SIP including:

- Reasonable further progress schedules,
- Assumptions specified in the attainment or maintenance demonstration, and
- SIP prohibitions, numerical emission limits, and work practice requirements.

Emission estimates summarized in Chapter 4 of the EIS and documented in Appendices D1, D2, D3, and D4 demonstrate that the projected increase in each pollutant will not exceed the applicable *de minimis* thresholds. Therefore, the Clean Air Act conformity determination requirements do not apply to the Limited Expansion Alternative or the Moderate Expansion Alternative.

A summary of all CLUMP-related emissions associated with the No Action Alternative is provided in Table D5-1.

A summary of all CLUMP-related emissions associated with the Limited Expansion Alternative, as well as increases projected to take place in each nonattainment area, is provided in Table D5-2.

A summary of all CLUMP-related emissions associated with the Moderate Expansion Alternative, as well as increases projected to take place in each nonattainment area, is provided in Table D5-3.

Records of Nonapplicability for both the Limited Expansion and Moderate Expansion Alternatives are included in this appendix.

TABLE D5-1. NAWS EMISSIONS FOR THE NO ACTION ALTERNATIVE

Category / Geographic Subarea	Annual Emissions, Tons Per Year ROG	NOx	CO	SOx	PM10
Airfield Flight Operations					
Kern County	127.600	74.350	640.360	3.050	44.580
San Bernardino County	0.510	11.150	4.610	0.520	8.540
Searles Valley PM10 area	128.110	85.500	644.980	3.570	53.120
In-Frame Engine Run-Ups					
Kern County/Searles Valley	60.780	11.670	169.720	0.690	15.920
Ground Support Equipment					
Kern County/Searles Valley	0.891	3.136	13.345	0.033	0.308
Fuel Deliveries and Transfers					
Kern County/Searles Valley	0.473	0.000	0.000	0.000	0.000
Range-Related Flight Activity					
Kern County ozone area	0.364	6.839	3.953	0.322	4.586
Searles Valley PM10 area	0.633	12.049	6.677	0.575	8.426
Owens Valley PM10 area	0.016	0.378	0.169	0.019	0.296
Mojave Desert PM10 area	0.352	8.774	3.839	0.436	7.712
Inyo County attainment area	0.018	0.317	0.148	0.015	0.238
Generators Supporting Range Ops					
Kern County ozone area	0.033	0.414	0.089	0.027	0.029
Searles Valley PM10 area	0.171	2.156	0.464	0.103	0.152
Owens Valley PM10 area	0.000	0.001	0.000	0.000	0.000
Mojave Desert PM10 area	0.022	0.290	0.062	0.019	0.020
Inyo County attainment area	0.001	0.009	0.002	0.001	0.001
Vehicle Emissions from Ground Troop Training					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.352	3.964	1.131	0.359	0.326
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
Mojave Desert PM10 area	0.344	3.869	1.104	0.350	0.319
Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
Fog Oil Emissions - Type 3 Ground Troop Training					
Searles Valley (non-Kern)	0.000	0.000	0.000	0.000	0.000
Fugitive Dust Frm Ground Troop Training Vehicle Activity					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.000	0.000	0.000	0.000	34.778
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
Mojave Desert PM10 area	0.000	0.000	0.000	0.000	33.722
Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
Ordnance Use for Ground Troop Training					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.002	0.008	0.000	0.000	1.301
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
Mojave Desert PM10 area	0.002	0.008	0.000	0.000	1.261
Inyo County attainment area	0.000	0.000	0.000	0.000	0.000

TABLE D5-1. NAWS EMISSIONS FOR THE NO ACTION ALTERNATIVE

Category / Geographic Subarea	Annual Emissions, Tons Per Year ROG	NOx	CO	SOx	PM10
Ordnance Use for Test and Target Sites					
Kern County ozone area	0.005	0.094	0.000	0.000	6.333
Searles Valley PM10 area	0.018	0.344	0.000	0.000	22.904
Owens Valley PM10 area	0.001	0.009	0.000	0.000	0.631
Mojave Desert PM10 area	0.003	0.051	0.000	0.000	3.469
Inyo County attainment area	0.002	0.030	0.000	0.000	1.996
Total CLUMP-Related Emissions for No Action Alternative:					
Kern County ozone area	190.146	96.504	827.467	4.122	71.756
Searles Valley PM10 area	191.429	118.828	836.318	5.330	137.235
Owens Valley PM10 area	0.017	0.388	0.169	0.019	0.927
Mojave Desert PM10 area	0.723	12.992	5.005	0.805	46.503
Inyo County attainment area	0.020	0.356	0.150	0.016	2.235
NAWS Totals***	192.190	132.564	841.642	6.170	186.899

*** Kern County ozone area totals are ALSO included in Searles Valley PM10 area totals.

TABLE D5-2. NAWS EMISSIONS FOR THE LIMITED EXPANSION ALTERNATIVE

Category Geographic Subarea	Annual Emissions, Tons Per Year ROG	NOx	CO	SOx	PM10
Airfield Flight Operations					
Kern County	146.760	85.510	736.500	3.510	51.260
San Bernardino County	0.580	12.820	5.310	0.600	9.820
Searles Valley PM10 area	147.340	98.330	741.810	4.110	61.080
In-Frame Engine Run-Ups					
Kern County/Searles Valley	67.800	13.120	190.900	0.770	17.670
Ground Support Equipment					
Kern County/Searles Valley	1.018	3.537	15.333	0.037	0.349
Fuel Deliveries and Transfers					
Kern County/Searles Valley	0.544	0.000	0.000	0.000	0.000
Range-Related Flight Activity					
Kern County ozone area	0.419	7.864	4.546	0.370	5.274
Searles Valley PM10 area	0.728	13.857	7.678	0.661	9.690
Owens Valley PM10 area	0.019	0.435	0.194	0.021	0.340
Mojave Desert PM10 area	0.405	10.090	4.415	0.502	8.869
Inyo County attainment area	0.020	0.364	0.170	0.018	0.273
Generators Supporting Range Ops					
Kern County ozone area	0.038	0.476	0.103	0.031	0.033
Searles Valley PM10 area	0.196	2.479	0.534	0.119	0.174
Owens Valley PM10 area	0.000	0.001	0.000	0.000	0.000
Mojave Desert PM10 area	0.026	0.333	0.072	0.022	0.023
Inyo County attainment area	0.001	0.010	0.002	0.001	0.001
Vehicle Emissions from Ground Troop Training					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.697	7.838	2.236	0.709	0.646
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
Mojave Desert PM10 area	0.688	7.737	2.208	0.700	0.637
Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
Fog Oil Emissions - Type 3 Ground Troop Training					
Searles Valley (non-Kern)	0.000	0.000	0.000	0.000	0.000
Fugitive Dust Frm Ground Troop Training Vehicle Activity					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.000	0.000	0.000	0.000	69.091
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
Mojave Desert PM10 area	0.000	0.000	0.000	0.000	67.409
Inyo County attainment area	0.000	0.000	0.000	0.000	0.000
Ordnance Use for Ground Troop Training					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.004	0.016	0.000	0.000	2.591
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.000
Mojave Desert PM10 area	0.004	0.015	0.000	0.000	2.522
Inyo County attainment area	0.000	0.000	0.000	0.000	0.000

TABLE D5-2. NAWS EMISSIONS FOR THE LIMITED EXPANSION ALTERNATIVE

Category	Annual Emissions, Tons Per Year				
Geographic Subarea	ROG	NOx	CO	SOx	PM10
Ordnance Use for Test and Target Sites					
Kern County ozone area	0.006	0.111	0.000	0.000	7.206
Searles Valley PM10 area	0.021	0.394	0.000	0.000	26.063
Owens Valley PM10 area	0.001	0.011	0.000	0.000	0.718
Mojave Desert PM10 area	0.003	0.059	0.000	0.000	3.948
Inyo County attainment area	0.002	0.034	0.000	0.000	2.271
Total CLUMP-Related Emissions					
Kern County ozone area	216.585	110.618	947.382	4.718	81.792
Searles Valley PM10 area	218.348	139.571	958.491	6.406	187.354
Owens Valley PM10 area	0.020	0.447	0.194	0.021	1.058
Mojave Desert PM10 area	1.125	18.235	6.695	1.224	83.408
Inyo County attainment area	0.023	0.409	0.172	0.019	2.545
NAWS Totals***	219.516	158.662	965.552	7.670	274.365
Net Change from No Action Alternative:					
Kern County ozone area	26.439	14.115	119.914	0.596	10.036
Searles Valley PM10 area	26.919	20.744	122.174	1.076	50.119
Owens Valley PM10 area	0.003	0.059	0.025	0.002	0.131
Mojave Desert PM10 area	0.402	5.243	1.689	0.419	36.906
Inyo County attainment area	0.003	0.052	0.022	0.003	0.310
NAWS Total Net Change***	27.327	26.098	123.910	1.499	87.466

*** Kern County ozone area totals are ALSO included in Searles Valley PM10 area totals.

TABLE D5-3. NAWS EMISSIONS FOR THE MODERATE EXPANSION ALTERNATIVE

Category Geographic Subarea	Annual Emissions, Tons Per Year ROG	NOx	CO	SOx	PM10
Airfield Flight Operations					
Kern County	159.520	92.950	800.540	3.810	55.730
San Bernardino County	0.630	13.940	5.770	0.650	10.680
Searles Valley PM10 area	160.150	106.890	806.310	4.460	66.410
In-Frame Engine Run-Ups					
Kern County/Searles Valley	74.660	14.330	208.080	0.850	19.510
Ground Support Equipment					
Kern County/Searles Valley	1.116	3.940	16.688	0.041	0.387
Fuel Deliveries and Transfers					
Kern County/Searles Valley	0.591	0.000	0.000	0.000	0.000
Range-Related Flight Activity					
Kern County ozone area	0.459	8.597	4.983	0.405	5.772
Searles Valley PM10 area	0.811	15.321	8.487	0.732	10.744
Owens Valley PM10 area	0.021	0.483	0.217	0.024	0.377
Mojave Desert PM10 area	0.446	11.108	4.873	0.552	9.764
Inyo County attainment area	0.024	0.415	0.193	0.020	0.314
Generators Supporting Range Ops					
Kern County ozone area	0.041	0.518	0.112	0.034	0.036
Searles Valley PM10 area	0.213	2.695	0.581	0.129	0.189
Owens Valley PM10 area	0.000	0.001	0.000	0.000	0.000
Mojave Desert PM10 area	0.028	0.362	0.078	0.024	0.026
Inyo County attainment area	0.001	0.011	0.002	0.001	0.001
Vehicle Emissions from Ground Troop Training					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	1.339	11.144	6.329	0.975	1.156
Owens Valley PM10 area	0.004	0.047	0.014	0.004	0.004
Mojave Desert PM10 area	0.688	7.737	2.208	0.700	0.637
Inyo County attainment area	0.001	0.013	0.004	0.001	0.001
Fog Oil Emissions - Type 3 Ground Troop Training					
Searles Valley (non-Kern)	0.092	0.000	0.000	0.000	9.100
Fugitive Dust Frm Ground Troop Training Vehicle Activity					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.000	0.000	0.000	0.000	84.117
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.217
Mojave Desert PM10 area	0.000	0.000	0.000	0.000	67.409
Inyo County attainment area	0.000	0.000	0.000	0.000	0.061
Ordnance Use for Ground Troop Training					
Kern County ozone area	0.000	0.000	0.000	0.000	0.000
Searles Valley PM10 area	0.006	0.043	0.000	0.000	4.469
Owens Valley PM10 area	0.000	0.000	0.000	0.000	0.005
Mojave Desert PM10 area	0.004	0.015	0.000	0.000	2.522
Inyo County attainment area	0.000	0.000	0.000	0.000	0.001

TABLE D5-3. NAWS EMISSIONS FOR THE MODERATE EXPANSION ALTERNATIVE

Category Geographic Subarea	Annual Emissions, Tons Per Year ROG	NOx	CO	SOx	PM10
Ordnance Use for Test and Target Sites					
Kern County ozone area	0.006	0.120	0.000	0.000	7.861
Searles Valley PM10 area	0.022	0.424	0.000	0.000	28.432
Owens Valley PM10 area	0.001	0.012	0.000	0.000	0.783
Mojave Desert PM10 area	0.003	0.064	0.000	0.000	4.307
Inyo County attainment area	0.002	0.037	0.000	0.000	2.478
Total CLUMP-Related Emissions					
Kern County ozone area	236.485	120.455	1030.403	5.140	98.396
Searles Valley PM10 area	239.000	154.787	1046.475	7.187	224.515
Owens Valley PM10 area	0.026	0.543	0.231	0.028	1.386
Mojave Desert PM10 area	1.168	19.287	7.159	1.276	84.664
Inyo County attainment area	0.028	0.477	0.199	0.022	2.856
NAWS Totals***	240.223	175.094	1054.064	8.513	313.421
Net Change from No Action Alternative					
Kern County ozone area	46.339	23.951	202.935	1.018	26.640
Searles Valley PM10 area	47.571	35.959	210.157	1.857	87.280
Owens Valley PM10 area	0.009	0.155	0.062	0.009	0.459
Mojave Desert PM10 area	0.445	6.295	2.154	0.470	38.162
Inyo County attainment area	0.008	0.120	0.049	0.006	0.621
NAWS Total Net Change ***	48.033	42.530	212.422	2.343	126.522

*** Kern County ozone area totals are ALSO included in Searles Valley PM10 area totals.

5090
8G0000D/041
31 May 2001

MEMORANDUM TO FILE

From: Head, Environmental Project Office (8G0000D)

Subj: RECORD OF NON-APPLICABILITY FOR THE MODERATE EXPANSION ALTERNATIVE AS THE COMPREHENSIVE LAND USE MANAGEMENT PLAN

Ref: (a) 40 CFR 93 Subpart B "Determining Conformity of General Federal Actions to State or Federal Implementation Plans
(b) CNO Draft Interim Guidance on Compliance with the Clean Air Act General Conformity Rule
(c) Draft Environmental Impact Statement for the NAWS China Lake Comprehensive Land Use Management Plan

1. As required by references (a) and (b), an analysis has been performed to determine the applicability of reference (a) to the following project: "Moderate Expansion Alternative as the Comprehensive Land Use Management Plan".

2. NAWS China Lake encompasses portions of Kern County, Inyo County, and San Bernardino County. Air quality programs in each of these counties are the responsibility of different air pollution control districts or air quality management districts. Four federally designated nonattainment areas overlap portions of NAWS China Lake: the Kern County serious ozone nonattainment area in the Kern County portion of the station; the Searles Valley moderate PM_{10} nonattainment area in Kern County portion of the station plus part of the Inyo County and San Bernardino County portions of the station; the Owens Valley serious PM_{10} nonattainment area in a small part of the Inyo County portion of the station; and the Mojave Desert moderate PM_{10} nonattainment area in part of the San Bernardino County portion of the station. (The remaining portion within Inyo County is designated "attainment/unclassified" for all pollutants.)

3. The *de minimis* threshold for each nonattainment area is as follows:
Kern County Ozone nonattainment area: 50 tons of ROG and 50 tons of NOx.
Searles Valley PM10 nonattainment area: 100 tons of PM10.
Owens Valley PM10 nonattainment area: 70 tons of PM10.
Mojave Desert PM10 nonattainment area: 100 tons of PM10.

4. The emissions increases in each nonattainment area that would be associated with implementation of the Moderate Expansion Alternative are as follows.
Kern County Ozone nonattainment area: 46.34 tons of ROG and 23.95 tons of NOx.
Searles Valley PM10 nonattainment area (all counties combined): 87.28 tons of PM10.
Owens Valley PM10 nonattainment area: 0.46 tons of PM10.
Mojave Desert PM10 nonattainment area: 38.16 tons of PM10.

Subj: RECORD OF NON-APPLICABILITY FOR THE MODERATE EXPANSION ALTERNATIVE AS THE COMPREHENSIVE LAND USE MANAGEMENT PLAN

5. The maximum annual net increase in direct and indirect emissions of nonattainment pollutants and their precursors are not regionally significant and will be less than the applicable *de minimis* levels in each of the nonattainment areas affecting NAWS China Lake. Consequently, the requirements of the EPA general conformity rule are not applicable to the Moderate Expansion Alternative (40 CFR 93.153(c)(1)).

6. The emissions estimates, underlying assumptions, and all supporting documentation are included as Appendix D of reference (c).

Carolyn A. Shepherd

CAROLYN A. SHEPHERD

5090
8G0000D/040
31 May 2001

MEMORANDUM TO FILE

From: Head, Environmental Project Office (8G0000D)

Subj: RECORD OF NON-APPLICABILITY FOR THE LIMITED EXPANSION ALTERNATIVE AS THE COMPREHENSIVE LAND USE MANAGEMENT PLAN

Ref: (a) 40 CFR 93 Subpart B "Determining Conformity of General Federal Actions to State or Federal Implementation Plans
(b) CNO Draft Interim Guidance on Compliance with the Clean Air Act General Conformity Rule
(c) Draft Environmental Impact Statement for the NAWS China Lake Comprehensive Land Use Management Plan

1. As required by references (a) and (b), an analysis has been performed to determine the applicability of reference (a) to the following project: "Limited Expansion Alternative as the Comprehensive Land Use Management Plan".

2. NAWS China Lake encompasses portions of Kern County, Inyo County, and San Bernardino County. Air quality programs in each of these counties are the responsibility of different air pollution control districts or air quality management districts. Four federally designated nonattainment areas overlap portions of NAWS China Lake: the Kern County serious ozone nonattainment area in the Kern County portion of the station; the Searles Valley moderate PM_{10} nonattainment area in Kern County portion of the station plus part of the Inyo County and San Bernardino County portions of the station; the Owens Valley serious PM_{10} nonattainment area in a small part of the Inyo County portion of the station; and the Mojave Desert moderate PM_{10} nonattainment area in part of the San Bernardino County portion of the station. (The remaining portion within Inyo County is designated "attainment/unclassified" for all pollutants.)

3. The *de minimis* threshold for each nonattainment area is as follows:
Kern County Ozone nonattainment area: 50 tons of ROG and 50 tons of NOx.
Searles Valley PM10 nonattainment area: 100 tons of PM10.
Owens Valley PM10 nonattainment area: 70 tons of PM10.
Mojave Desert PM10 nonattainment area: 100 tons of PM10.

4. The emissions increases in each nonattainment area that would be associated with implementation of the Limited Expansion Alternative are as follows.
Kern County Ozone nonattainment area: 26.44 tons of ROG and 14.11 tons of NOx.
Searles Valley PM10 nonattainment area (all counties combined): 50.12 tons of PM10.
Owens Valley PM10 nonattainment area: 0.31 tons of PM10.
Mojave Desert PM10 nonattainment area: 36.91 tons of PM10.

Subj: RECORD OF NON-APPLICABILITY FOR THE LIMITED EXPANSION ALTERNATIVE AS THE COMPREHENSIVE LAND USE MANAGEMENT PLAN

5. The maximum annual net increase in direct and indirect emissions of nonattainment pollutants and their precursors are not regionally significant and will be less than the applicable *de minimis* levels in each of the nonattainment areas affecting NAWS China Lake. Consequently, the requirements of the EPA general conformity rule are not applicable to the Limited Expansion Alternative (40 CFR 93.153(c)(1)).

6. The emissions estimates, underlying assumptions, and all supporting documentation are included as Appendix D of reference (c).

Carolyn A. Shepherd

CAROLYN A.SHEPHERD

Appendix E

Biological Resources

APPENDIX E - BIOLOGICAL RESOURCES

E.1 PLANT COMMUNITIES AT NAWS CHINA LAKE

Mojave Sand Field

Mojave sand field at NAWS China Lake is defined as areas where sand deposits are sufficiently deep to influence areas normally dominated by Mojave mixed woody scrub, creosote bush scrub, or saltbush scrub. Influences of sand fields or stabilized dunes usually reduce or exclude large shrubs with the exception of creosote bush (*Larrea tridentata*), which thrives and grows larger. Creosote clones (rings) are found most often in these areas. Extensive sand fields occur at NAWS China Lake in the southern Argus Range on the eastern side of NAWS China Lake. Elevations of these formations range from 2,200 feet (671 m) to 3,800 feet (1,158 m) above MSL. Perennials characteristic of Mojave sand field include freckled milkvetch (*Astragalus lentiginosus* var. *variabilis*), stillingia (*Stillingia spinulosa* and *S. paucidentata*), woolly star (*Eriastrum densifolium* ssp. *mohavense*), and birdcage primrose (*Oenothera deltoides*) (US Navy 1998b).

Alkali Sink Scrub

On NAWS China Lake, alkali sink scrub occurs where salt-tolerant plants grow as locally patchy covers. Alkali sink scrub is usually transitional between barren salt flats and saltbush scrub. Characteristic species of alkaline basin scrub include bush seepweed (*Suaeda moquinii*), Mojave red sage (*Kochia californica*), Parry saltbush (*Atriplex paryii*), pickleweed (*Allenrolfea occidentalis*), shrubby alkali aster (*Machaeranthera carnosa*), rubber rabbitbrush (*Chrysothamnus nauseosus*), allscale (*Atriplex polycarpa*), shadscale (*A. confertifolia)*, and desert alyssum (*Lepidium fremontii* var. *fremontii*). Other perennials occur in alkaline basin scrub include four-wing saltbush (*Atriplex canescens*), Torrey saltbush (*A. lentiformis* var. *torreyi*), tamarisk (*Tamarix* sp.), Mojave indigo bush (*Psorothamnus arborescens* var. *arborescens*), desert horsebrush (*Tetradymia glabrata*), goldenbush (*Isocoma acradenia* var. *acradenia*), prince's plume (*Stanleya pinnata* var. *pinnata*), and saltgrass (*Distichlis spicata*) (US Navy 1998b).

Blackbush Scrub

This plant community is defined where blackbush (*Coleogyne ramosissima*) is dominant. This community occurs on hills, outcrops, and low ridges from 3,500 feet (1,067 m) to 6,500 feet (1,981 m) above MSL. At lower elevations, north slopes are favored. Species that are present with blackbush include Joshua tree (*Yucca brevifolia*), Mormon tea (*Ephedra viridis*), rubber rabbitbrush, and linear-leaved goldenbush (*Ericameria linearifolia*). On NAWS China Lake, blackbush scrub exists on both the North and South Ranges. Extensive stands of blackbush scrub are found in the central Argus Range near Moscow Spring, north of Birchum Springs, north and east of Junction Ranch, and east of Coles Spring on the North Range. On the South Range, blackbush scrub appears on the north slopes of Slocum Mountain and extends northward to the Pilot Knob area (US Navy 1998b).

Creosote Bush Scrub

At NAWS China Lake, creosote bush grows from the lowest, well-drained, nonalkaline areas at 1,900 feet (579 m) to about 5,500 feet (1,676 m) above MSL. Above 3,500 feet (1,067 m) above MSL, however, creosote bush is present as an associated species within Mojave mixed scrub, shadscale scrub, Joshua tree woodland, and blackbush scrub communities. Creosote bush scrub covers extensive areas of NAWS China Lake, particularly in the valleys on both the North and South Ranges (US Navy 1998b). Common associate species in creosote bush scrub include burro bush (*Ambrosia dumosa*), shadscale, goldenhead (*Acamptopappus sphaerocephalus*), Mojave indigo bush, allscale, cheesebush (*Hymenoclea salsola* var. *salsola*), desert senna (*Senna armata*), and Anderson thornbush (*Lycium andersonii)* (US Navy 1998b, Holland 1986).

Desert Holly Scrub

Desert holly (*Atriplex hymenolytra*), is a patchy, but locally dominant, cover on NAWS China Lake. It usually occurs less than 3,000 feet (914 m) above MSL. Desert holly scrub is defined wherever desert holly is evenly distributed, dominant or codominant with creosote bush or other saltbush. Examples of desert holly scrub at NAWS China Lake are present in the White Hills, Salt Wells Valley, Randsburg Wash Road, Wingate Pass, and areas on the southern bajadas and foothills of Straw Peak (US Navy 1998b). The locations of this plant community are not shown in Figures 3.4-1 and 3.4-2, but are being mapped for future use.

Desert Transition Scrub

On NAWS China Lake, there are areas of shrub formations that are characteristic of the transition between the Great Basin and Mojave deserts. These ecotones often occur where canyons meet uplands, especially on the North Range. Desert transition scrub formations at NAWS China Lake are common between 4,000 feet (1,219 m) and 6,500 feet (1,981 m) above MSL. At NAWS China Lake, the presence of a few shrubs are characteristic of the Mojave-Great Basin transition. Linear-leaved goldenbush is the most characteristic shrub of desert transition scrub. Cottonthorn (*Tetradymia axillaris*) and western desert penstemon *(Penstemon incertus)* are also characteristic of desert transition scrub. Blackbush and Joshua tree are common associates (US Navy 1998b). The locations of this plant community are not shown in Figures 3.4-1 and 3.4-2, but are being mapped for future use.

Great Basin Mixed Scrub

Great Basin mixed scrub is defined where bitterbrush (*Purshia tridentata* var. *glandulosa*) is a codominant cover or a common associate with big sagebrush and Mormon tea. Great Basin mixed scrub is present in the northern and northeastern portions of the North Range in rocky areas from 5,000 feet (1,524 m) to 8,000 feet (2,438 m) above MSL. Great Basin scrub most often occurs between sagebrush scrub at the lower elevations and blackbush scrub at the higher elevations. Common associate plant species in Great Basin mixed scrub include rubber rabbitbrush and Joshua tree (US Navy 1998b).

Hopsage Scrub

Hopsage scrub on NAWS China Lake occurs between 3,000 feet (914 m) and 5,000 feet (1,524 m) above MSL on both the North Range and South Range. Strongly dominated by spiny hopsage (*Grayia spinosa*), common associates in this community on NAWS China Lake include cheesebush, Anderson thornbush, four-wing saltbush, shadscale, and blackbush (US Navy 1998b).

Mojave Mixed Scrub

Mojave mixed scrub is present at higher elevations than creosote bush scrub in well-drained areas from 2,500 feet (762 m) to 5,500 feet (1,676 m) MSL. This plant community is defined where the upper zones of creosote bush scrub transition into shrub composites no longer clearly dominated by creosote bush and burrobush, and is an aggregate of numerous associations and highly variable elements with the highest diversity of plant species. Of all identified plant communities, Mojave mixed scrub occupies the largest percentage of land on NAWS China Lake and occurs in both the North Range and South Range. Mojave mixed scrub has elements common to desert transition scrub, saltbush scrub, hopsage scrub, Mojave wash scrub, Mojave sand field, and Joshua tree woodland. The most common form of Mojave mixed scrub at NAWS China Lake is usually a codominant composition of creosote bush, Cooper goldenbush (*Ericameria cooperi* var. *cooperi*), Mojave indigo bush, cheesebush, bladder sage (*Salazaria mexicana*), Anderson thornbush, hopsage, California buckwheat (*Eriogonum fasciculatum* ssp. *polifolium*), Mojave aster (*Xylorhiza tortifolia* var. *tortifolia*), Nevada ephedra (*Ephedra nevadensis*), wire lettuce (*Stephanomeria pauciflora* var. *pauciflora*), and Acton brittlebush (*Encelia actoni*) (US Navy 1998b).

Mojave Wash Scrub

Mojave wash scrub at NAWS China Lake typically occurs in areas surrounded by creosote bush scrub where washes provide extra moisture and create distinct shrub associations. These wash communities exist on both the North Range and South Range at the lowest elevations at NAWS China Lake and transition to Mojave mixed scrub at elevations of 3,000 feet (914 m) to 4,000 feet (1,219 m) above MSL. Depending on various hydrologic and geologic factors, dominant shrubs will vary. Cheesebush is the most characteristic shrub in low elevation washes, while higher elevations are dominated by scalebroom (*Lepidospartum squamatum*), four-wing saltbush, rubber rabbitbrush, Mojave indigo bush, and allscale (US Navy 1998b).

Sagebrush Scrub

On NAWS China Lake, this community occurs at elevations between 4,500 feet (1,372 m) and 6,000 feet (1,829 m) above MSL in the Coso and Argus ranges on the North Range. This plant community is not found on the South Range. The dominant shrub is big sagebrush (*Artemisia tridentata* ssp. *tridentata*). Sagebrush scrub is often occurs in sandy valleys, flats, and basins of corresponding elevation where big sagebrush often forms sagebrush monocultures. These formations are common in Etcheron Valley and Coles Flat in the Coso Management Unit. Sagebrush scrub is often present as a subset of Great Basin mixed scrub where it is often associated with Joshua trees. Sagebrush scrub is also the dominant plant community on high elevation basalt lava flows where it is frequently associated with Mormon tea. Purple sage (*Salvia dorrii* var. *dorrii*) and matchweed (*Gutierrezia microcephala*) are sometimes common associates on basalt mesas in the central Argus Range; east of Birchum springs, surrounding Water Canyon; and west of Junction Ranch. Where washes or disturbances exist, big sagebrush will often be replaced with rubber rabbitbush and four-wing saltbush. Black sagebrush (*Artemisia nova*) replaces big sagebrush where geology, especially limestone, favors subshrubs (US Navy 1998b). In addition, sagebrush communities have a substantial herbaceous component dominated by perennial grasses, such as false roegneria (*Pseudoroegneria spicata* var. *spicata*), California brome (*Bromus carinatus* var. *carinatus*), ashy wildrye (*Leymus cinereus*), and needlegrass (*Achnatherum* spp.). In many areas, the introduced annual downy chess (*Bromus tectorum*) has become the dominant herbaceous species (US Navy 1998b).

Saltbush Scrub

Saltbush scrub on NAWS China Lake occurs at elevations less than 5,000 feet (1,524 m) above MSL. These areas on the North Range are located surrounding China Lake, Airport Lake, and Mirror Lake; and in the Salt Wells Valley and the Coso geothermal area. On the South Range, saltbush scrub is present in the Pilot Knob Valley, Wingate Wash, and Superior Valley. Saltbush scrub communities are defined by areas where allscale or spinescale (*Atriplex spinifera*) are the dominant cover shrub, often to the exclusion of all other shrub species. Common associates in saltbush scrub include other saltbush species, including shadscale, desert holly and four-wing saltbush. Torrey saltbush and Parry saltbush also occur in saltbush scrub, but are most typically associated with alkaline basin scrub. Allscale is the most widespread and abundant species of saltbush at NAWS China Lake. It often forms monocultures near riparian areas or at lower elevations bordering alkali playas and claypans (US Navy 1998b).

Shadscale Scrub

Shadscale scrub at NAWS China Lake is defined where shadscale is dominant. At NAWS China Lake, shadscale scrub usually exists over broad bajada slopes and basins between 3,500 feet (1,067 m) and 5,000 feet (1,524 m) above MSL on both the North Range and South Range. Shadscale scrub occurs in the lower Cactus Flats region, small basins within the Coso geothermal area, Darwin Wash, and lower Centennial flat. Shadscale scrub dominates the alluvial stretches north of NAWS China Lake throughout Darwin Mesa and Lee Flat. Frequently associated species include spinescale, Anderson thornbush, cheesebush, spiny hopsage, and desert alyssum (US Navy 1998b).

Joshua Tree Woodland

Joshua trees appear to be concentrated on NAWS China Lake from 4,000 feet (1,219 m) to 7,000 feet (2,134 m) above MSL in alluvial valleys, washes, and bowls upstream of major drainages, canyons and playas, such as upper Renegade Wash, southwest Etcheron Valley, and Lower Centennial Flat. Joshua trees occur on both the North Range and South Range, but are most prominent on the North Range. Joshua trees are present with saltbush scrub in Superior Valley; creosote bush scrub in the northeast and west Coso Mountains; shadscale scrub in Centennial Flat, northwest Argus Mountains, and the Slate Range; blackbush scrub northeast of Mountain Springs and at PK Ranch in George Range; sagebrush scrub in Etcheron Valley and Coles Flat; Great Basin mixed scrub throughout the Coso and Argus ranges; and on the fringes of pinyon woodland (US Navy 1998b).

Pinyon Woodland

Pinyon woodland at NAWS China Lake is defined where singleleaf pinyon pine (*Pinus monophylla)* grows in moderate to dense stands. Pinyon woodland is usually present above 6,500 feet (1,981 m) above MSL, on north slopes, drainages, and peaks of the Coso and Argus ranges. Above 7,500 feet (2,286 m) above MSL, singleleaf pinyon pine is usually dense and dominant regardless of geology or aspect. Big sagebrush, Mormon tea, and bitterbrush are the most frequent associates of pinyon woodland (US Navy 1998b).

Playa

The playa plant community occurs in areas ranging from seasonal pools to flooded alkaline basins, which are normally barren but become flooded seasonally and produce dense to patchy growths of annuals. In the desert, only wet years will reveal any specialized annuals or biennials characteristically associated with a playa shore edge. NAWS China Lake has numerous dry lakes, playas, and clay depressions ranging from small clay depressions and pools in the basalt flows at 7,500 feet (2,286 m) above MSL in the northern Coso Range to alkaline and semi-alkaline playas in Salt Wells and south Panamint Valleys at 1,900 feet (579 m) above MSL and 1,400 feet (427 m) above MSL, respectively. In years of abundant rainfall, annuals such as devil's lettuce (*Amsinkia tessellata*), tumble mustard (*Sisymbrium altissimum*), and pineapple weed (*Chamomilla suaveolens*) can form dense areas of cover on the perimeters of depressions, pools, and playas. One of the more prominent examples of playa vegetation at NAWS China Lake is at the northern end of Airport Lake, which supports a field of tumble mustard and devil's lettuce (US Navy 1998b). The locations of this plant community are not shown in Figures 3.4-1 and 3.4-2, but are being mapped for future use.

Riparian

Riparian communities are present where there are plants that require a permanent source of water or a substantial ephemeral flow. Riparian communities are highly restricted, well-defined areas characterized by aquatic herbs, grasses, tall shrubs, and trees in active growth stages in the summer. Typical riparian areas at NAWS China Lake consist of various vegetation patches, each dominated by a single species, usually at springs and seeps. This habitat can consist of dense stands of willow (*Salix* spp.), Fremont cottonwood (*Populus fremontii* var. *fremontii*), seepwillow (*Baccharis sergiloides*), and rushes (*Juncus* ssp.), but plant species range with elevation and hydrology at a particular site (US Navy 1998b). The locations of this plant community are not shown in Figures 3.4-1 and 3.4-2, but are being mapped for future use.

Disturbed

This plant community represents habitats characterized by certain invasive or non-native species. These plant communities result from disturbance, such as human activities, overuse by feral domestic species, fires, rapid erosion, or flash flood, which replaces the existing plant community with a specific composition of disturbancefavoring plants. Some non-native plant communities are a cover series dominated by woody shrubs, but the majority are dominated by herbaceous, mostly annual plants (US Navy 1998b).

Examples of species that are common in these disturbed habitats are devil's lettuce; tumbleweed (*Salsola tragus)* which are the annual cover at target areas; annual ragweed (*Ambrosia acanthicarpa*) which occurs along roads; and non-native grasses such as annual cheatgrass and downy chess (*Bromus madritensis* ssp. *rubens*) which are present throughout NAWS China Lake (US Navy 1998b). The golf course and landscaped urban areas are considered disturbed habitats. The locations of this plant community are not shown in Figures 3.4-1 and 3.4-2, but are being mapped for future use.

E.2 TABLES OF NAWS—SENSITIVE PLANT AND WILDLIFE SPECIES KNOWN OR SUSPECTED TO EXIST AT NAWS CHINA LAKE

Table E-1
NAWS-Sensitive Plant Species Known or Suspected to Exist at NAWS China Lake

Species Common Name ***Scientific Name***	**North or South Range Complex**	**Elevation (feet above MSL)**	**Associated Plant Community at NAWS China Lake**	**Status Federal/State/CNPS Or Reason for NAWS-Sensitive Species**
Plants Confirmed at NAWS China Lake				
Pinyon rock cress *Arabis dispar*	North	4,000-8,000	Pinyon woodland, Great Basin mixed scrub, sagebrush scrub, Joshua tree woodland, blackbush scrub	--/--/2
Darwin Mesa milkvetch *Astragalus atratus* var. *mensanus*	North	5,800-7,800	Pinyon woodland, Great Basin mixed scrub, sagebrush scrub, Joshua tree woodland, blackbush scrub	--/--/1B
Desert bird's-beak *Cordylanthus eremicus* ssp. *eremicus*	North	4,900-8,400	Pinyon woodland, Great Basin mixed scrub, sagebrush scrub, Joshua tree woodland, blackbush scrub, desert transition scrub	--/--/4
Yerba desierto *Fendlerella utahensis*	North	4,900-8,400	Pinyon woodland, Great Basin mixed scrub, desert transition scrub	---/--/4
Creosote clones *Larrea tridentata*	North	2,000-3,000	Mojave sand field	Scientific value (extreme age)
Coso Mountains lupine *Lupinus magnificus* var. *glarecola*	North	5,000-8,000	Pinyon woodland, Great Basin mixed scrub, sagebrush scrub, Joshua tree woodland, blackbush scrub	--/--/4
Crowned muilla *Muilla coronata*	North	3,000-5,700	Joshua tree woodland, blackbush scrub, desert transition scrub, Mojave mixed scrub, hopsage scrub, shadscale scrub, creosote bush scrub	--/--/4
Death Valley round-leaved phacelia *Phacelia mustelina*	South	300-6,000	Joshua tree woodland, blackbush scrub, Mojave mixed scrub	--/--/1B
Charlotte's phacelia *Phacelia nashiana*	North	2,000-7,200	Joshua tree woodland, Mojave mixed scrub, hopsage scrub, shadscale scrub, creosote bush scrub	FSC/--/1B
Mojave indigo bush *Psorothamnus arborescens* var. *arborescens*	South	Above 2,500	Joshua tree woodland, blackbush scrub, Mojave mixed scrub, hopsage scrub	--/--/4
Mojave fish-hook cactus *Sclerocactus polyancistrus*	Both	2,000-7,000	Great Basin mixed scrub, Joshua tree woodland, blackbush scrub, desert transition scrub, Mojave mixed scrub, shadscale scrub, creosote bush scrub	--/--/4
DeDecker's clover *Trifolium macilentum* var. *dedeckerae*	North	6,900-11,500	Pinyon woodland	--/--/1B

Table E-1
NAWS-Sensitive Plant Species Known or Suspected to Exist at NAWS China Lake *(continued)*

Species Common Name ***Scientific Name***	**North or South Range**	**Elevation (feet above MSL)**	**Associated Plant Community at NAWS China Lake**	**Status Federal/State/CNPS Or Reason for NAWS-Sensitive Species**
Plants with unconfirmed records at NAWS China Lake				
Darwin rock cress *Arabis pulchra* var. *munciensis*	North	3,500-6,500	NA	--/--/2
Shining milkvetch *Astragalus lentiginosus* var. *micans*	North	2,000-3,500	Creosote bush scrub, saltbush scrub, alkaline basin scrub	FPT/--/1B
Naked milkvetch *Astragalus serenoi* var. *shockleyi*	North	4,000-7,000	Sagebrush scrub, pinyon pine	--/--/2
Panamint mariposa lily *Calochortus panamintensis*	North	6,500-8,100	Pinyon woodland, Great Basin mixed scrub, sagebrush scrub	--/--/4
Booth's evening-primrose *Camissonia boothii* ssp. *boothii*	North	2,500-4,500	NA	--/--/4
Clokey's cryptantha *Cryptantha clokeyi*	South	3,000-4,500	Creosote bush scrub, Mojave mixed scrub	--/--/1B
Panamint dudleya *Dudleya saxosa* ssp. *saxosa*	South	3,000-7,100	Creosote bush scrub, pinyon woodland	FSC/--/4
Inyo hulsea *Hulsea vestita* ssp. *inyoensis*	North	4,600-7,600	Mixed desert scrub, sagebrush scrub, pinyon woodland	--/--/2
Caespitose evening-primrose *Oeonothera caespitosa* ssp. *crinita*	North	3,800-11,000	Mixed desert scrub, pinyon woodland, bistlecone pine forest, subalpine coniferous forest	--/--/4
Plants with habitat at NAWS China Lake				
Barstow Wooly Sunflower *Eriophyllum mohavense*	South	3,000-4,000	NA	--/--/4
Desert Cymopterus *Cymopterus deserticola*	South	3,000-4,000	NA	--/--/4
Lane Mountain milkvetch *Astragalus jaegerianus*	South	3,000-4,000	Creosote bush scrub, Joshua tree woodland	FPE/--/1B
Pygmy poppy *Canbya candida*	North	2,000-4,000	NA	--/--/1B
Ripley's Gilia *Gilia ripleyi*	South	3,000-4,000	NA	--/--/4

Sources: US Fish and Wildlife Service 1995a, 1995b, 1996; US Navy 1997d; California Department of Fish and Game 1997a, 1997c, 1997d; Hickman 1993; Skinner and Pavlik 1994.

Notes: MSL = Mean sea level
NA = Information not available

Federal Status
FPE = Proposed endangered
FPT = Proposed threatened
FSC = Species of Concern
-- = No status definition

State Status
-- = No status definition

CNPS (California Native Plant Society) Status
1B = List 1B, Plants rare and endangered in California and elsewhere
2 = List 2, Plants rare, threatened, or endangered in California, but more common elsewhere
4 = Plants of limited distribution – a watch list

Table E-2
NAWS-Sensitive Wildlife Species Known or Suspected to Exist On NAWS China Lake

Species Common Name ***Scientific Name***	**North or South Range**	**Habitat on NAWS China Lake**	**Legal Status Federal/State**	**Reason for NAWS-Sensitive Species Status**
Invertebrates:				
Argus land snail *Eremariontoides argus*	Both	Revenue Canyon, Homewood Canyon, Slate Range, Mountain Springs Canyon	--/--	Species of limited distribution
Fairy shrimp *Branchinecta* spp.	North	Playas	--/--	Species occur in a protected habitat
Jerusalem crickets *Stenopelmatus* spp.	North	Creosote bush scrub, sandy areas	--/--	May be endemic species of limited distribution
Dune cockroaches *Arenavaga* spp.	North	Sand dunes	--/--	May be endemic species or subspecies
Darwin Tieminn's beetle *Megacheuma brevipennis tiemannii*	North	Associated with Parry saltbush, which occurs near playas	--/--	Has a limited distribution
Dune weevils *Trigonoscuta* spp.	North	Sand dunes	--/--	Species of limited distribution
San Emigido blue *Plebejulina emigdionis*	North	Near the El Conejo Gate	--/--	Species of limited distribution
Spotted blue *Euphilotes baueri vernalis*	North	Louisiana Butte	--/--	Species of limited distribution
Woodland satyr *Cercyonis sthenele*	North	Argus Range, Coso Range, Etcheron Valley	--/--	Species of limited distribution
Amphibians:				
Western toad *Bufo boreas*	North	Haiwee Spring	--/--	BLM indicator species
Pacific tree frog *Pseudaeris regilla*	North	Haiwee Spring	--/--	BLM indicator species
Reptiles:				
Chuckwalla *Sauromalus obesus*	Both	Argus Range, Coso Range, rocky areas to 6,000 feet above MSL	FSC/--	BLM indicator species
Gilbert's skink *Eumeces gilberti*	North	North Range springs and riparian habitat	--/--	BLM indicator species
Panamint alligator lizard *Gerrhonotus panamintina*	North	Argus Range, Coso Range, Margaret Ann Spring, Hiawee Spring	FSC/CSC	Species of concern
Birds:				
Neotropical migrant birds (numerous species)	Both	Riparian areas	Variable	Species may include migrant threatened or endangered species.
Raptors (numerous species)	Both	Throughout	Variable	Federally-endangered and California-listed species are migrants
Wetlands Birds (numerous species)	Both	Playas, riparian areas	Variable	Birds use wetlands resources

Table E-2
NAWS-sensitive Wildlife Species Known or Suspected to Exist On NAWS China Lake *(continued)*

Species Common Name ***Scientific Name***	**North or South Range**	**Habitat on NAWS China Lake**	**Legal Status/ Federal/State**	**Reason for NAWS-sensitive species Status**
Mammals:				
Spotted bat *Euderma maculatum*	Both	Water sources and roosting places, such as old buildings and mines	FSC/CSC	Species of concern
Townsend's big-eared bat *Corynorhinus townsendii*	Both	Water sources and roosting places, such as old buildings and mines	FSC/CSC	Species of concern
Pallid bat *Antrozous pallidus*	Both	Water sources and roosting places, such as old buildings and mines	--/CSC	Species of concern
Greater western mastiff-bat *Eumops perotis*	Both	Water sources and roosting places, such as old buildings and mines	FSC/CSC	Species of concern
Mohave ground squirrel *Spermophilus mohavensis*	Both	Brown Mountain, Pilot Knob Valley, Superior Valley, Coso geothermal area	--/CT	Legal status
Argus Mountains kangaroo rat *Dipodomys panamintinus argusensis*	North	Upper Cactus Flat, Darwin Wash	--/--	BLM Sensitive Species
Vole (unknown species) *Microtus* sp.	Both	Lark Seep, Paxton Ranch, Margaret Ann Spring, Eagle Crags	FE*/SE*	*The species has not been positively identified, but may be the Amargosa vole (*Microtus californicus sciroensis)*
Ringtail *Bassariscus astutus*	North	Argus Range, Coso Range	--/--	BLM Sensitive Species
American badger *Taxidea taxus*	Both	All slopes on the North and South Ranges.	--/--	BLM Sensitive Species
Mountain lion *Felis concolor*	North	Argus Range, Coso Range	--/--	Low numbers on NAWS China Lake
Nelson's bighorn sheep *Ovis canadensis nelsoni*	Both	Transient in the Argus Mountains and Eagle Crags	--/--	Limited distribution in California; have been reintroduced to NAWS China Lake by the Navy, BLM, and the CDFG

Sources: California Department of Fish and Game 1983, 1997a, 1997b, 1997c, 1997d; US Fish and Wildlife Service 1995a, 1995b, 1996; US Navy 1997d.

Notes: NA = information not available

Federal Status	State Status
FE = Endangered	SE = Endangered
FSC = Species of Concern (formerly C2)	CSC = California species of special concern
-- = No status definition	-- = No status definition

E.3 DETAILED DESCRIPTIONS OF NAWS—SENSITIVE SPECIES

E.3.1 NAWS—Sensitive Plant Species

Although there are no known federally listed threatened or endangered plant species on NAWS China Lake lands, there are a few unique plant species that are of particular interest and management concern. The plant species discussed in this section do not have federal protection, but have been identified as sensitive plant species existing on NAWS China Lake. According to the Integrated Natural Resources Management Plan currently in preparation by NAWS China Lake (US Navy 1998), sensitive plant species include those that are listed or are being considered for listing by the State of California, as well as those considered sensitive by the USFWS, BLM, or CNPS. Those plants with a limited range or endemic to a particular area; those of questionable or unclear taxonomic status; species of scientific interest; those exhibiting unique or rare features (e.g. creosote clones or Joshua spikes); those occurring in a known valuable habitat (e.g., riparian areas, or sand dunes); and those species which exist in a protected habitat (e.g., wetlands, riparian areas, playas) are also considered NAWS-sensitive.

Pinyon Rock Cress. Pinyon rock cress (*Arabis dispar*) is an upright, perennial herb of the mustard family. This species is included on the California Native Plant Society's (CNPS) List 2, plants that CNPS considers to be rare, threatened or endangered in California, but more common elsewhere. It usually grows on loose, gravelly slopes or on compact talus slopes, from 4,000 feet (1,219 m) to 8,000 feet (2,438 m) above MSL. Pinyon rock cress is reported by DeDecker (1980) as infrequent in the Coso and Argus ranges from 5,000 feet (1,524 m) to 7,600 feet (2,316 m) above MSL. Current records at NAWS include sparse populations (less than 10 plants) on Birchum Mesa, south Etcheron Valley and El Conejo gate (US Navy 1997d).

Darwin Mesa Milkvetch. Darwin Mesa milkvetch (*Astragalus atratus* var. *mensanus*) is a delicate herbaceous perennial. The variety mensanus, occurring in the northern Mojave Desert, is geographically isolated from the rest of the species mostly in the Great Basin Desert. The Darwin Mesa milkvetch is included on CNPS List 1B, plants that CNPS considers to be rare, threatened or endangered in California and elsewhere. It occurs on open flats and hillsides, between 5,800 feet (1,768 m) and 7,800 feet (2,377 m) above MSL, in volcanic clay and gravel. It usually occurs among low scrub formations associated with blackbush, Joshua tree woodland, sagebrush and pinyon woodland. The NAWS China Lake populations occur in the Coso peak, El Conejo and south Etcheron Valley areas. Only one other population (Hunter Mountain) outside NAWS is currently known (US Navy 1997d).

Panamint Bird's-beak. Panamint bird's-beak (*Cordylanthus eremicus* ssp. *eremicus*) is a late blooming annual species. This species is included on CNPS List 4, plants CNPS considers to be of limited distribution (a watch list). Panamint bird's beak grows from 4,900 feet (1,494 m) to 8,400 feet (2,560 m) above MSL, in sagebrush scrub and pinyon woodland. It is endemic to the Coso, Argus, Nelson, San Bernardino and Panamint ranges. This species is widespread and locally abundant in high elevations of NAWS China Lake North Range, ranging from 5,000 feet above MSL in the Moscow Spring area, and extending to the western flanks of Maturango Peak and throughout the Coso Range, up to 8,000 feet above MSL. A 1993 survey found the species extremely abundant in many areas and widespread in both the Argus and Coso Ranges (US Navy 1997d).

Yerba Desierto. Yerba desierto (*Fendlerella utahensis*) is a low, much-branched erect shrub with shreddy bark with small, white flowers. It occurs on dry limestone slopes between 5,000 feet (1,524 m) and 8,400 feet (2,560 m) above MSL, in shadecale scrub, mixed desert scrub, sagebrush scrub, and pinyon woodland. It occurs throughout the southwest and in the mountains of the northern and eastern Mojave desert. This species is included on CNPS List 4. On NAWS China Lake it has been observed in the Maturango Peak area (DeDecker 1980). Potential distribution on NAWS China Lake would be in limestone areas of the northern Argus Range, although not much of the potential habitat has been surveyed (US Navy 1997d).

Creosote Clones. NAWS China Lake has one of the largest concentrations of creosote rings in the Mojave Desert. The largest number of creosote rings are found in the heavy sand deposits and sand dunes along the southern portion of the Argus Range near the K-2 Range. The creosote rings often grow to diameters in excess of 40 feet (12.2 m). It has been estimated that these creosote rings are 6,000 to 8,000 years in age. For example, one clone, King Clone, is approximately 72 feet (21.9 m) in diameter and has been estimated to be approximately 11,700 years old (Michael Brandman Associates, Inc. 1989).

Coso Mountains Lupine. Coso Mountains lupine *(Lupinus magnificus* var. *glarecola)* is a low growing herbaceous perennial with a tall and colorful spike of purplish blue flowers. It grows between 5,000 feet (1,524 m) and 8,000 feet (2,438 m) above MSL in Joshua tree woodland, sagebrush scrub, blackbush scrub, and pinyon woodland. It is infrequent on the slopes of the eastern Sierra Nevada. This species is included on CNPS List 4. It has been found on NAWS China Lake throughout higher elevations in the Coso range, including Upper Centennial Flat, Coso Peak, Silver Peak, El Conejo Gate and Louisiana Butte. The species has been successful at colonizing road cuts at NAWS China Lake, especially on Louisiana Butte (US Navy 1997d).

Crowned Muilla. Crowned muilla (*Muilla coronata*) is a small bulb forming member of lily family which resembles some onion (*Allium* spp.) species. Crowned muilla prefers rocky to clayey soils in Joshua tree woodland, mixed Mojave scrub, creosote bush scrub and Mojave-Great Basin transition communities. This species is included on CNPS List 4. At NAWS China Lake, this species is documented in the Devil's Kitchen site in the Coso Geothermal area. DeDecker (1980) reports this as occasional populations in the Coso and Argus ranges, from 3,000 feet (914 m) to 5,700 feet (1,737 m) above MSL. This species should be expected on the South Range (US Navy 1997d).

Death Valley Round-leaved Phacelia. Death Valley round-leaved phacelia (*Phacelia mustelina*) is a small, branching annual with small, violet flowers, and a strong, disagreeable odor. It is found in crevices and ledges on granitic, volcanic, and limestone rock outcrops and cliffs, between 300 feet (91 m) and 6,000 feet (1,829 m) above MSL, in creosote bush scrub, mixed desert scrub, sagebrush scrub, and pinyon woodland. This species is included on CNPS List 1B. On NAWS China Lake, it is known at two locations, near Granite Wells and Seep Spring in Mojave B South Range. Potentially it could occur in appropriate habitat in the Argus Range, and the Mojave B and Randsburg Wash areas (US Navy 1997d).

Charlotte's Phacelia. Charlotte's Phacelia (*Phacelia nashiana*) is a federal species of concern and is included on CNPS List 1B. Charlotte's phacelia is an annual flowering plant with cobalt blue flowers. It appears to be limited to volcanic soils along the western boundary of the North Range (US Navy 1989, 1997)

Mojave Indigo Bush. Mojave indigo bush *(Psosrothamnus arborescens* var. *arborescens)* is a low to medium sized legume shrub. This taxon occurs in washes and upper bajada slopes of the central Mojave region, from east of Barstow, west to Randsburg and north into NAWS China Lake. The dense populations are most commonly associated with wide washes of decomposed granite. This taxon is included on CNPS List 4. The populations at NAWS China Lake occur above 2,500 feet (762 m) above MSL and are restricted to well-drained upper washes and alluvial terraces in Mojave mixed scrub, Joshua tree woodland and blackbush scrub. The distribution for Mojave indigo bush at NAWS China Lake includes all appropriate habitat south of Randsburg Wash (US Navy 1997d).

Mojave Fish-hook Cactus. Mojave fish-hook cactus (*Sclerocactus polyancistrus*) is included on CNPS List 4. At NAWS China Lake, Mojave fish-hook cactus occurs on the low granitic hills adjacent to Etcheron Valley, southeast of Coso Peak, Louisiana Butte, at Pink Hill, and near Renegade Canyon. This species has not been found on the Mojave B North Range or the Randsburg Wash Test Range, most likely because of the granitic and volcanic geology in the Mojave B North Range and the low elevation in the Randsburg Wash Test Range. However, one large, almost continuous, population exists in the western portion of the Mojave B South Range (US Navy 1982, 1997d).

DeDecker's Clover. DeDecker's clover (*Trifolium macilentum* var. *dedeckerae*) is a low, herbaceous perennial with a loose crown of tripinnate leaves and distinctively arid-adapted features. This plant is known in the eastern Sierra Nevada. The sites represent a range of plant communities from pinyon woodland to Alpine crests, 6,900 feet (2,103 m) to 11,500 feet (3,505 m) above MSL, usually growing in rock crevices. This species is included on CNPS List 1B. A likely perennial *Trifolium* species was recently located northeast of Coso Peak. The population consists of approximately 100 plants on an upper slope of metamorphic granite at 7,500 feet (2,286 m) above MSL. Further determinations and collections need to be completed (US Navy 1997d).

Darwin Rock Cress. Darwin rock cress (*Arabis pulchra* var. *munciensis)* is a slim, upright, perennial herb of the mustard family. It usually grows in crevices of rocky areas and in n the protection of shrubs. It is known mostly to the northeast of NAWS China Lake and into Nevada. One verified record comes from the Darwin Hills, a few miles north of NAWS China Lake. This species is included on CNPS List 2. Potential habitat is located on NAWS China Lake in the north Coso and Argus ranges (US Navy 1997d).

Shining Milkvetch. Shining milkvetch (*Astragalus lentiginosus* var. *micans*) is a federal proposed-threatened species and is included on CNPS List 1B. This species occurs from 2,000 feet (607 m) to 3,500 feet (1,067 m) above MSL on sandy areas, stabilized dunes, and roadsides. It occurs in Mojave sand field, creosote bush scrub, saltbush scrub, and alkaline basin scrub (US Navy 1997d).

Naked Milkvetch. Naked milkvetch *(Astragalus serenoi* var. *shockleyi)* is a spreading to upright perennial herb. It is moderately rare and scattered, but widely distributed from 4,000 (1,219 m) MSL to 7,000 feet (2,134 m) above MSL, through much of the White-Inyo Mountains and into Nevada. It generally prefers sagebrush or pinyon pine plant communities. This species is included on CNPS List 2. An unconfirmed specimen was collected in the Cole Springs area on NAWS China Lake in 1996 (US Navy 1997d).

Panamint Mariposa Lily. The Panamint mariposa lily (*Calachortus panamintensis*) occurs at elevations between 6,500 (1,981 m) MSL and 8,100 feet (2,469 m) above MSL. It predominantly occurs in areas containing pinyon woodland, Great Basin mixed scrub, and sagebrush scrub on basalt flats and rolling terrain. Two sites with plants that have tentatively been identified as Panamint mariposa lily are known to exist in NAWS in the Coso Park area (US Navy 1997d). This plant is included on CNPS List 4.

Booth's Evening Primrose. Booth's evening primrose *(Camissonia boothii* ssp. *boothii)* is a late spring annual. It is a common plant in western Nevada between 2,500 feet (762 m) and 4,500 feet (1,372 m) above MSL. This species is included on CNPS List 4. This species is suspected to exist on NAWS China Lake at Cinder Peak, Volcano Peak, Sugarloaf, Coso Geothermal Area, Haiwee Spring and Cactus Flat (US Navy 1997d).

Clokey's cryptantha. Clokey's cryptantha (*Cyrptantha clokeyi*) is a branching annual with hairy stems and leaves and small white flowers. It grows in sandy or gravelly soils in creosote bush scrub or Mojave mixed scrub at 3,000 feet (914 m) to 4,500 feet (1,372 m) above MSL. This species is included on CNPS List 1B. It was observed, but not confirmed, on the South Range at NAWS China Lake (Silverman 1998).

Panamint Live-forever. Panamint live-forever (*Dudleya saxosa* ssp. *saxosa*) is a small succulent perennial of the Stonecrop family (Crassulaceae). It occurs only in the Panamint Mountains from Augerberry Point in the north to Arrastre Springs in the south. It occurs between 3,000 feet (914 m) and 7,100 feet (2,164 m) above MSL, in creosote bush scrub and pinyon woodland. It is usually restricted, but locally common, growing on dry stony slopes, bouldery areas and crevices in granitic or carbonate soils. This species is a federal species of concern, and is included on CNPS List 4. An unconfirmed BLM report from 1980 indicates this taxon at NAWS China Lake, on Pilot Knob on the Mojave B South Range (US Navy 1997d).

Inyo Hulsea. Inyo hulsea *(Hulsea vestita* ssp. *inyoensis*) occurs on steep slopes of unstable substrate, composed of dark slate, shale, or volcanic soils, between 4,600 feet (1,402 m) and 7,600 feet (2,316 m) above MSL, in mixed desert scrub, sagebrush scrub, and pinyon woodland. Inyo hulsea is a low, herbaceous biennial or perennial with yellow ray and disk flowers. It occurs in the Grapevine, Cottonwood, Inyo, and Coso mountains in California. This species is included on CNPS List 2. On NAWS China Lake, only one collection appears to have been made in the canyon next to and south of Crystal Spring in the Coso Mountains. Potential habitat on NAWS China Lake is in disturbed areas and unstable slopes of coarse soil in the Coso and Argus ranges above about 5,000 feet (1,524 m) above MSL (US Navy 1997d).

Caespitose Evening Primrose. Caespitose evening primrose (*Oenothera caespitosa* ssp. *crinita)* is an herbaceous perennial with large, white flowers. It occurs on limestone and calcium soils in dry rock crevices and outcrops, between 3,800 feet (1,158 m) and 11,000 feet (3,353 m) above MSL in mixed desert scrub, pinyon woodland, bristlecone pine forest, and subalpine coniferous forest. The subspecies occurs in several mountain ranges in the northern and eastern Mojave Desert. This species is included on CNPS List 4. This evening primrose subspecies is known on NAWS from one population identified in the 1993 summer sensitive plant survey, however the plant material was not complete and there is some question on the determination. The nearest known populations to NAWS China Lake are collections made near Darwin. Potential habitat on NAWS China Lake could be on gypsum and limestone areas above 5,000 feet (1,524 m) above MSL (US Navy 1997d).

Lane Mountain Milkvetch. Lane Mountain milkvetch (*Astragalus jaegerianus*) is a slender, diffuse herbaceous perennial, the stems weak and often twining through a shrub. It occurs on low granite hills and desert mesas, in granite soils and gravel, between 3,000 feet (914 m) and 4,000 feet (1,219 m) above MSL, in creosote bush scrub and Joshua tree woodland. Its entire distribution is within an approximately 15 mile (24.1 km) diameter circle. This species is a federal proposed-endangered species and it is included on CNPS List 1B. The nearest known population to NAWS China Lake is approximately four miles (6.4 km) south, in Superior Valley. Potential habitat on NAWS China Lake is in Superior Valley and the gentle slopes bordering the valley (US Navy 1997d).

Pygmy Poppy. Pygmy poppy (*Canbya candida*) is an annual with white flowers above a minute clump of foliage. It has been found close to the NAWS China Lake North Range western boundary. The general range of pygmy poppy is in the southern Sierra-Mojave transition from south of Owens Valley, through Red Rock Canyon, Rand Mountains, Kramer Hills, Lucerne Valley, Mojave and Lancaster. This distribution suggests that the pygmy poppy is more common than what is currently documented. However, many of these populations are on private lands or have other threats. This species is included on CNPS List 1B. This species likely occurs on the North Range and perhaps in the Pilot Knob area of the South Range (US Navy 1997d).

E.3.2 NAWS—Sensitive Wildlife Species

NAWS—sensitive species according to the Natural Resources Management Plan currently in preparation by NAWS China Lake (US Navy 1997), include: those that are listed or are being considered for listing as endangered or threatened; those which are considered a species of special management concern by the US Fish and Wildlife Service, BLM, US Forest Service, National Audubon Society, or the California Department of Fish and Game; those with limited range or endemic to a particular area; those of questionable or unclear taxonomic status; species of scientific interest (e.g., butterflies); those exhibiting unique or rare features; those found in a known valuable habitat (e.g., riparian areas or sand dunes); and those species found in a protected habitat (e.g., wetlands, riparian areas, playas). This section is organized according to evolutionary grouping, including invertebrates, fishes, amphibians, reptiles, birds (avian species), and mammals.

Invertebrates

Fairy Shrimp. Ephemeral playa and clay pan habitats support many invertebrates, including several species of fairy shrimp such as giant fairy shrimp (*Branchinecta gigas*). Figure 3.4-5 shows the location of giant fairy shrimp on NAWS China Lake. Other species of fairy shrimp, *B. mackini* and *B. lindahli* are also located on NAWS China Lake. These species were collected from Mirror Lake, China Lake, the west end of Airport Lake, and several unnamed playas near the G-1 Tower Road during a study of invertebrates in temporary pools and playa lakes (California Department of Fish and Game 1983).

Jerusalem Crickets. A Jerusalem cricket species (*Stenopelmatus* sp.) has been located on NAWS China Lake, however, studies to determine the specific species of Jerusalem cricket have not been conducted. As such, the NAWS China Lake Natural Resources Management Plan recommends that it should be regarded as an endemic species with a limited distribution and therefore potentially sensitive. It may ultimately be afforded legal protection. The family taxonomy is currently being reviewed and what are currently considered to be only a few species may actually be many species. On NAWS China Lake, Jerusalem crickets may be found throughout creosote bush scrub but are probably most common in sandy areas such as the K-2 track area. Weissman has conducted work in the K-2 area and other sandy areas around China Lake on the North Range. The species may also be present in riparian areas (US Navy 1997d).

Dune Cockroaches. Two species of dune cockroaches (*Arenavaga* spp.) have been found in the vicinity of Birchum Springs. The taxonomy of these species is currently unresolved. Because they are wingless, they cannot move great distances and are likely an endemic species or subspecies which may ultimately receive legal protection (US Navy 1997d).

Darwin Tiemann's Beetle. Darwin Tiemann's beetle (*Megacheuma brevipennis tiemannii*) is a wide ranging species known from scattered localities in the Great Basin regions of Idaho, eastern Oregon, north-central Nevada, Utah, and recently discovered populations in the Fish Lake and China Lake basins in California. On NAWS China Lake, it is associated with its host plant, Parry saltbush; thus, its distribution is associated with areas surrounding the China Lake playa, and potentially Airport Lake playa, Paxton Ranch, Baker Range playas, and Magazine playa. As such, it may qualify for state and/or federal listing as a threatened or possible endangered species due to its limited distribution (US Navy 1997d).

There has been some indication that the subspecies on NAWS China Lake deserves specific status. A paper has been completed raising *M. b. tiemannii* to species level. As such, it should be regarded as an endemic species with a limited distribution and a potentially listed species (US Navy 1997d).

Argus Land Snail. The Argus land snail (*Eremariontoides argus*) is a small land snail that lives in rocky areas on north-facing slopes. The Argus land snail has no specific legal status, and is not considered to be a Special Animal by the California Department of Fish and Game's California Natural Diversity Data Base. However, it is a species of limited distribution which has been collected on NAWS China Lake in Revenue Canyon, Homewood Canyon, on the eastern slopes of the Slate Mountains, and Mountain Springs Canyon (US Navy 1997d).

Dune Weevils. Dune weevils (*Trigonoscuta* spp.) have been located on many of the sand dunes on NAWS China Lake. However, studies to determine the specific species of dune weevil present on NAWS China Lake have not been conducted. There may be more than one species present on NAWS China Lake (US Navy 1997d).

San Emigido Blue. San Emigido blue (*Plebejulina emigdionis*) is a butterfly species which is restricted to about a dozen locations in Kern, Inyo, San Bernardino, and Ventura counties. On NAWS China Lake it has been found near the El Conejo Gate (US Navy 1997d).

Spotted Blue. Spotted blue (*Euphilotes baueri vernalis*) is a butterfly species which is known to exist only on NAWS China Lake and in Coxey Meadow in the San Bernardino Mountains. It may also exist south of Butterbreadt Peak on the southeast slopes of the Sierra Nevada, but studies to confirm this have not been conducted. On NAWS China Lake, this species has been found on the east side of Louisiana Butte north into the Coso Range near Pinon Bridge (US Navy 1997d).

Woodland Satyr. Woodland satyr (*Cercyonis sthenele*) is a butterfly species which has been located in Shepherd Canyon, the high elevations of the Argus and Coso ranges, and the western side of Etcheron Valley. At one time this species was probably more widespread, but its numbers have been reduced because it may compete with introduced horses and burros since its host species are perennial grasses (US Navy 1997d).

Fishes

There are currently no fish designated as NAWS-sensitive on NAWS China Lake, with the exception of the federally endangered Mohave tui chub.

Amphibians

There are two NAWS-sensitive species on NAWS China Lake, the western toad (*Bufo boreas*) and the Pacific tree frog (*Pseudaerus regilla*). These are both species that are used as indicator species for habitat quality determination by the BLM. The western toad occurs throughout the NAWS China Lake urban areas (US Navy 1997d). Outside of these developed areas, the western toad has been confirmed only at Haiwee Spring. The Pacific tree frog was recorded at Haiwee Spring in 1980.

Reptiles

Chuckwalla. Although it is not a federally-threatened or endangered reptile species, the chuckwalla (*Sauromalus obesus*) is a federal species of concern and a species of particular interest and management concern. The chuckwalla is a long-lived (possibly more than 20 years) herbivore, and, as such, has delayed reproduction and relatively large clutches that increase with age (and size). They do not reproduce annually. They live among boulder piles and use crevices for shelter, taking refuge there when disturbed, wedging themselves in the cracks by inflating the body. Except for a study in a limited area of NAWS China Lake, there have been no surveys or other studies for chuckwallas. Their distribution on NAWS China Lake is currently unknown. Potentially, chuckwallas could occur in all rocky areas of the Argus and Coso ranges, between the elevational range of sea level to 6,000 feet (1,829 m) above MSL (US Navy 1997d).

Gilbert's Skink. Gilbert's skink (*Eumeces gilberti*) is used as an indicator species of habitat quality by the BLM. It is widespread among the springs and riparian habitat on the North Ranges of NAWS China Lake (US Navy 1997d).

Panamint Alligator Lizard. The Panamint alligator lizard (*Elgaria (Gerrhonotus) panamintina*) is a federal species of concern and a California species of special concern because it is not well known and is assumed to have a limited distribution. On NAWS China Lake, potential Panamint alligator lizard habitat is restricted to the Argus and Coso ranges, within the vicinity of permanent springs or riparian habitat. Panamint alligator lizards have been observed on NAWS China Lake at Margaret Ann Spring and at Haiwee Spring. Several areas of potential habitat include Mountain Springs Canyon, Coso Cold Spring, and a lateral spring connecting Mountain Springs Canyon to Wilson Canyon (US Navy 1997d).

Avian Species

For discussion purposes of avian species requiring special consideration, they have been grouped into three categories: neotropical migrant birds, raptors, and wetland birds. NAWS-sensitive avian species include those that use protected habitats, such as wetlands, or federally-threatened or endangered species that are migrants at NAWS China Lake.

Neotropical Migrant Birds. Neotropical migrant birds, are those that migrate from their summer northern breeding grounds to the warmer southern latitudes for the winter, specifically in Latin America or the Caribbean. Traditional flyways are used during migration, and in desert areas, where energy resources can be widely dispersed, certain areas are critical to the bird's survival. Usually these resources are concentrated around water sources, where invertebrates and vegetation used for food and protected roost sites are more abundant. These resources are present at NAWS China Lake wetlands and riparian areas (US Navy 1989, 1997d).

Raptors. There are 16 raptor species that have been confirmed at NAWS China Lake. There are no breeding sites of federally-threatened or endangered raptor species or identified critical raptor habitat on NAWS China Lake (US Navy 1989, 1997d).

Two federally-endangered raptor species are migrants at NAWS China Lake. The peregrine falcon (*Falco peregrinus*) is a migrant rarely seen at NAWS China Lake, and the bald eagle (*Haliaetus leucocephalus*) is a rare migrant to the area. There appear to be no threats to these species at NAWS China Lake. Other raptors have State of California listings (US Navy 1989, 1997d).

Wetland Birds. While birds are migrating over desert areas, wetlands represent a crucial resource for them, as a resting and/or foraging area. Playas also provide foraging for shorebirds because water triggers the hatch of invertebrate eggs. Some birds require wetlands for nesting or as foraging resources within range of nesting areas. None of the wetland birds known to inhabit NAWS China Lake is federally listed as threatened or endangered. Even though there are no federally-endangered wetland bird species that are residents at NAWS China Lake, there are other regulations to protect the wetlands (US Navy 1989, 1997d).

Mammals

Mohave Ground Squirrel. Due to the small geographic range of the Mohave ground squirrel (*Spermophilus mohavensis*) and loss of its habitat, it was designated rare by the State of California in 1971. This was changed to a designation of threatened in 1985 when the State of California amended their Endangered Species Act to match the federal nomenclature.

The Mohave ground squirrel prefers alluvial-filled valleys with deep, fine to medium textured soils with Joshua tree woodland, creosote scrub, shadscale scrub, or alkali sink scrub. Desert pavement and eroded, shallow soils that promote rapid runoff seem to limit populations, and they generally avoid rocky or mountainous terrain and sterile playas. On NAWS China Lake, the majority of Mohave ground squirrel habitat is on alluvial fans adjacent to hills and mountains, where the sandy soils tend to be deep. It occurs on Brown Mountain at the south end of the Slate Range, Pilot Knob Valley and Superior Valley on the South Range, and on the North Range, it occurs in the Coso geothermal area, and south and east throughout the Indian Wells and Salt Wells valleys (US Navy 1997d) (Figure 3.4-12).

Vole (unknown species). Although the voles captured on NAWS China Lake have not been positively identified, they may be California voles (*Microtus californicus*). One subspecies of the California vole is federally listed as endangered (Amargosa vole [*Microtus californicus sciroensis*]). The genetic relationship of the vole found at NAWS China Lake to other populations is unknown, and the species should be treated as a potential candidate for federal listing until its taxonomic status is determined. The Amargosa vole typically occurs in wetland pockets of bulrushes (*Scirpus* spp.), cattails (*Typha* spp.), saltgrass (*Distichlis spicata*), and willow (*Salix* spp.). On NAWS China Lake, voles were captured at Lark Seep, Paxton Ranch, and Margaret Ann Spring (Kiva Biological Consulting 1993) (Figure 3.4-13).

Nelson's Bighorn Sheep. Nelson's bighorn sheep *(Ovis canadensis nelsoni),* found in the desert mountain ranges, is one of three races of bighorn sheep inhabiting California. These sheep have a limited distribution in California. They were previously found on NAWS China Lake in the Coso and Argus ranges. Numerous bighorn petroglyphs indicate they were once common throughout the area. Surveys in 1970 concluded that bighorn populations were transient in the Coso Mountains, and the surveys estimated populations of 12 sheep in the Argus Mountains and seven in the Eagle Crags. Surveys in 1982 reported that the sheep had disappeared from the Coso Range sometime after 1948 and from the Argus Range and Eagle Crags sometime after 1971 (US Navy 1989, 1997d).

In an effort toward restoring natural resources at NAWS China Lake, the Navy and the CDFG decided in the early 1980s to re-introduce the bighorn sheep to NAWS China Lake. The Eagle Crags on the South Range of NAWS China Lake was targeted for re-introduction. After eliminating cattle grazing and removing the majority of feral burros from the Mojave B Ranges, 25 bighorn sheep were released in the Eagle Crags in December 1983 and were augmented with another 15 sheep in 1987. In 1986, 25 sheep were released on the east side of the Argus Mountains on the North Range by the BLM and CDFG, on BLM land. As of 1991, the status of the re-introductions was uncertain, although there was evidence of bighorn in both areas and evidence of reproduction in the Eagle Crags (US Navy 1989, 1997d).

Argus Mountains Kangaroo Rat. The Argus Mountains kangaroo rat (*Dipodomys panamintinus argusensis*) is a BLM sensitive species that has a limited distribution. On NAWS China Lake, it is found from upper Cactus Flat south to the northern end of the Indian Wells Valley, east across Cole Flat and Wild Horse Mesa to Darwin Wash (US Navy 1997d).

Bats. NAWS China Lake supports a diverse bat fauna, in part due to its abundance of water sources and mines. Ten species of bats are known to exist on NAWS China Lake. Four of which are considered to be sensitive, including the spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), and the greater western mastiff-bat (*Eumops perotis*). The pallid bat is a California species of special concern, the remaining three species are federal species of concern and California species of special concern. Protection of roosting and foraging sites, water sources, and food supply are key for management of bat species (US Navy 1997d).

Ringtail. The ringtail (*Bassariscus astutus*) is a BLM sensitive species. Ringtails generally inhabit brushy, rocky slopes between 3,500 feet (1,067 m) and 7,000 feet (2,134 m) above MSL. Distribution and density on NAWS China Lake is unknown, but is suspected to be throughout the Argus and Coso ranges. There does not appear to be appropriate habitat on the South Range. Ringtails have been observed in the Coso Geothermal Area and in Mountain Springs Canyon (US Navy 1997d).

American Badger. The American badger (*Taxidea taxus)* is a BLM significant species. American badgers inhabit a variety of habitat, from sea level to over 8,000 feet (2,438 m) above MSL, from deserts to dense forests. On NAWS China Lake, they occur on all but the steepest slopes of the North Range and South Range (US Navy 1997d).

Mountain Lion. The mountain lion (*Felis concolor*) is a NAWS-sensitive species because of its low numbers on NAWS China Lake. This species occurs in a wide variety of habitats in virtually all mountainous areas of California. On NAWS China Lake, it is uncommon in the Argus and Coso ranges (US Navy 1997d).

E.4 TABLES OF PLANTS AND WILDLIFE OCCURRING ON NAWS CHINA LAKE

Table E-3
NAWS China Lake Plant List

Scientific Name	Common Name	Native or Exotic	Life Form
Pteridophytes			
ADIANTACEAE			
Adiantum capillus-veneris *	Southern Maiden-hair Fern	native	perennial herb
PTERIDACEAE			
Cheilanthes covillei	Coville Lip Fern, Bead Fern	native	perennial herb
Cheilanthes parryi	Parry Cloak Fern	native	perennial herb
Cheilanthes viscida	Sticky Lip Fern	native	perennial herb
Pellaea mucronata var. *californica*	Bird's Foot Fern	native	perennial herb
Pentagramma triangularis ssp. *triangularis*	Goldenback Fern	native	perennial herb
Gymnosperms			
CUPRESSACEAE			
Juniperus osteosperma	One-seeded Juniper	native	tree
EPHEDRACEAE			
Ephedra aspera *	Ephedra, Joint-fir	native	shrub
Ephedra funerea	Death Valley Ephedra	native	shrub
Ephedra nevadensis	Nevada Ephedra	native	shrub
Ephedra viridis	Mormon Tea	native	shrub
PINACEAE			
Pinus monophylla	Singleleaf Pinyon Pine	native	tree
Angiosperms			
ACERACEAE			
Acer glabrum var. *diffusum*	Mountain Maple	native	tree
AMARANTHACEAE			
Amaranthus albus	Tumbleweed	exotic	annual
Amaranthus blitoides	Prostrate Pigweed	native	annual
Amaranthus fimbriatus	Fringed Amaranth	native	annual
Tidestromia oblongifolia	Honey-sweet	native	perennial herb
APIACEAE			
Berula erecta	Water Parsnip	exotic	perennial herb
Cymopterus aboriginum	Indian Parsley	native	perennial herb
Cymopterus panamintensis var. *panamintensis*	Panamint Parsley	native	perennial herb
Lomatium mohavense	Mohave Parsley	native	perennial herb
Lomatium nevadense var. *parishii*	Parish Parsley	native	perennial herb
Lomatium utriculatum	Parsley	native	perennial herb
APOCYNACEAE			
Apocynum cannabinum *	Indian Hemp	native	perennial herb
ARECACEAE			
Phoenix sp.	Date Palm	exotic	tree
ASCLEPIADACEAE			
Asclepias erosa	Desert Milkweed	native	perennial
Asclepias fascicularis	Milkweed	native	perennial herb
Asclepias vestita	Wooly Milkweed	native	perennial herb
Sarcostemma hirtellum	Rambling milkweed	native	perennial

Scientific Name	Common Name	Native or Exotic	Life Form
ASTERACEAE			
Acamptopappus sphaerocephalus	Goldenhead	native	shrub
Adenophyllum cooperi	Dyssodia	native	perennial herb
Ambrosia acanthicarpa	Annual Ragweed	native	annual
Ambrosia dumosa	Burro Bush	native	shrub
Amphipappus fremontii	Chaff Bush	native	subshrub
Anisocoma acaulis	Snakehead	native	annual
Artemisia douglasiana	Douglas Mugwort	native	perennial
Artemisia dracunculus	Tarragon, Mugwort	native	perennial
Artemisia ludoviciana var. *albula*	Western Mugwort	native	perennial herb
Artemisia ludoviciana var. *ludoviciana* *	Western Mugwort	native	perennial herb
Artemisia nova	Black Sagebrush	native	shrub
Artemisia spinescens	Bud Sagebrush	native	subshrub
Artemisia tridentata ssp. *tridentata*	Big Sagebrush	native	shrub
Artemisia tridentata ssp. *vaseyana*	Vasey Sagebrush	native	shrub
Baccharis brachyphylla *	Seepwillow	native	shrub
Baccharis salicifolia	Seepwillow	native	shrub
Baccharis sergiloides	Seepwillow	native	shrub
Baileya pleniradiata	Wooly Marigold	native	annual
Bebbia juncea var. *aspera*	Sweetbush	native	shrub
Brickellia arguta var. *arguta*	Pungent Brickellia	native	subshrub
Brickellia californica	Brickellia	native	shrub
Brickellia desertorum	Desert Brickellia	native	shrub
Brickellia microphylla	Brickellia	native	subshrub
Brickellia multiflora	Gum-leaved Brickellia	native	shrub
Brickellia oblongifolia var. *linifolia*	Pinyon Brickellia	native	perennial
Brickellia desertorum x B. multiflora	Knapp Brickellia hybrid	native	shrub
Calycoseris parryi	Yellow Tack-stem	native	annual
Calycoseris wrightii	White Tack-stem	native	annual
Chaenactis carphoclinia var. *carphoclinia*	Pebble Pincushion	native	annual
Chaenactis douglasii var. *douglasii*	Douglas Pincushion	native	biennial
Chaenactis fremontii	Fremont Pincushion	native	annual
Chaenactis macrantha	Pincushion	native	annual
Chaenactis stevioides	Pincushion	native	annual
Chaenactis xantiana	Xantus Pincushion	native	annual
Chamomilla suaveolens	Pineapple Weed	exotic	annual
Chrysothamnus nauseosus ssp. *consimilis*	Rubber Rabbitbrush	native	shrub
Chrysothamnus nauseosus ssp. *hololeucus*	Rubber Rabbitbrush	native	shrub
Chrysothamnus nauseosus ssp. *mohavensis*	Rubber Rabbitbrush	native	shrub
Chrysothamnus paniculatus	Blackband Rabbitbrush	native	shrub
Chrysothamnus teretifolius	Rabbitbrush	native	shrub
Chrysothamnus viscidiflorus ssp. *puberulus*	Sticky-leaved Rabbitbrush	native	shrub
Chrysothamnus viscidiflorus ssp. *viscidiflorus*	Sticky-leaved Rabbitbrush	native	shrub
Cirsium mohavense	Mojave Thistle	native	perennial herb
Cirsium neomexicanum	New Mexico Thistle	native	biennial herb
Cirsium occidentale var. *venustum* *	Thistle	native	perennial
Conyza canadensis	Horseweed	exotic	annual
Conyza coulteri	Coulter Horseweed	exotic	annual
Coreopsis bigelovii	Bigelow Coreopsis	native	annual
Coreopsis californica	California Coreopsis	native	annual
Coreopsis calliopseda	Leafy-stemmed Coreopsis	native	annual
Crepis occidentalis	Western Hawksbeard	native	perennial
Dicoria canescens	Dicoria	native	robust annual
Encelia actoni	Acton Brittlebush	native	shrub
Encelia actonii X E. farinosa	Brittlebush hybrid	native	shrub
Encelia farinosa	Brittlebush	native	shrub
Encelia frutescens *	Rayless Brittlebush	native	shrub
Ericameria cooperi var. *cooperi*	Cooper Goldenbush	native	shrub

Scientific Name	Common Name	Native or Exotic	Life Form
Ericameria cooperi X E. linearfolia	Goldenbush hybrid	native	shrub
Ericameria cuneata	Cliff Goldenbush	native	shrub
Ericameria linearifolia	Linear-leaved Goldenbush	native	shrub
Erigeron aphanactis	Gold Buttons	native	biennial herb
Erigeron breweri var. *covillei*	Coville Fleabane Daisy	native	perennial herb
Erigeron breweri var. *porphyreticus*	Boulder Daisy	native	perennial herb
Eriophyllum ambiguum	Wooly Sunflower	native	annual
Eriophyllum pringlei	Pringle Wooly Sunflower	native	annual
Eriophyllum wallacei	Wallace Wooly Sunflower	native	annual
Filago arizonica	Herba Impia	native	annual
Filago californica	Herba Impia	native	annual
Filago depressa	Herba Impia	native	annual
Geraea canescens	Desert Sunflower	native	annual
Glyptopleura marginata	Holly Dandelion	native	annual
Gnaphalium canescens ssp. *beneolens*	Everlasting	native	perennial herb
Gnaphalium luteo-album	Cudweed	exotic	bienniel herb
Gnaphalium palustre	Cudweed	native	annual
Gnaphalium stramineum	Cudweed	native	annual
Gutierrezia microcephala	Matchweed	native	shrub
Gutierrezia sarothrae	Snakeweed	native	subshrub
Heliomeris multiflora var. *nevadensis*	Nevada Golden-eye	native	perennial herb
Hulsea heterochroma	Great Hulsea	native	perennial herb
Hulsea vestita ssp. *inyoensis* *	Inyo Hulsea	native	perennial herb
Hymenoclea salsola var. *patula*	Cheesebush	native	shrub
Hymenoclea salsola var. *salsola*	Cheesebush	native	shrub
Isocoma acradenia var. *acradenia*	Goldenbush	native	shrub
Iva axillaris ssp. *robustior*	Poverty Weed	native	perennial herb
Lactuca serriola	Prickely Lettuce	exotic	annual weed
Lasthenia californica	Alkali Goldfields	native	annual
Lasthenia microglossa *	Modest Lasthenia	native	annual herb
Layia glandulosa	White Tidy Tips	native	annual
Lepidospartum squamatum	Scale Broom	native	shrub
Lessingia lemmonii var. *lemmonii*	Vinegar Weed	native	annual herb
Lessingia lemmonii var. *ramulosissima*	Lemmon Vinegar Weed	native	annual herb
Machaeranthera canescens var. *canescens*	Hoary-aster	native	biennial herb
Machaeranthera carnosa	Shrubby Alkali Aster	native	shrub
Malacothrix coulteri	Snake's Head	native	annual
Malacothrix glabrata	Desert Dandelion	native	annual
Malacothrix sonchoides	Yellow Saucers	native	annual
Malacothrix stebbinsii *	Stebbins Dandelion	native	annual
Monoptilon bellidiforme	Gray Desert Star	native	annual
Monoptilon bellioides	Desert Star	native	annual
Nicolletia occidentalis	Hole-in-the-sand Plant	native	perennial herb
Palafoxia arida var. *arida*	Spanish Needle	native	annual
Pectis papposa var. *papposa*	Chinch Weed	native	annual
Perityle emoryi	Emory Rock Daisy	native	annual
Perityle megalocephala var. *oligophylla*	Perityle	native	subshrub
Peucephyllum schottii	Pygmy Cedar	native	shrub
Pleurocoronis pluriseta	Hofmeistra Pluriseta	native	subshrub
Pluchea odorata	Salt Marsh Fleabane	native	shrub
Pluchea sericea	Arrow-weed	native	shrub
Prenanthella exigua	Bright White	native	annual
Psathyrotes annua	Mealy Rosette	native	annual
Psathyrotes ramosissima	Turtle Plant	native	annual
Rafinesquia californica	California Chicory	native	annual
Rafinesquia neomexicana	White Chicory	native	annual
Senecio flaccidus var. *douglasii*	Sand-wash Groundsel	native	shrub
Senecio flaccidus var. *monoensis*	Mono Senecio	native	shrub
Solidago spectablis	Showy Goldenrod	native	perennial herb

Scientific Name	Common Name	Native or Exotic	Life Form
Sonchus asper ssp. *asper*	Common Sow Thistle	exotic	annual
Stephanomeria exigua ssp. *exigua*	Annual Mitra	native	annual
Stephanomeria parryi	Parry Rock Pink	native	perennial herb
Stephanomeria pauciflora var. *pauciflora*	Wire Lettuce	native	perennial
Stephanomeria spinosa	Spiny Milk-aster	native	perennial
Stylocline gnaphalioides	Everlasting Nest Straw	native	annual
Stylocline micropoides	Desert Nest Straw	native	annual
Syntrichopappus fremontii	Fremont Xerasid	native	annual
Tetradymia axillaris var. *axillaris* *	Cotton-thorn	native	shrub
Tetradymia axillaris var. *longispina*	Cotton-thorn	native	shrub
Tetradymia canescens	Grey Horsebrush	native	shrub
Tetradymia glabrata	Desert Horsebrush	native	shrub
Tetradymia stenolepis	Mojave Horsebrush	native	shrub
Townsendia scapigera	Ground Daisy	native	perennial herb
Uropappus lindleyi	Silver Puffs, Silver Stars	native	annual
Vigueria reticulata	Reticulated Golden-eye	native	perennial
Xanthium strumarium	Cocklebur	exotic	biennial
Xylorhiza tortifolia var. *tortifolia*	Mojave Desert Aster	native	perennial
BORAGINACEAE			
Amsinckia menziesii var. *intermedia*	Common Fiddleneck	native	annual
Amsinckia tessellata	Devil's Lettuce	native	annual
Amsinckia vernicosa *	Vernal Fiddleneck	native	annual
Cryptantha angustifolia	Narrow-leaved Cryptantha	native	annual
Cryptantha barbigera	Bearded Forget-me-not	native	annual
Cryptantha clokeyi *	Clokey's Cryptantha	native	annual
Cryptantha circumscissa	Capped Forget-me-not	native	annual
Cryptantha confertiflora	Yellow Cryptantha	native	perennial herb
Cryptantha decipiens	Gravel Forget-me-not	native	annual
Cryptantha dumetorum	Forget-me-not	native	annual
Cryptantha echinella	Forget-me-not	native	annual
Cryptantha gracilis *	Slender Forget-me-not	native	annual
Cryptantha intermedia	Common Forget-me-not	native	annual
Cryptantha maritima	Guadalupe Forget-me-not	native	annual
Cryptantha micrantha	Purple-rooted Cryptantha	native	annual
Cryptantha nevadensis	Nevada Cryptantha	native	annual
Cryptantha pterocarya var. *cycloptera*	Wing-nut Forget-me-not	native	annual
Cryptantha pterocarya var. *pterocarya*	Wing-nut Forget-me-not	native	annual
Cryptantha racemosa	Bushy Forget-me-not	native	perennial herb
Cryptantha recurvata *	Recurved Cryptantha	native	annual
Cryptantha utahensis	Fragrant Forget-me-not	native	annual
Hackelia sp. *	Stickseed	native	annual
Heliotropium curassavicum var. *oculatum*	Heliotrope	native	perennial herb
Pectocarya penicillata	Winged Comb-bur	native	annual
Pectocarya platycarpa	Broad-nutted Comb-bur	native	annual
Pectocarya recurvata	Curved Comb-bur	native	annual
Pectocarya setosa	Round Comb-bur	native	annual
Plagiobothrys arizonicus	Arizona Popcorn -flower	native	annual
Plagiobothrys canescens	Valley Popcorn-flower	native	annual
Plagiobothrys jonesii	Jones Popcorn-flower	native	annual
Plagiobothrys leptocladus	Prostrate Popcorn-flower	native	annual
Tiquilia nuttallii	Nutall's Coldenia	native	annual
Tiquilia plicata	String Plant	native	perennial
BRASSICACEAE			
Arabis dispar	Pinyon Rock-cress	native	perennial
Arabis glaucovalvula	Blue-pod Rock-cress	native	perennial
Arabis inyoensis *	Inyo Rock-cress	native	perennial
Arabis perennens	Arched Rock-cress	native	perennial herb

Scientific Name	Common Name	Native or Exotic	Life Form
Arabis pulchra var. *gracilis*	Beautiful Rock-cress	native	perennial
Arabis pulchra var. *munciensis* *	Darwin Rock-cress	native	perennial
Arabis pulchra var. *pulchra*	Beautiful Rock-cress	native	perennial
Arabis sparsiflora var. *sparsiflora* *	Rock-cress	native	perennial herb
Brassica nigra	Black Mustard	exotic	annual
Brassica tournefortii	Tournfort's Mustard	native	annual
Caulanthus cooperi	Cooper Caulanthus	native	annual
Caulanthus coulteri	Coulter Caulanthus	native	annual herb
Caulanthus crassicaulis var. *crassicaulis* *	Thick-stemmed Wild Cabbage	native	perennial herb
Caulanthus inflatus var. *inflatus*	Desert Candle	native	annual
Caulanthus pilosus	Chocolate Drops	native	perennial
Descurainia pinnata	Tansy Mustard	native	annual
Descurainia sophia	Tansy mustard	exotic	annual
Dithyrea californica	Spectacle-pod	native	annual
Draba cuneifolia	Desert Draba	native	annual
Erysimum capitatum ssp. *capitatum*	Douglas Wallflower	native	perennial
Guillenia lasiophylla	California Mustard	native	annual
Halimolobus jaegeri *	Rock Mustard	native	perennial herb
Hutchinsia procumbens	Hutchinsia	native	annual
Lepidium flavum var. *flavum*	Yellow Pepper-grass	native	annual
Lepidium fremontii var. *fremontii*	Desert Alyssum	native	subshrub
Lepidium lasiocarpum var. *lasiocarpum*	Modest Pepper Grass	native	annual
Rorippa nasturtium-aquatica	Water Cress	native	perennial herb
Sisymbrium altissimum	Tumble Mustard	exotic	annual
Sisymbrium irio	London Rocket	exotic	annual
Stanleya elata	Prince's Plume	native	perennial
Stanleya pinnata var. *pinnata*	Prince's Plume	native	perennial
Streptanthella longirostris	Streptanthella	native	annual
Thysanocarpus curvipes	Fringe-pod	native	annual
Thysanocarpus laciniatus	Fringe-pod	native	annual
Tropidocarpum gracile	Keel-fruit	native	annual
CACTACEAE			
Echinocactus polycephalus var. *polycephalus*	Cottontop Cactus	native	perennial
Echinocereus englemanii var. *chrysocentrus*	Hedgehog Cactus	native	perennial
Mammillaria tetrancistra	Fish Hook Cactus	native	perennial
Opuntia basilaris var. *basilaris*	Beavertail Cactus	native	perennial
Opuntia echinocarpa	Golden Cholla	native	perennial
Opuntia erinacea var. *erinacea*	Mojave Prickly Pear	native	perennial
Opuntia erinacea var. *ursina* *	Grizzly Bear Cactus	native	perennial
Opuntia ramosissima	Diamond Cholla	native	perennial
Sclerocactus polyancistrus	Mojave Fish-hook Cactus	native	perennial
CAMPANULACEAE			
Nemacladus glanduliferus var. *glanduliferus*	Threadplant	native	annual
Nemacladus glanduliferus var. *orientalis*	Lake Mead Nemacladus	native	annual
Nemacladus rubescens	Desert Nemacladus	native	annual
Nemacladus sigmoideus	Inyo Nemacladus	native	annual
Parishella californica	Parishella	native	annual
CAPRACEAE			
Cleomella obtusifolia	Common Stinkweed	native	annual
Oxystylis lutea	Oxystylis	native	annual
CAPRIFOLLIACEAE			
Sambucus mexicana	Elderberry	native	shrub
Symphoricarpos longiflorus	Desert Snowberry	native	shrub

Scientific Name	Common Name	Native or Exotic	Life Form
CARYOPHYLLACEAE			
Achyronychia cooperi	Frost-mat	native	annual
Arenaria kingii var. *glabrescens*	Dolomite Sandwort	native	perennial herb
Arenaria macradenia ssp. *ferrisiae* *	Baby's Breath	native	perennial herb
Arenaria macradenia var. *macradenia*	Mojave Sandwort	native	perennial herb
Arenaria macradenia var. *parishiorum*	Green Baby's Breath	native	perennial herb
Silene verecunda ssp. *andersonii*	Mountain Campion	native	perennial herb
Spergularia bocconii *	Boccone Sand Spury	native	annual
Spergularia marina	Sand Spurry	native	annual
CEROTOPHYLLACEAE			
Ceratophyllum demersum	Hornwort	native	aquatic herb
CHENOPODIACEAE			
Allenrolfea occidentalis	Pickleweed	native	shrub
Atriplex canescens	Four-wing Saltbush	native	shrub
Atriplex confertifolia	Shadscale	native	shrub
Atriplex hymenelytra	Desert Holly	native	shrub
Atriplex lentiformis var. *torreyi*	Torrey Saltbush	native	shrub
Atriplex parryi	Parry Saltbush	native	shrub
Atriplex phyllostegia	Arrowscale	native	annual
Atriplex polycarpa	Allscale	native	shrub
Atriplex rosea	Tumbling Oracle	exotic	annual
Atriplex spinifera	Spinescale	native	shrub
Chenopodium atrovirens *	Goosefoot	native	annual
Chenopodium californicum	Soap Plant	native	perennial herb
Chenopodium desiccatum var. *leptophylloides*	Narrow-leaf Goosefoot	native	annual
Chenopodium fremontii	Fremont Goosefoot	native	annual
Chenopodium incanum var. *occidentale*	Granite Goosefoot	native	annual
Grayia spinosa	Spiny Hopsage	native	shrub
Kochia americana	Gray Molly	native	subshrub
Kochia californica	Mojave Red Sage	native	shrub
Kochia scoparia	Summer Cypress	exotic	annual
Krascheninnikovia lanata	Winterfat	native	shrub
Monolepis nuttalliana	Patata	native	annual
Nitrophila occidentalis	Alkali Pink	native	perennial
Salsola paulsenii	Barbwire Russian Thistle	exotic	annual
Salsola tragus	Tumbleweed	exotic	annual
Suaeda moquinii	Bush Seepweed	native	shrub
CONVOLVULACEAE			
Cressa truxillensis	Alkali Weed		perennial herb
CRASSULACEAE			
Dudleya saxosa ssp. *saxosa* *	Panamint Dudleya	native	perennial herb
CROSSOSOMATACEAE			
Forsellesia nevadensis *	Nevada Forsellesia	native	sushrub
CUCURBITACEAE			
Cucurbita palmata	Coyote Melon	native	perennial herb
Cuscuta denticulata	Toothed Dodder	native	annual
Cuscuta nevadensis	Nevada Dodder	native	annual
CYPERACEAE			
Carex alma	Sedge	native	perennial herb
Carex praegracilis *	Clustered Field Sedge	native	perennial herb
Eleocharis parishii	Parish Spikerush	native	perennial herb
Scirpus acutus	Common Tule	native	perennial

Scientific Name	Common Name	Native or Exotic	Life Form
Scirpus maritimus	Alkali Bulrush	native	perennial
Scirpus robustus	Bulrush	native	perennial
EUPHORBIACEAE			
Chamaesyce albomarginata	Rattlesnake Weed	native	perennial herb
Chamaesyce micromera	Desert Spurge	native	annual
Chamaesyce ocellata var. *arenicola*	Spurge	native	annual
Chamaesyce parishii	Death Valley Sand Mat	native	perennial herb
Chamaesyce polycarpa var. *polycarpa* *	Spurge, Sand Mat	native	perennial herb
Chamaesyce setiloba	Spurge	native	annual
Eremocarpus setigerus	Dove Weed	exotic	annual
Stillingia paucidentata	Stillingia	native	perennial
Stillingia spinulosa	Stillingia	native	annual
FABACEAE			
Astragalus acutirostris	Annual Milkvetch	native	annual
Astragalus atratus var. *mensanus*	Darwin Mesa Milkvetch	native	perennial herb
Astragalus casei	Case Locoweed	native	perennial herb
Astragalus coccineus	Scarlet Loco	native	perennial herb
Astragalus didymocarpus var. *didymocarpus*	Two-Seeded Milkvetch	native	annual
Astragalus didymocarpus var. *dispermus*	Two-Seeded Milkvetch	native	annual
Astragalus layneae	Layne Locoweed	native	perennial
Astragalus lentiginosus var. *fremontii*	Freckeled Milkvetch	native	perennial herb
Astragalus lentiginosus var. *micans* *	Shining Milkvetch	native	perennial
Astragalus lentiginosus var. *variabilis*	Freckeled Milkvetch	native	perennial herb
Astragalus newberryi var. *newberryi* *	Newberry Locoweed	native	perennial herb
Astragalus purshii var. *tinctus*	Pursh Locoweed	native	perennial herb
Astragalus serenoi var. *shockleyi* *	Naked Milkvetch	native	perennial herb
Lotus humistratus	Short-podded Lotus	native	annual
Lotus nevadensis var. *nevadensis* *	Sierra Lotus	native	annual
Lotus procumbens var. *procumbens*	Prostrate Lotus	native	perennial herb
Lotus purshianus var. *purshianus*	Lotus	native	annual
Lotus rigidus	Rock Pea	native	perennial herb
Lotus strigosus	Sand Lotus	native	annual
Lotus wrangelianus *	Short-winged Lotus	native	annual
Lupinus argenteus (L. palmeri)	Silver Lupine	native	perennial herb
Lupinus bicolor	Miniature Lupine	native	annual
Lupinus brevicaulis	Short-stemmed Blue Lupine	native	annual
Lupinus concinnus	Bajada Lupine	native	annual
Lupinus concinnus	Bajada Lupine	native	annual
Lupinus excubitus var. *excubitus*	Inyo Bush Lupine	native	shrub
Lupinus flavoculatus	Yellow-eyes	native	annual
Lupinus magnificus var. *glarecola*	Coso Mountains Lupine	native	perennial herb
Lupinus microcarpus var. *microcarpus*	Chick Lupine	native	annual
Lupinus nanus *	Grass Lupine	native	annual
Lupinus odoratus	Royal Desert Lupine	native	annual
Lupinus ruber	Red Lupine	native	annual
Lupinus shockleyi	Shockley Lupine	native	annual
Lupinus subvexus	Hairy Lupine	native	annual
Melilotus alba	White Sweetclover	exotic	annual
Melilotus indica	Yellow Sweetclover	exotic	annual
Prosopis glandulosa var. *torreyana*	Honey Mesquite	native	tree
Psorothamnus arborescens var. *arborescens*	Mojave Indigo Bush	native	shrub
Psorothamnus arborescens var. *minutifolius*	Indigo Bush	native	shrub
Psorothamnus polydenius	Indigo Bush	native	shrub
Robinia pseudoacacia	Black Locust	exotic	tree
Senna armata	Desert Senna	native	shrub
Trifolium gracilentum	Clover	native	annual
Trifolium macilentum var. *dedeckerae* *	DeDecker's Clover	native	perennial herb

Scientific Name	Common Name	Native or Exotic	Life Form
FRANKENIACEAE			
Frankenia salina	Alkali Heath	native	subshrub
GERANIACEAE			
Erodium cicutarium	Filaree, Storks Bill	exotic	annual
Erodium texanum	Texas Filaree	native	annual
GROSSULARIACEAE			
Ribes cereum	Wax Current	native	shrub
Ribes velutinum	Plateau Gooseberry	native	shrub
HYDROPHYLLACEAE			
Emmenanthe penduliflora var. *penduliflora*	Whispering Bells	native	annual
Eucrypta chrysanthemifolia var. *bipinnatifida*	Spotted Eucrypta	native	annual
Eucrypta micrantha	Small-flowered Eucrypta	native	annual
Nama aretioides var. *multiflorum*	Sagebrush Nama	native	annual
Nama demissum var. *demissum*	Purple Mat	native	annual
Nama depressum *	Narrow-leaved Nama	native	annual
Nama hispidum var. *spathulatum* *	Hispid Nama	native	annual
Nama pusillium	Small-leaved Nama	native	annual
Nemophila menziesii ssp. *integrifolia*	Baby Blue Eyes	native	annual
Phacelia bicolor var. *bicolor*	Sticky Yellow Throats	native	annual
Phacelia cicutaria var. *cicutaria* *	Caterpillar Phacelia	native	annual
Phacelia crenulata	Purple Phacelia	native	annual
Phacelia cryptantha	Limestone Phacelia	native	annual
Phacelia curvipes	Washoe Phacelia	native	annual
Phacelia distans	Blue Phacelia	native	annual
Phacelia fremontii	Yellow Throats	native	annual
Phacelia humilis *	Low Phacelia	native	annual
Phacelia ivesiana	Ive's Phacelia	native	annual
Phacelia mustelina	Weasel Phacelia	native	annual
Phacelia nashiana	Charlotte's Phacelia	native	annual
Phacelia neglecta	Phacelia	native	annual
Phacelia cf. *pachyphylla* *	Thick-leaf Phacelia	native	annual
Phacelia pedicellata	Specter Phacelia	native	annual
Phacelia perityoides var. *perityloides*	Panamint Phacelia	native	perennial herb
Phacelia ramosissima var. *latifolia*	Branching Phacelia	native	perennial herb
Phacelia rotundifolia	Round-leaved Phacelia	native	annual
Phacelia tanacetifolia	Tansy-leaved Phacelia	native	annual
Phacelia vallis-mortae	Death valley Phacelia	native	annual
Pholistoma membranaceum	White Fiesta Flower	native	annual
Tricardia watsonii	Three Hearts	native	perennial herb
JUNCACEAE			
Juncus balticus	Wire Grass	native	perennial
Juncus bufonius var. *bufonius*	Toad Rush	native	annual
Juncus mexicanus	Mexican Rush	native	perennial
Juncus rugulosus	Corrugated Rush	native	annual
Juncus xiphioides	Iris-leaved Rush	native	perennial
KRAMERIACEAE			
Krameria erecta	Range Rhatany	native	subshrub
LAMIACEAE			
Marrubium vulgare	Horehound	exotic	perennial
Monardella exilis	Annual Monardella	native	annual
Monardella linoides ssp. *linoides*	Flax-leaved Monardella	native	perennial
Monardella odoratissima ssp. *odoratissima* *	Monardella	native	perennial

Scientific Name	Common Name	Native or Exotic	Life Form
Salazaria mexicana	Bladder Sage	native	shrub
Salvia carduacea	Thistle Sage	native	annual
Salvia columbariae	Chia	native	annual
Salvia dorrii var. *dorrii*	Purple Sage	native	shrub
Salvia pachyphylla	Thick Leaf Sage	native	shrub
Stachys albens	Stachys	native	annual
LENNOACEAE			
Pholisma arenarium	Sand Plant	native	perennial
LILIACEAE			
Allium cristatum var. *cristatum* *	Wild Onion	native	perennial
Allium denticulatum	Wild Onion	native	perennial
Allium lacunosum	Wild Onion	native	perennial
Calochortus kennedyi var. *kennedyi*	Mariposa Lily	native	perennial
Calochortus panamintensis *	Panamint Mariposa Lily	native	perennial
Dichelostemma capitatum	Blue Dicks	native	perennial
Muilla coronata *	Crowned Muilla	native	perennial
Muilla maritima *	Long-stemmed Muilla	native	perennial
Smilacina stellata	Panicled False Solomon's-seal	native	perennial
Yucca brevifolia	Joshua Tree	native	tree
LOASACEAE			
Eucnide urens	Rock Nettle	native	perennial
Mentzelia affinis	Yellow Comet	native	annual
Mentzelia albicaulis	Blazing Star	native	annual
Mentzelia congesta	Flower Baskets	native	annual
Mentzelia inyoensis	Inyo Blazing Star	native	perennial
Mentzelia nitens *	Venus Blazing Star	native	annual
Mentzelia obscura	Blazing Star	native	annual
Mentzelia tridentata	Blazing Star	native	annual
Mentzelia veatchiana	Copper Blazing Star	native	annual
Petalonyx nitidus	Shining SandPpaper Plant	native	shrub
Petalonyx thurberi ssp. *thurberi*	Sand Paper Plant	native	shrub
MALVACEAE			
Eremalche exilis	White Mallow	native	annual
Eremalche rotundifolia	Desert Five Spot	native	annual
Malacothamnus fremontii	Bush Mallow	native	shrub
Sphaeralcea ambigua ssp. *ambigua*	Apricot Mallow	native	perennial herb
Abronia pogonantha	Mojave Sand Verbena	native	annual
Abronia villosa var. *villosa*	Desert Sand Verbena	native	annual
Mirabilis bigelovii var. *bigelovii*	Wishbone Bush	native	perennial herb
Mirabilis bigelovii var. *retrorsa*	Wishbone Bush	native	perennial herb
Mirabilis multiflora var. *glandulosa*	Giant Four o' Clock	native	perennial herb
OLEACEAE			
Forestiera pubescens	Desert Olive	native	tree
Fraxinus anomala	Single-leaf Ash	native	tree
Fraxinus velutina	Velvet Ash	exotic	tree
Menodora spinescens	Spiny Menodora	native	shrub
ONAGRACEAE			
Camissonia boothii ssp. *boothii*	Booth's Evening-primrose	native	annual
Camissonia boothii ssp. *desertorum*	Booth's Evening-primrose	native	annual
Camissonia boothii ssp. *inyoensis*	Inyo Booth Primrose	native	annual
Camissonia brevipes	Yellow Sun Cups	native	annual
Camissonia campestris ssp. *campestris*	Mojave Sun Cup	native	annual
Camissonia cardiophylla var. *robusta*	Heart-leaved Primrose	native	perennial herb

Scientific Name	Common Name	Native or Exotic	Life Form
Camissonia chamaeneroides	Modest Evening-primrose	native	annual
Camissonia claviformis ssp. *claviformis*	Brown-eyed Primrose	native	annual
Camissonia ignota *	Small Primrose	native	annual
Camissonia kernensis ssp. *gilmanii*	Gilman Primrose	native	annual
Camissonia palmeri	Palmer Primrose	native	annual
Camissonia pterosperma *	Wing-fruited Primrose	native	annual
Camissonia pubens *	Hairy Primrose	native	annual
Camissonia pusilla *	Slender Hairy Primrose	native	annual
Camissonia refracta	Evening-primrose	native	annual
Camissonia walkeri ssp. *torilis*	Rock Primrose	native	annual
Epilobium ciliatum ssp. *ciliatum*	Valley Epilobium	native	perennial herb
Oenothera caespitosa ssp. *crinita*	Limestone Evening-primrose	native	perennial herb
Oenothera caespitosa ssp. *marginata*	Evening-primrose	native	perennial herb
Oenothera californica ssp. *avita*	Evening-primrose	native	perennial herb
Oenothera deltoides	Birdcage Primrose	native	biennial
Oenothera primiveris	Yellow Evening-primrose	native	annual
ORCHIDACEAE			
Epipactis gigantea	Stream Orchid	native	perennial herb
OROBANCHACEAE			
Orobanche cooperi ssp. *cooperi*	Broom Rape	native	perennial
Orobanche fasciculata	Broom Rape	native	perennial
OXALIDACEAE			
Oxalis corniculata	Wood-sorrel	exotic	perennial herb
PAPAVERACEAE			
Argemone corymbosa	Prickley Poppy	native	perennial
Argemone munita	Prickley Poppy	native	perennial
Dicentra chrysantha *	Golden Ear-drops	native	perennial herb
Eschscholzia glyptosperma	Desert Gold Poppy	native	annual
Eschscholzia minutiflora ssp. *covillei*	Coville Gold Poppy	native	annual
Eschscholzia minutiflora ssp. *minutiflora*	Little Gold Poppy	native	annual
Platystemon californicus	Cream Cups	native	annual
PHILIDELPHACEAE			
Fendlerella utahensis *	Yerba Desierto	native	shrub
Philadelphus microphyllus	Mockorange	native	shrub
PLANTAGINACEAE			
Plantago major	Common Plantain	exotic	perennial herb
Plantago ovata	Plantain	native	annual
Plantago patagonica	Pursh Plantain	native	annual
POACEAE			
Achnatherum hymenoides	Indian Rice Grass	native	perennial
Achnatherum occidentalis ssp. *occidentalis*	Needlegrass	native	perennial
Achnatherum parishii	Needlegrass	native	perennial
Achnatherum speciosum	Needlegrass	native	perennial
Agrostis stolonifera var. *stolonifera*	Redtop	native	perennial
Aristida purpurea var. *fendleriana*	Fendler Three-awn	native	perennial
Aristida purpurea var. *nealleyi*	Reverchon Three-awn	native	perennial
Bouteloua barbata var. barbata	Six Weeks Gramma Grass	native	annual
Bromus arizonicus	Arizona Brome	native	annual
Bromus carinatus var. *carinatus*	California Brome	native	perennial
Bromus catharticus	Rescue Grass	exotic	annual
Bromus ciliatus	Fringed Brome	exotic	annual
Bromus diandrus	Ripgut	exotic	annual

Scientific Name	Common Name	Native or Exotic	Life Form
Bromus madritensis ssp. *rubens*	Foxtail Chess	exotic	annual
Bromus tectorum	Downy Chess	exotic	annual
Bromus trinii	Chilean Chess	exotic	annual
Cynodon dactylon	Burmuda Grass	exotic	perennial
Distichlis spicata	Saltgrass	native	perennial
Elymus elymoides ssp. *elymoides*	Squirreltail	native	perennial
Elymus multisetus	Big Squirreltail	native	perennial
Erioneuron pulchellum	Fluffgrass	native	perennial
Hordeum brachyantherum ssp. *californicaum*	Barley	exotic	perennial
Hordeum murinum ssp. *leporinum*	Wild Barley	exotic	annual
Leymus cinereus	Ashy Wildrye	native	perennial
Leymus condensatus *	Big Wildrye	native	perennial
Leymus triticoides	Creeping Wildrye	native	perennial
Melica frutescens	Tall Melica	native	perennial
Melica imperfecta	Small-flowered Melica	native	perennial
Melica stricta	Rock Melicgrass	native	perennial
Muhlenbergia asperifolia	Mist Grass	native	perennial
Muhlenbergia sp. *	Mat Muhly	native	perennial
Muhlenbergia porteri	Bush Muhly	native	perennial
Muhlenbergia rigens	Deergrass	native	perennial
Paspalum dialatum	Dallis Grass	exotic	perennial
Paspalum distichum	Ditch Grass	native	perennial
Phragmites australis	Common Reed	native	perennial
Pleuraphis jamesii	James Galleta Grass	native	perennial
Pleurophis rigida	Galleta Grass	native	perennial
Poa fendleriana ssp. *longiligula* *	Longtongue Mutton Grass	native	perennial
Poa secunda ssp. *secunda*	Pine Bluegrass	native	perennial
Polypogon monspelliensis	Rabbitfoot Grass	exotic	annual
Schismus arabicus	Split Grass	exotic	annual
Schismus barbatus	Split Grass	exotic	annual
Sporobolus airoides	Alkali Sacaton	native	perennial
Sporobolus flexuosus	Mesa Dropseed	exotic	perennial
Vulpia microstachys var. *pauciflora*	Pacific Fescue	native	annual
Vulpia octoflora var. *octoflora*	Six-weeks Fescue	native	annual
Vulpia myuros var. *megalura*	Rattail Fescue	native	annual
POLEMONIACEAE			
Eriastrum densifolium ssp. *mohavense*	Wooly Star	native	perennial
Eriastrum diffusum	Wooly Star	native	annual
Eriastrum eremicum ssp. *eremicum*	Wooly Star	native	annual
Eriastrum sparsiflorum	Wooly Star	native	annual
Eriastrum wilcoxii *	Wooly Star	native	annual
Gilia aliquanta ssp. *aliquanta*	Puffed-calyx Gilia	native	annual
Gilia brecciarum ssp. *brecciarum*	Nevada Small Gilia	native	annual
Gilia brecciarum ssp. *neglecta*	Inyokern Gilia	native	annual
Gilia brecciarum ssp. *neglecta* (ssp. *argusana)*	Argus Gilia	native	annual
Gilia cana ssp. *cana*	Showy Gilia	native	annual
Gilia cana ssp. *cana* (*G. latiflora* ssp. *cosana)*	Coso Broad-flowered Gilia	native	annual
Gilia cana ssp. *speciosa* *	Showy Gilia	native	annual
Gilia cana ssp. *triceps*	Showy Gilia	native	annual
Gilia filiformis	Thread-stemmed Gilia	native	annual
Gilia hutchinsifolia	Pale Gilia	native	annual
Gilia latiflora ssp. *elongata*	Broad-flowered Gilia	native	annual
Gilia latiflora ssp. *latiflora* (ssp. *excellens*)	Broad-flowered Gilia	native	annual
Gilia latifolia	Holly Gilia	native	annual
Gilia leptomeria	Great Basin Gilia, Sand Gilia	native	annual
Gilia malior	Scrub Gilia	native	annual
Gilia micromeria	Gilia	native	annual
Gilia minor	Gilia	native	annual

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Gilia modocensis	Modoc Gilia	native	annual
Gilia ochroleuca ssp. *ochroleuca*	Gilia	native	annual
Gilia opthalmoides	Pinyon Gilia	native	annual
Gilia scopulorum	Rock Gilia	native	annual
Gilia sinuata	Gilia	native	annual
Gilia stellata	Gilia	native	annual
Gilia transmontana	Gilia	native	annual
Gilia triodon *	Toothed Gilia	native	annual
Ipomopsis polycladon	Ipomopsis	native	annual
Langloisia setosisima ssp. *punctata*	Spotted Langloisia	native	annual
Leptodactylon pungens	Prickly Phlox	native	subshrub
Linanthus arenicola	Sand Linanthus	native	annual
Linanthus aureus ssp. *aureus*	Golden Linanthus	native	annual
Linanthus bigelovii	Linanthus	native	annual
Linanthus ciliatus *	Whisker Brush	native	annual
Linanthus dichotomus	Evening Snow	native	annual
Linanthus parryae	Sand Blossoms	native	annual
Loeseliastrum matthewsii	Desert Calico	native	annual
Loeseliastrum schottii	Sunbonnets	native	annual
Phlox gracilis	Annual Phlox	native	annual
Phlox stansburyi	Phlox	native	perennial
POLYGONACEAE			
Centrostegia thurberi	Red Triangles	native	annual
Chorizanthe brevicornu ssp. *brevicornu*	Brittle Spine Plant	native	annual
Chorizanthe rigida	Rigid Spine Plant	native	annual
Chorizanthe watsonii	Spine Plant	native	annual
Chorizanthe xantii var. *xantii* *	Spine Plant	native	annual
Eriogonum angulosum	Angle-stemmed Buckwheat	native	annual
Eriogonum baileyi var. *baileyi*	Bailey Buckwheat	native	annual
Eriogonum brachyanthum	Yellow Buckwheat	native	annual
Eriogonum brachypodum	Tecopa Skeleton Weed	native	annual
Eriogonum davidsonii *	Heerman Buckwheat	native	annual
Eriogonum deflexum var. *baratum*	Tall Skeleton Weed	native	annual
Eriogonum deflexum var. *deflexum*	Skeleton Weed	native	annual
Eriogonum fasciculatum ssp. *polifolium*	California Buckwheat	native	shrub
Eriogonum glandulosum *	Pink Mist	native	annual
Eriogonum gracillimum	Slender Buckwheat	native	annual
Eriogonum heermannii var. *argense*	Heerman Buckwheat	native	perennial
Eriogonum inflatum var. *inflatum*	Desert Trumpet	native	perennial
Eriogonum kennedyi var. *purpusii*	Kennedy Mojave Buckwheat	native	shrub
Eriogonum maculatum	Spotted Buckwheat	native	annual
Eriogonum microthecum var. *laxiflorum*	Buckwheat	native	shrub
Eriogonum mohavense	Mojave Buckwheat	native	annual
Eriogonum nidularium	Whisk Broom Buckwheat	native	annual
Eriogonum nudum var. *nudum*	Nude Buckwheat	native	perennial herb
Eriogonum nudum var. *westonii*	Cinder Nude Buckwheat	native	perennial herb
Eriogonum ovalifolium var. *ovalifolium* *	Oval-leaved Buckwheat	native	perennial herb
Eriogonum palmerianum *	Buckwheat	native	annual
Eriogonum panamintense (ssp. *mensicola*)	Pinyon Mesa Buckwheat	native	perennial herb
Eriogonum panamintense (ssp. *panamintense*)	Panamint Buckwheat	native	perennial
Eriogonum plumatella	Plume Buckwheat	native	perennial
Eriogonum pusillum	Yellow Turbans	native	annual
Eriogonum reniforme	Kidney-leaved Buckwheat	native	annual
Eriogonum rixfordii	Pagoda Buckwheat	native	annual
Eriogonum saxatile	Rock Buckwheat	native	perennial herb
Eriogonum spergulinum var. *reddingianum*	Buckwheat	native	annual
Eriogonum trichopes var. *hooveri*	Little Trumpet	native	annual
Eriogonum umbellatum var. *nevadense*	Sulpher Buckwheat	native	subshrub

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Eriogonum umbellatum var. *subaridum*	Sulpher Buckwheat	native	subshrub
Eriogonum viridescens	Buckwheat	native	annual
Eriogonum wrightii var. *subscaposum*	Wright Buckwheat	native	perennial
Mucronea perfoliata	Perfoliate Spineflower	native	annual
Oxytheca dendroidea	Fine Oxytheca	native	annual
Oxytheca perfoliata	Saucer Plant	native	annual
Polygonum arenastrum	Common Knotweed	exotic	annual
Pterostegia drymarioides	Pterostegia	native	annual
Rumex crispus	Curly Dock	exotic	biennial
Rumex hymenoseplas	Canaigre, Wild Rhubarb	native	perennial
Rumex salicifolius var. *denticulatus*	Willow Dock	native	perennial
PORTULACACEAE			
Calandrinia ciliata	Calandrinia	native	annual
Calyptridium monandrum	Sand Cress	native	annual
Calyptridium parryi var. *nevadense* *	Pussy Paws	native	annual
Claytonia parviflora (rubra)	Miner's Lettuce	native	annual
POTAMOGETONACEAE			
Potamogeton pusillus	Small Pondweed	native	perennial
POLYGONACEAE			
Aquilegia shockleyi	Shockley's Columbine	native	perenial herb
Clematis ligusticifolia	Virgin's Bower	native	perennial
Delphinium parishii ssp. *parishii*	Larkspur	native	perennial
Ranunculus cymbalaria var. *saximontanus*	Buttercup	native	perennial
RESEDACEAE			
Oligomeris linifolia	Mignonette	native	annual
RHAMNACEAE			
Ceanothus greggii var. *vestitus*	Buckbrush	native	shrub
Amelanchier utahensis	Service-berry	native	shrub
Cercocarpus intricatus	Little Mahogany	native	shrub
ROSACEAE			
Chamaebatiaria millefolium	Fern Bush	native	shrub
Coleogyne ramosissima	Blackbush	native	shrub
Holodiscus microphyllus	Small-leaved Cream Bush	native	shrub
Horkeliella congdonis	Horkeliella	native	perennial herb
Prunus andersonii	Desert Peach	native	shrub
Prunus fasciculata var. *fasiculata*	Desert Almond	native	shrub
Purshia mexicana var. *stansburiana*	Cliffrose	native	shrub
Purshia tridentata var. *glandulosa*	Bitterbrush	native	shrub
Rosa woodsii var. *ultramontana*	Wild Rose	native	shrub
RUBIACEAE			
Galium aparine	Catchweed Bedstraw	native	annual
Galium argense	Argus Bedstraw	native	subshrub
Galium hilendiae ssp. *hilendiae*	Bristly Bedstraw	native	Psubshrub
Galium matthewsii	Bushy Bedstraw	native	subshrub
Galium stellatum var. *eremicum*	Desert Bedstraw	native	subshrub
RUTACEAE			
Thamnosma montana	Turpentine Bush	native	subshrub
SALICACEAE			
Populus fremontii ssp. *fremontii*	Fremont Cottonwood	native	tree
Salix exigua	Narrow-leaved Willow	native	tree

Scientific Name	Common Name	Native or Exotic	Life Form
Salix laevigata	Red Willow	native	tree
Salix lasiolepis	Arroyo Willow	native	tree
Salix lucida ssp. *lasiandra*	Yellow Willow	native	tree
SAXIFRAGACEAE			
Heuchera rubescens var. *alpicola*	Alumroot	native	perennial herb
SCROPHULARIACEAE			
Antirrhinum coulterianum *	Coulter Snapdragon	native	annual
Antirrhinum filipes	Twining Snapdragon	native	annual
Antirrhinum kingii	Least Snapdragon	native	annual
Castilleja angustifolia	Desert Indian Paintbrush	native	perennial
Castilleja exserta ssp. *exserta*	Purple Owl's Clover	native	annual
Castilleja linariifolia	Long-leaved Paintbrush	native	perennial
Collinsia callosa	Granite Collinsia	native	annual
Cordylanthus eremicus ssp. *eremicus*	Panamint Bird's-beak	native	annual
Cordylanthus kingii ssp. *helleri* *	Bird's-beak	native	annual
Keckiella breviflora var. *breviflora*	Bush Penstemon	native	shrub
Keckiella rothrockii var. *rothrockii*	Bush Penstemon	native	shrub
Mimulus bigelovii	Monkey Flower	native	annual
Mimulus cardinalis	Monkey Flower	native	perennial herb
Mimulus guttatus	Monkey Flower	native	biennial
Mimulus pilosus	Monkey Flower	native	annual
Mimulus rubellus	Monkey Flower	native	annual
Mohavea confertiflora	Mojave Ghost Flower	native	annual
Penstemon fruticiformis var. *fruticiformis*	Desert Mountain Penstemon	native	subshrub
Penstemon incertus	Western Desert Penstemon	native	subshrub
Penstemon monoensis *	Mono Penstemon	native	perennial herb
Penstemon palmeri var. *palmeri*	Palmer Penstemon	native	subshrub
Penstemon patens *	Owens Valley Penstemon	native	perennial herb
Penstemon rostriflorus	Penstemon	native	perennial herb
Penstemon speciosus	Showy Penstemon	native	perennial herb
Scrophularia desertorum	Figwort	native	perennial herb
SOLANACEAE			
Datura wrightii	Jimson Weed	native	perennial
Lycium andersonii	Anderson Thornbush	native	shrub
Lycium cooperi	Peach Thorn	native	shrub
Nicotiana attenuata	Coyote Tobacco	native	annual
Nicotiana obtusifolia	Desert Tobacco	native	perennial herb
Physalis crassifolia	Ground Cherry	native	perennial herb
Solanum americanum	Nightshade	exotic	perennial herb
TAMMARICAEAE			
Tamarix aphylla	Athel	exotic	tree
Tamarix parviflora	French Tamarisk	exotic	tree
Tamarix ramosissima	Salt Cedar	exotic	tree
TYPHACEAE			
Typha domingensis	Southern Catttail	native	perennial
URTICACEAE			
Parietaria hespera var. *hespera*	Parietaria	native	annual
Urtica dioica ssp. *holosericea*	Nettle	native	perennial
VERBENACEAE			
Verbena bracteata	Verbena	native	perennial herb

Scientific Name	Common Name	Native or Exotic	Life Form
VIOLACEAE			
Viola purpurea ssp. *purpurea*	Violet	native	perennial herb
VISCACEAE			
Arceuthobium divaricatum	Mistletoe	native	perennial
VITACEAE			
Vitis girdiana	Desert Wild Grape	native	perennial
ZYGOPHYLLACEAE			
Fagonia laevis *	Fagonia	native	annual
Larrea tridentata	Creosote Bush	native	shrub
Peganum harmala	North African Rue	exotic	perennial herb

* - *PLANTS WITH OLD, UNCONFIRMED OR SUSPECT RECORDS*

Table E-4
Amphibians and Reptiles of NAWS China Lake and Vicinity

Scientific Name	Common Name
Order Salientia (Frogs and Toads)	
Family Bufonidae	
Bufo boreas	Western Toad
Hylidae	Hylid Frog
Pseudaeris regilla	Pacific Tree-frog
Order Testudinata (Turtles)	
Family Testudinidae	
Gopherus agassizii	Desert Tortoise
Order Squamata (Lizards and Snakes)	
Family Gekkonidae	
Coleonyx variegatus	Western Banded Gecko
Family Iguanidae	
Disposaurus dorsalis	Desert Iguana
Sauromalus obesus	Chuckwalla
Callisaurus draconoides	Zebra-tailed Lizard
Crotaphytus collaris	Collared Lizard
Gambelia wislezennii	Leopard Lizard
Sceloporus magister	Desert Spiny Lizard
Sceloporus occidentalis	Western Fence Lizard
Urosaurus graciosus	Long-tailed Brush Lizard
Uta stansburiana	Side-blotched Lizard
Phrynosoma platyrhinos	Desert Horned Lizard
Family Xantusidae	
Xantusia vigilis	Desert Night Lizard
Family Skinkidae (Skinks)	
Eumeces gilberti	Gilbert's Skink
Family Teidae	
Cnemidophorus tigris	Western Whiptail
Family Anguidae	
Gerrhonotus panamintina	Panamint Alligator Lizard
Family Boidae (Boas)	
Lichanura trivirgata	Desert Rosy Boa
Family Colubridae (Colubrids)	
Diadophis amabilis	Western Ring-necked Snake
Phyllorhynchus decurtatus	Spotted leaf-nosed Snake
Masticophis flagellum	Red Racer
Masticophis taeniatus	Striped Whipsnake
Salvadora hexalepis	Western Patch-nosed Snake
Arizona elegans	Glossy Snake
Pituophis melanoleucus	Gopher Snake
Lampropeltis getulus	Common King Snake
Rhinocheilus lecontei	Long-nosed Snake
Chionactis occipitalis	Western shovel-nosed Snake
Hypsiglena torquata	Night Snake
Family Viperidae	

Scientific Name	**Common Name**
Crotalus cerastes	Sidewinder
Crotalus mitchelli	Speckled Rattlesnake
Crotalus scutulatus	Mojave Rattlesnake

Table E-5
Birds of NAWS China Lake and Vicinity

Scientific Name	Common Name
Loons (Gaviidae)	
Gavia immer	Common Loon
Grebes (Podicipedidae)	
Podilymbus podiceps	Pied-billed Grebe
Podiceps auritus	Horned Grebe
Podiceps nigricollis	Eared Grebe
Aechmophorus occidentalis	Western Grebe
Aechmophorus clarkii	Clark's Grebe
Pelicans (Pelicanidae)	
Pelecanus erythrorhynchos	American White Pelican
Pelecanus occidentalis	Brown Pelican
Cormorants (Phalacrocoracidae)	
Phalacrocorax auritus	Double-crested Cormorant
Bitterns & Herons (Ardeidae)	
Botaurus lintiginosus	American Bittern
Ixobrychus exilis	Least Bittern
Ardea herodias	Great Blue Heron
Casmerodius albus	Great Egret
Egretta thula	Snowy Egret
Bubulcus ibis	Cattle Egret
Butorides virescens	Green Heron
Nycticorax nycticorax	Black-crowned Night Heron
Plegadis chihi	White-faced Ibis
Ajaja ajaja	Roseate Spoonbill
Swans, Geese, & Ducks (Anatidae)	
Cygnus columbianus	Tundra Swan
Anser albifrons	Greater White-fronted Goose
Chen caerulescens	Snow Goose
Chen rossii	Ross' Goose
Branta bernicla	Brant
Branta canadensis	Canada Goose
Aix sponsa	Wood Duck
Dendrocygna bicolor	Fulvous Whistling duck
Anas crecca	Green-winged Teal
Anas platyrhynchos	Mallard
Anas acuta	Northern Pintail
Anas discors	Blue-winged Teal
Anas cyanoptera	Cinnamon Teal
Anas clypeata	Northern Shovelor
Anas strepera	Gadwall
Anas clypeata.	Eurasian Wigeon
Anas americana	American Wigeon

Scientific Name	Common Name
Aythya valisineria	Canvasback
Aythya americana	Redhead
Aythya collaris	Ring-necked Duck
Aythya marila	Greater Scaup
Aythya affinis	Lesser Scaup
Clangula hyemalis	Oldsquaw
Melanitta perspicillata	Surf Scoter
Bucephala clangula	Common Goldeneye
Bucephala albeola	Bufflehead
Lophodytes cucullatus	Hooded Merganser
Mergus merganser	Common Merganser
Mergus serrator	Red-breasted Merganser
Oxyura jamaicensis	Ruddy Duck
American Vultures (Cathartidae)	
Cathartes aura	Turkey Vulture
Kites, Hawks, Osprey and Eagles (Accipitridae)	
Pandion haliaetus	Osprey
Elanus Leucurus	White-tailed Kite
Haliaeetus leucocephalus	Bald Eagle
Circus cyaneus	Northern Harrier
Accipiter striatus	Sharp-shinned Hawk
Accipiter cooperii	Cooper's Hawk
Buteo lineatus	Red-shouldered Hawk
Buteo swainsoni	Swainson's Hawk
Buteo jamaicensis	Red-tailed Hawk
Buteo regalis	Ferruginous Hawk
Buteo lagopus	Rough-legged Hawk
Aquila chrysaetos	Golden Eagle
Falcons (Falconidae)	
Falco sparverius	American Kestrel
Falco columbarius	Merlin
Falco peregrinus	Peregrine Falcon
Falco mexicanus	Prairie Falcon
Partridges & Quail (Phasianidae)	
Alectrosi chukar	Chukar (I)
Callipepla gambelii	Gambel's Quail
Callipepla californica	California Quail
Oreortyx pictus	Mountain Quail
Rails, Gallinules, & Coots (Rallidae)	
Rallus limicola	Virginia Rail
Porzana carolina	Sora
Gallinula chloropus	Common Moorhen
Fulica americana	American Coot
Cranes (Gruidae)	

Scientific Name	Common Name
Grus canadensis	Sandhill Crane
Plovers (Charadriidae)	
Pluvialis squatarola	Black-bellied Plover
Pluvialis dominica	American Golden Plover
Charadrius alexandrinus	Snowy Plover
Charadrius semipalmatus	Semipalmated Plover
Charadrius vociferus	Killdeer
Charadrius montanus	Mountain Plover
Stilts & Avocets (Recurvirostridae)	
Himantopus mexicanus	Black-necked Stilt
Recurvirostra americana	American Avocet
Sandpipers & Phalaropes (Scolopacidae)	
Tringa melanoleuca	Greater Yellowlegs
Tringa flavipes	Lesser Yellowlegs
Tringa solitaria	Solitary Sandpiper
Catoptrophorus semipalmatus	Willet
Heteroscelus incanus	Wandering Tattler
Actitis macularia	Spotted Sandpiper
Numenius phaeopus	Whimbrel
Numenius americanus	Long-billed Curlew
Limosa fedoa	Marbled Godwit
Arenaria interpres	Ruddy Turnstone
Arenaria melanocephala	Black Turnstone
Calidris canutus	Red Knot
Calidris alba	Sanderling
Calidris pusilla	Semipalmated Sandpiper
Calidris mauri	Western Sandpiper
Calidris minutilla	Least Sandpiper
Calidris bairdii	Baird’s Sandpiper
Calidris melanotos	Pectoral Sandpiper
Calidris alpina	Dunlin
Calidris himantopus	Stilt Sandpiper
Philomachus pugnax	Ruff
Limnodromus griseus	Short-billed Dowitcher
Limnodromus scolopaceus	Long-billed Dowitcher
Gallinago gallinago	Common Snipe
Phalaropus tricolor	Wilson’s Phalerope
Phalaropus lobatus	Red-necked Phalerope
Phalaropus fulicaria	Red Phalerope
Skuas, Gulls, & Terns (Laridae)	
Stercorarius pomarinus	Pomarine Jaeger
Stercorarius parasiticus	Parasitic Jaeger
Larus pipixcan	Franklin’s Gull
Larus philadelphia	Bonaparte’s Gull
Larus delawarensis	Ring-billed Gull
Larus californicus	California Gull

Scientific Name	Common Name
Larus argentatus	Herring Gull
Rissa tridactyla	Black-legged Kittiwake
Xema sabinia	Sabine's Gull
Sterna caspia	Caspian Tern
Sterna hirundo	Common Tern
Sterna paradisaea	Arctic Tern
Sterna forsteri	Forster's Tern
Sterna antillarum	Least Tern
Childonias niger	Black Tern
Rynchops niger	Black Skimmer
Pigeons & Doves (Columbidae)	
Columba livia	Rock Dove (I)
Columba fasciata	Band-tailed Pigeon
Zenaida asiatica	White-winged Dove
Zenaida macroura	Mourning Dove
Columbina talpacoti	Ruddy Ground dove
Cuckoos (Cuculidae)	
Coccyzus americanus	Yellow-billed Cuckoo
Geococcyx californianus	Greater Roadrunner
Barn Owls (Tytonidae)	
Tyto alba	Barn Owl
Typical Owls (Strigidae)	
Otus flammeolus	Flammulated Owl
Bubo virginianus	Great Horned Owl
Speotyto cunicularia	Burrowing Owl
Asio otus	Long-eared Owl
Asio flammeus	Shorted-eared Owl
Aegolius acadicus	Northern Saw-whet Owl
Goatsuckers (Caprimulgidae)	
Chordeiles acutipennis	Lesser Nighthawk
Chordeiles minor	Common Nighthawk
Phalaenoptilus nuttallii	Common Poorwill
Swifts (Apodidae)	
Chaetura vauxi	Vaux's Swift
Aeronautes saxatalis	White-throated Swift
Hummingbirds (Trochilidae)	
Cynanthus latirostris	Broad-billed Hummingbird
Archilocus alexandri	Black-chinned Hummingbird
Calypte anna	Anna's Hummingbird
Calypte costae	Costa's Hummingbird
Stellula calliope	Calliope Hummingbird
Selasphorus rufus	Rufous Hummingbird
Selasphorus sasin	Allen's Hummingbird

Scientific Name	Common Name
Kingfishers (Alcedinidae)	
Ceryle alcyon	Belted Kingfisher
Woodpeckers (Picidae)	
Melanerpes lewis	Lewis' Woodpecker
Melanerpes formicivorus	Acorn Woodpecker
Sphyrapicus varius	Yellow-bellied Sapsucker
Sphyrapicus ruber	Red-breasted Sapsucker
Picoides scalaris	Ladder-backed Woodpecker
Picoides nuttallii	Nuttalls Woodpecker
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Picoides albolarvatus	White-headed Woodpecker
Colaptes auratus	Northern Flicker
Tyrant Flycatchers (Tyranidae)	
Contopus borealis	Olive-sided Flycatcher
Contopus sordidulus	Western Wood Peewee
Empidonax traillii	Willow Flycatcher
Empidonax hammondii	Hammond's Flycatcher
Empidonax oberholseri	Dusky Flycatcher
Empidonax wrightii	Gray Flycatcher
Empidonax difficilis	Pacific-slope Flycatcher
Sayornis nigricans	Black Phoebe
Sayornis saya	Say's Phoebe
Pyrocephalus rubinus	Vermilion Flycatcher
Myiarchus cinerascens	Ash-throated Flycatcher
Tyrannus vociferans	Cassin's Kingbird
Tyrannus verticalis	Western Kingbird
Tyrannus tyrannus	Eastern Kingbird
Tyrannus forficatus	Scissor-tailed Flycatcher
Larks (Alaudidae)	
Eremophila alpestris	Horned Lark
Swallows (Hirundinidae)	
Progne subis	Purple Martin
Tachycineta bicolor	Tree Swallow
Tachycineta thalassina	Violet-green Swallow
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Riparia riparia	Bank Swallow
Hirundo pyrrhonota	Cliff Swallow
Hirundo rustica	Barn Swallow
Jays, Magpies, & Crows (Corvidae)	
Cyanocitta stelleri	Stellar's Jay
Aphelocoma coerulescens	Scrub Jay
Gymnorhinus cyanocephalus	Pinyon Jay
Nucifraga columbiana	Clark's Nutcracker

Scientific Name	Common Name
Pica pica	Black-billed Magpie
Corvus corax	Common Raven
Titmice (Paridae)	
Parus gambeli	Mountain Chickadee
Parus inornatus	Plain Titmouse
Verdins (Remizidae)	
Auriparus flaviceps	Verdin
Bushtits (Aegithalidae)	
Psaltriparus minimus	Bushtit
Nuthatches (Sittidae)	
Sitta canadensis	Red-breasted Nuthatch
Sitta carolinensis	White-breasted Nuthatch
Sitta pygmaea	Pygmy Nuthatch
Creepers (Certhiidae)	
Certhia americana	Brown Creeper
Wrens (Troglodytidae)	
Campylorhynchus brunneicapillus	Cactus Wren
Salpinctes obsoletus	Rock Wren
Catherpes mexicanus	Canyon Wren
Thryomanes bewickii	Bewick's Wren
Troglodytes aedon	House Wren
Troglodytes troglodytes	Winter Wren
Cistothorus palustris	Marsh Wren
Muscicapids (Muscicapidae)	
Kinglets & Gnatcatchers	
Regulus satrapa	Golden-crowned Kinglet
Regulus calendula	Ruby-crowned Kinglet
Polioptila caerulea	Blue-gray Gnatcatcher
Solitaires & Thrushes	
Sialia mexicana	Western Bluebird
Sialia currucoides	Mountain Bluebird
Myadestes townsendi	Townsend's Solitaire
Catharus ustulatus	Swainson's Thrush
Catharus guttatus	Hermit Thrush
Turdus migratorius	American Robin
Ixoreus naevius	Varied Thrush
Mockingbirds & Thrashers (Mimidae)	
Mimus polyglottos	NorthernMockingbird
Oreoscoptes montanus	Sage Thrasher
Toxostoma redivivum	California Thrasher
Toxostoma lecontei	LeContes Thrasher

Scientific Name	Common Name
Pipits (Motacillidae)	
Anthus cervinus	Red-throated Pipit
Anthus rubescens	American Pipit
Waxwings (Bombycillidae)	
Bombycilla garrulus	Bohemian Waxwing
Bombycilla cedorum	Cedar Waxwing
Silky Flycatchers (Ptilogonatidae)	
Phainopepla nitens	Phainopepla
Shrikes (Laniidae)	
Lanius excubitor	Northern Shrike
Lanius ludovicianus	Loggerhead Shrike
Starlings (Sturnidae)	
Sturnus vulgaris	European Starling (I)
Vireos (Vireonidae)	
Vireo griseus	White-eyed Vireo
Vireo bellii	Least Bell's Vireo
Vireo solitarius	Solitary Vireo
Vireo gilvus	Warbling Vireo
Emberizids (Emberizidae)	
Wood Warblers	
Vermivora celata	Orange-crowned Warbler
Vermivora ruficapilla	Nashville Warbler
Vermivora virginiae	Virginia's Warbler
Vermivora luciae	Lucy's Warbler
Dendroica petechia	Yellow Warbler
Dendroica magnolia	Magnolia Warbler
Dendroica caerulescens	Black-throated Blue Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica nigrescens	Black-throated Gray Warbler
Dendroica townsendi	Townsend's Warbler
Dendroica occidentalis	Hermit Warbler
Dendroica palmarum	Palm Warbler
Dendroica striata	Blackpoll Warbler
Mniotilta varia	Black and White Warbler
Setophaga ruticilla	American Redstart
Protonotaria citrea	Prothonotary Warbler
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Oporornis tolmiei	MacGillivray's Warbler
Geothlypis trichas	Common Yellowthroat
Wilsonia citrina	Hooded Warbler
Wilsonia pusilla	Wilson's Warbler
Icteria virens	Yellow-breasted Chat

Scientific Name	Common Name
Tanagers	
Piranga rubra	Summer Tanager
Piranga ludoviciana	Western Tanager
Grosbeaks & Buntings	
Pheucticus ludovicianus	Rose-breasted Grosbeak
Pheucticus melanocephalus	Black-headed Grosbeak
Guiraca caerulea	Blue Grosbeak
Passerina amoena	Lazuli Bunting
Passerina cyanea	Indigo Bunting
Towhees & Sparrows	
Pipilo chlorurus	Green-tailed Towhee
Pipilo erythropthalmus	Spotted Towhee
Pipilo crissalis	California Towhee
Spizella arborea	American Tree Sparrow
Spizella passerina	Chipping Sparrow
Spizella pallida	Clay-colored Sparrow
Spizella breweri	Brewer's Sparrow
Spizella atrogularis	Black-chinned Sparrow
Pooecetes gramineus	Vesper Sparrow
Chondestes grammacus	Lark Sparrow
Amphispiza bilineata	Black-throated Sparrow
Amphispiza belli	Sage Sparrow
Passerculus sandwichensis	Savannah Sparrow
Ammodramus savannarum	Grasshopper Sparrow
Ammodramus leconteii	LeConte's Sparrow
Passerella iliaca	Fox Sparrow
Melospiza melodia	Song Sparrow
Melospiza lincolnii	Lincoln's Sparrow
Melospiza georgiana	Swamp Sparrow
Zonotrichia albicollis	White-throated Sparrow
Zonotrichia atricapilla	Golden-crowned Sparrow
Zonotrichia leucophrys	White-crowned Sparrow
Zonotrichia querula	Harris's Sparrow
Junco hyemalis	Dark-eyed Junco
Calcarius lapponicus	Lapland Longspur
Blackbirds & Orioles	
Dolichonyx oryzivorus	Bobolink
Agelaius phoeniceus	Red-winged Blackbird
Agelaius tricolor	Tricolored Blackbird
Sturnella neglecta	Western Meadowlark
Xanthocephalus xanthocephalus	Yellow-headed Blackbird
Euphagus carolinus	Rusty Blackbird
Euphagus cyanocephalus	Brewer's Blackbird
Quiscalus mexicanus	Great-tailed Grackle
Molothrus ater	Brown-headed Cowbird
Icterus spurius	Orchard Oriole
Icterus cucullatus	Hooded Oriole

Scientific Name	Common Name
Icterus galbula	Northern Oriole
Icterus parisorum	Scott's Oriole
Old World Finches (Fringillidae)	
Carpodacus purpureus	Purple Finch
Carpodacus cassinii	Cassin's Finch
Carpodacus mexicanus	House Finch
Loxia curvirostra	Red Crossbill
Carduelis pinus	Pine Siskin
Carduelis psaltria	Lesser Goldfinch
Carduelis lawrencei	Lawrence's Goldfinch
Carduelis tristis	American Goldfinch
Coccothraustes vespertinus	Evening Grosbeak
Old World Sparrows (Passeridae)	
Passer domesticus	House Sparrow (I)

Note: (I) Introduced Species

Table E-6
Mammals of NAWS China Lake and Vicinity

Scientific Name	Common Name
Order Insectivora	
Family Soricidae	
Notiosorex crawfordi	Gray Shrew
Order Chiroptera	
Family Vespertilionidae	
Myotis lucifugus	Little Brown Myotis
Myotis volans	Long-legged Myotis
Myotis thysanodes	Fringed Myotis
Lasionycteris noctivagans	Silver-haired Bat*
Myotis californicus	California Myotis
Myotis yumanensis	Yuma Myotis*
Myotis ciliolabrum	Small-footed Myotis
Pipistrellus hesperus	Western Pipistrel
Myotis volans	Hairy-winged Myotis*
Myotis evotis	Long-eared Myotis*
Euderma maculatum	Spotted Bat
Antrozous pallidus	Pallid Bat
Corynorhinus townsendii	Townsend's Big-eared Bat
Lasiurus cinereus	Hoary Bat*
Lasiurus blossevillii	Red Bat*
Eptesicus fuscus	Big Brown Bat
Family Molossidae	
Tadarida brasiliensis	Mexican Free-tailed Bat
Eumops perotis	Western Mastiff Bat
Order Rodentia	
Family Scuiridae	
Spermophilus beecheyi	California Ground Squirrel
Ammospermophilus leucurus	Antelope Ground Squirrel
Spermophilus mohavensis	Mohave Ground Squirrel
Eutamias panamintinus	Panamint Chipmunk
Family Cricetidae	
Reithrodontomys megalotis	Western Harvest Mouse
Peromyscus maniculatus	Deer Mouse
Peromyscus crinitus	Canyon Mouse
Peromyscus eremicus	Cactus Mouse
Peromyscus boylii	Brush Mouse
Peromyscus truei	Pinyon Mouse
Onychomys torridus	Southern Grasshopper Mouse
Neotoma fuscipes	Dusky-footed Woodrat
Neotoma lepida	Desert Woodrat
Microtus sp.	Vole (species unknown)
Family Geomyidae	
Thomomys bottae	Botta Pocket Gopher
Family Heteromyidae	
Perognathus longimembris	Little Pocket Mouse

Scientific Name	Common Name
Perognathus penicillatus	Desert Pocket Mouse
Perognathus formosus	Long-tailed Pocket Mouse
Dipodomys merriami	Merriam Kangaroo Rat
Dipodomys microps	Great Basin Kangaroo Rat
Dipodomys panamintinus	Panamint Kangaroo Rat
Dipodomys deserti	Desert Kangaroo Rat
Family Erethizontidae	
Erethizon dorsatum	Porcupine
Order Carnivore	
Family Canidae	
Canis latrans	Coyote
Vulpes macrotis	Desert Kit Fox
Urocyon cinereoargenteus	Gray Fox
Family Fedlidae	
Lynx rufus	Bobcat
Felis concolor	Mountain Lion
Family Procyonidae	
Bassariscus astutus	Ringtail
Family Mustedlidae	
Taxidea taxus	Badger
Mephitis mephitis	Striped Skunk
Mustela frenata	Long-tailed weasel
Order Lagmorpha	
Family Leporidae	
Lepus californicus	Black-tailed hare
Sylvilagus audubonii	Desert cottontail
Order Perissodactyla	
Family Equidae	
Equus asinus	Feral Burro (I)
Equus caballus	Feral Horse (I)
Order Artiodactyla	
Family Cervidae	
Odocoileus hemionus	Mule Deer
Family Bovidae	
Ovis canadensis	Bighorn Sheep (R)

Notes: *Species of potential occurrence on NAWS China Lake
(I) Introduced Species
(R)Reintroduced Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Field Office
2493 Portola Road, Suite B
Ventura, California 93003

June 27, 1995

Carolyn A. Shepherd
Head, Environmental Project Office
Public Works Department
Department of the Navy
China Lake Naval Weapons Station
China Lake, California 93555-6001

Subject: Reinitiation of Formal Consultation for the Desert Tortoise Habitat Management Plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 823EOOD C8305) (1-8-95-F-30R)

Dear Ms. Shepherd:

By letter, dated March 27, 1995, and received by us on March 30, 1995, you requested reinitiation of formal consultation with the Fish and Wildlife Service (Service), pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), regarding the referenced Management Plan. Your request was made specifically to evaluate the impacts that the Naval Air Weapons Station's (Station) Desert Tortoise Habitat Management Plan (Management Plan) may have on critical habitat designated for the desert tortoise (*Gopherus agassizii*), a federally listed threatened species. This biological opinion supersedes the non-jeopardy biological opinion on the Management Plan issued on December 3, 1992 (Service file no. 1-6-92-F-60).

This biological opinion was prepared using information: contained in your original request for consultation to the Service in 1992; obtained during informal consultation between our staffs; and in our files.

Biological Opinion

It is the opinion of the Service that the proposed action is not likely to jeopardize the continued existence of the desert tortoise or adversely modify critical habitat for the desert tortoise.

Description of the Proposed Action

The Navy proposes to continue implementation of the Station's Management Plan and administration of the Desert Tortoise Management Area established following issuance of the Service's 1992 non-jeopardy opinion on the Management Plan.

The Station occupies 1,095,680 acres in two discrete units within Kern, Inyo, and San Bernardino Counties (Kiva et al. 1991) (see Service, 1992 for maps). The north ranges are located immediately north of the residential areas of China Lake and the City of Ridgecrest. The southern ranges are approximately 20 miles southeast of China Lake.

The mission of the Station is to provide, operate, and maintain base support services for both tenant and transient organizations at China Lake, California (Navy 1992). The Station is a primary site for the Navy to research, develop, test, and evaluate missile weapons systems and electronic warfare simulation (Kiva et al. 1991). Other activities include landing of planes at back-country locations, training of paratroops, and bombing of stationary targets in the Superior Valley portion of the southern ranges. The high visibility resulting from clean air, open air space free of civilian and commercial aircraft, and seclusion make the Station a suitable site for these activities.

Some activities, such as bombing at the Superior Valley range, are located at the Station on a permanent basis and occur regularly. However, the Station also hosts many Department of Defense units and private contractors from around the nation that require the temporary use of training or testing areas with the physical attributes found at China Lake. Such programs may occur for only a short period of time with little prior notice given to the Station.

In the latter case, the Station's Environmental Project Office is required to provide guidance and support in ensuring that environmental constraints are addressed during the temporary activities. In cases where the desert tortoise could be adversely affected, the short turn-around time required by the transient users conflicts with the longer time frames needed by the Service to process section 7 consultations. As a result, Environmental Project Office and Service staff developed a programmatic approach to project review that would be consistent with section 7 guidelines and at the same time could serve as a management plan to benefit desert tortoises at the Station. *

The Station's Management Plan provides guidelines for project review, standard mitigation measures, and designation of approximately 200,000 acres of the southern ranges as a management area for desert tortoises. For a detailed account of the measures proposed by the Navy see the Service's 1992 biological opinion.

Effects of the Proposed Project on the Listed Species

Species Account

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the creosote, shadscale, and Joshua tree series of Mojave desertscrub, and the lower Colorado River Valley subdivision of Sonoran desertscrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from two to eight inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Turner 1982, and Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally found in windblown sand or in rocky terrain (Luckenbach 1982). Live desert tortoises have been found in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of about 1,000 to 3,000 feet (Luckenbach 1982, Schamberger and Turner 1986).

Desert tortoises are most active in California during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein et al. (1987), and U.S. Fish and Wildlife Service (1994).

On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered. In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened. The Service designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah in a final rule, published February 8, 1994. A final recovery plan for the desert tortoise was published by the Service in June, 1994.

The recovery plan is the basis and key strategy for recovery and delisting of the desert tortoise (Service 1994). The plan divides the range of the desert tortoise into six distinct population segments or recovery units and recommends establishment of 14 desert wildlife management areas throughout the recovery units. Within each desert wildlife management area, the recovery plan recommends implementation of reserve level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. As part of the actions needed to accomplish recovery, land management within all desert wildlife management areas should restrict human activities that negatively affect desert tortoises (Service 1994).

A portion of the Station's Desert Tortoise Management Area lies within the Superior-Cronese Critical Habitat Unit (CHU), one of four CHUs designated in the Western Mojave Recovery Unit. CHUs and recovery units as defined in the final rule designating critical habitat for the desert tortoise were patterned after the desert wildlife management area and recovery unit concepts in the recovery plan. The Western Mojave Recovery Unit consists of approximately 4,753,000 acres, located entirely in California. Vegetation within this recovery unit is characterized by creosote bush scrub, big galleta-scrub steppe, desert needlegrass scrub-steppe, and blackbrush scrub (in higher elevations). Topography is varied, with flats, valleys, alluvial fans, washes, and rocky slopes. The Superior-Cronese CHU, covers approximately 766,900 acres in San Bernardino County, California.

Regulations found at 50 CFR § 402.02 define destruction or adverse modification of critical habitat as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features (referred to as the primary constituent elements [50 CFR § 424.12]) that were the basis for determining the habitat to be critical. In the final rule designating desert tortoise critical habitat, the Service determined that desert tortoise habitat consists of the following primary constituent elements: (1) sufficient space to support viable populations within each of the six Recovery Units and provide for movements, dispersal, and gene flow; (2) sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; (3) suitable substrates for burrowing, nesting, and overwintering; (4) burrows, caliche caves, and other sheltersites; (5) sufficient vegetation for shelter from temperature extremes and predators; and (6) habitat protected from disturbance and human-caused mortality (59 FR 5820).

Joshua tree woodland, creosote bush scrub, and saltbush scrub communities are the most common plant assemblages within the Station. The most common species found within these communities are Joshua trees (*Yucca brevifolia*), creosote bush (*Larrea tridentata*), and bursage (*Ambrosia dumosa*), and saltbush (*Atriplex* spp.), respectively. A large portion of the North Range of China Lake is at higher elevations than are generally occupied by desert tortoises. Additionally, a large playa which, because of its fine soils and absence of shrub cover does not support desert tortoises, occurs within the southern part of the North Range.

A discussion of the density and distribution of desert tortoises within the Station can be found in the original biological opinion for the Management Plan (Service 1992).

Analysis of Impacts

As noted in the original biological opinion for the Management Plan, numerous activities that the Navy undertakes at the Station have the potential to take desert tortoises through mortality, injury, or harassment and to disturb or eliminate desert tortoise habitat. These activities include construction of new facilities, testing of weapons and electronic warfare systems, use and maintenance of roads and utilities, bombing practice, and miscellaneous other activities. The Navy's Management Plan for the Station includes measures to minimize both the likelihood for take of individual desert tortoises and the effects of mission-related activities on desert tortoise habitat.

Key to implementation of the Management Plan is oversight by the Station's Environmental Project Office of a Desert Tortoise Management Area covering approximately 200,000 acres of the Station. As an incentive for project planners to minimize habitat loss or disturbance in this area, under the Management Plan, the maximum amount of disturbance associated with any given action will not exceed 2.5 acres without triggering an individual formal consultation. Cumulative impacts of the Management Plan are addressed through the stipulation that no more than five percent of the planning area could be developed or disturbed on a long-term basis without reinitiation of formal consultation.

The effectiveness of the Management Plan is exhibited by the impact of activities conducted within the planning area since its inception. In the 1993 annual report of actions within the planning area, the Station's Environmental Project Office noted that of 1200 projects reviewed, only 27 were proposed in or near desert tortoise habitat (Station 1993). The Environmental Project Office successfully sited 22 of the 27 projects in previously disturbed areas while the remaining five projects proceeded under the guidance provided in the Management Plan. For the 1993 reporting period, two acres of desert tortoise habitat were eliminated and two acres were disturbed (Station 1993).

At issuance of the original biological opinion on the Management Plan, the Station had removed almost 8,000 feral burros from its lands and installed over 11 miles of fence to exclude trespass livestock grazing from the south range. Under the Management Plan, the Station would continue these efforts and to pursue additional surveys of desert tortoise habitat, research, and educational programs on the desert tortoise and other biological resources of the desert.

The Service believes that the impacts described above resulting from implementation of the Management Plan will not jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat. We present this conclusion for the following reasons:

1. The Navy's Management Plan includes mitigation measures which would reduce the take of individual desert tortoises and their habitat.

2. The impacts that would result from continued implementation of the Management Plan would generally disturb small amounts of land over a large area and would not result in fragmentation of desert tortoise habitat.

3. The establishment by the Navy of an approximately 200,000-acre area to be managed for the desert tortoise furthers recovery efforts in the western Mojave Desert.

Cumulative Effects

Cumulative effects are those impacts of future State and private actions that are reasonably certain to occur in the project area. Future Federal actions will be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project.

Many of the actions that are reasonably expected to occur within the vicinity of the project will be subject to section 7 consultations, because large portions of the desert consist of Federal lands. Numerous unauthorized actions on both Federal and non-Federal lands, such as collection and vandalism of desert tortoises and off-highway vehicle use, will continue to degrade desert tortoise populations and their habitat, particularly in areas that receive large amounts of recreational use.

The Service has contacted the counties of San Bernardino, Kern, Riverside, Inyo, and Los Angeles (and the incorporated areas within the desert) regarding the listing of the desert tortoise and its implications for city- and county-permitted activities. Many cities within the range of the desert tortoise in San Bernardino, Los Angeles, and Kern counties have expressed interest in obtaining a section 10(a)(1)(B) incidental take permit from the Service. Regional planning efforts, such as the West Mojave Coordinated Management Plan, could serve as model habitat conservation plans for local governments. Cumulative impacts of future State and private projects will be addressed in regional plans, such as this, and in the section 10(a)(1)(B) incidental take permit process. The measures being developed by the Bureau of Land Management and other participating agencies in the Western Mojave Coordinated Management Plan are likely to be ~~with~~ compatible with management prescriptions specified in the Station's Desert Tortoise Management Plan.

Incidental Take

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this incidental take statement. The measures described as reasonable and prudent measures and terms and conditions in this biological opinion are nondiscretionary, and must be undertaken by the agency or made a binding condition of any grant or permit, as appropriate.

This biological opinion anticipates the following forms of take which would be associated with implementation of the reasonable and prudent measures:

1. Two (2) desert tortoises per year in the form of direct mortality during implementation of the Management Plan.

2. A total of forty (40) desert tortoises in the form of direct mortality during implementation of the Management Plan.

3. Ten (10) desert tortoises per year in the form of harassment through the excavation of burrows occupied by desert tortoises and the removal of desert tortoises found above ground in project areas during work and training activities.

This biological opinion does not authorize any form of take that is not incidental to implementation of the Desert Tortoise Management Plan at the Station, China Lake. Implementation of the plan is considered to include all activities that meet the criteria as established by the Navy in its plan and the Service in this biological opinion.

If the incidental take authorized by this biological opinion is met, the Navy shall immediately notify the Service in writing. If the incidental take authorized by this biological opinion is exceeded, the Navy shall immediately cease the activity resulting in the take and shall reinitiate formal consultation with the Service.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking authorized by this biological opinion:

1. Worker education programs and well-defined operational procedures shall be implemented to avoid the take of desert tortoises and minimize loss of their habitat implementation of the Desert Tortoise Management Plan.

2. Take of desert tortoises, through injury or death due to the straying of vehicles or equipment beyond project areas, shall be reduced through establishment of clearly defined work areas.

3. Take of desert tortoises, through injury or death, found within proposed project areas shall be reduced through the removal of these animals to safe, undisturbed areas adjacent to project sites.

4. Attraction of common ravens and other potential tortoise predators to project areas shall be reduced to the maximum extent possible.

5. The Station shall continue to manage for the benefit of desert tortoises the approximately 200,000 acres within the Station as described in the original biological opinion for the Management Plan.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Navy is responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. With the exception of updating reference to handling protocols and ensuring that wording reflects current conditions, the terms and conditions reiterate those presented in the Service's 1992 biological opinion on the Management Plan. They are included here to avoid the necessity of referring to another document and to minimize any confusion that could arise when two documents are involved.

Terms and conditions 1a, 1f, 1h, 1i, 1j, 1l, 1m, 2, 5, and 6, are established to implement reasonable and prudent measure 1. Terms and conditions 1b and 1e are established to implement reasonable and prudent measure 2. Terms and conditions 1c, 1d, 1k, and 4 are established to implement reasonable and prudent measure 3. Term and condition 3 is established to implement reasonable and prudent measure 4. Term and condition 1g is established to implement reasonable and prudent measure 5:

1.a. All proposals for new projects (and modifications to existing project sites) shall be reviewed by the Environmental Project Office (Code 823E00D). New projects include new construction or other land disturbing activities as well as significant changes in land use activities or types at established sites. Ongoing activities that may result in take of desert tortoises shall be reviewed on an annual basis. The Station-wide educational program (discussed in measure 6) shall focus on the procedures and requirements to eliminate off-site impacts and other actions that may result in inadvertent take.

1.b. The primary means to eliminate or minimize impacts to desert tortoises or their habitat shall continue to be through the use of avoidance procedures. These methods shall include the following:

i. Consultations with project proponents by Environmental Project Office (Code 823E00D) staff early in the planning process shall try to locate proposed project sites in areas that are not in desert tortoise habitat.

ii. If projects cannot be located in areas outside desert tortoise habitat, then the Environmental Project Office shall try to influence the project design such that projects are located in previously disturbed areas or so that the amount or type of disturbance is minimized.

1.c. Surveys for desert tortoises shall be accomplished for all projects which may be located in desert tortoise habitat. Surveys shall be accomplished by qualified biologists either currently employed by the Environmental Project Office (Code 823E00D) or through the use of contractor personnel. All surveys shall be accomplished in accordance with Service protocol. Modifications to the protocol to meet the requirements of specific actions shall receive prior approval from the Service.

1.d. Whenever possible, project sites shall be selected so that they are located in previously disturbed areas. Measures to minimize take shall include modifications to project size, orientation, location and construction practices. Should projects have to be located where desert tortoises are known to exist, the desert tortoises shall be relocated in accordance with procedures in Appendix A "Desert Tortoise Handling and Overwintering Procedures" (Desert Tortoise Council 1994).

1.e. Incidental take shall be minimized by taking the following measures. Actual measures shall be based on the results of site specific field surveys and shall be implemented at the discretion of Code 823E00D personnel:

i. Regular monitoring of construction operations and active project activities;

ii. Placement of signs indicating the need to reduce speeds on roadways and the necessity for all activities to be strictly confined to the project site;

iii. Clearly delineating the project site boundaries on the ground by flagging, survey lath or wooden stakes;

iv. Placement of desert tortoise-proof fences around certain projects or portions of projects where, due to the known proximity of desert tortoises to the project site, the probability of take is high;

v. Conduct project personnel briefings for all project personnel during all project phases. At a minimum the briefings shall discuss:

- the general provisions of the Endangered Species Act;
- the necessity for adhering to the provisions of the Act;
- the penalties associated with violating the provisions of the Act;
- the specific requirements (as delineated by this office) for complying with the provisions of the Act as they relate to each project;
- the exact boundaries of the project within which the project may be accomplished;
- the procedures to be accomplished by project personnel should any problem arise with respect to complying with environmental constraints;
- general behavior and ecology of the desert tortoise; and
- its sensitivity to human activities.

vi. Pre-construction site surveys to ensure the project area has remained clear of desert tortoises since the initial site surveys were accomplished. Pre-construction surveys shall be conducted within 7 days of initiation of construction activities; and

vii. Written operations plans detailing special constraints on project activities such as surveys or sweeps of project areas immediately prior to initiation of project activities for those projects which use areas on an infrequent basis.

1.f. The Station shall conduct an environmental briefing, with emphasis on threatened/endangered species management and the existence and details of the Desert Tortoise Habitat Management Plan to all Station and contractor personnel who use areas considered desert tortoise habitat. The briefing shall be conducted by Code 823E00D biologists. The briefing shall discuss the specific element of the Plan as well as general procedures detailing compliance with the Endangered Species Act.

1.g. The Station shall administer approximately 200,000 acres of land (contiguous) on the its South Range as the Desert Tortoise Management Area. This term and condition does not preclude the use of existing developments or eliminate ongoing or previously occurring activities within these areas. All personnel who use these developments or participate in such actions within these areas shall attend the educational program prior to the onset of activities. All other applicable terms and conditions of this biological opinion shall also be implemented. Existing, developed or utilized areas within the designated Desert Tortoise Management Areas shall be clearly delineated on the ground by placement of permanent markers (wooden posts). Entry points (roads) into these areas shall be delineated by signs indicating that personnel are entering a Desert Tortoise Management Area and that all activities must be strictly confined to established roadways and project sites.

1.h. The procedure for implementing this management plan shall vary depending on the location of the proposed project within or outside of the Management Area, the proposed size (acres) of the project area and the presence or absence of desert tortoises or their sign in the area. A written summary of the procedure is presented below and in the Service's previous biological opinion (Service 1992):

For: Projects outside the Management Area
Less than 50 acres in total area

With desert tortoise sign (on or near the project site):
Implement appropriate measures to preclude take
Notify Service in Annual Report

For: Projects outside the Management Area
Less than 50 acres in total area
Without desert tortoise sign (on or near the project site):
Notify Service in Annual Report

For: Projects outside the Management Area
Greater than 50 acres in total area
Without desert tortoise sign (on or near the project site):
Notify Service in Annual Report

For: Projects outside the Management Area
Greater than 50 acres in total area
With desert tortoise sign (on or near the project site):
Notify Service of project proposal with supporting documentation and request their review
* → Initiate section 7 consultation on request of Service

For: Projects inside the Management Area
Greater than 2.5 acres
With or without desert tortoise sign:
Notify Service of project proposal with supporting documentation and request their review
* → Initiate section 7 consultation on request of Service

For: Project inside the Management Area
Less than 2.5 acres
With or without desert tortoise sign:
Implement appropriate measures to preclude take
Notify Service in Annual Report

1.i. Should the cumulative acreage developed within the Management Area exceed 5 percent of the total Management Area acreage, the Station shall reinitiate formal section 7 consultation. Should small (less than 2.5 acres) project sites be established in such a fashion that they are adjacent to or near other small projects and the actual area of effect could be considered to be greater that 2.5 acres, the small projects shall each be considered to be greater than 2.5 acres and treated as described in measure 1m.

1.j. Active or usable desert tortoise burrows located adjacent to or near construction sites shall be protected by temporary desert tortoise-proof fencing placed to completely enclose the burrow at a minimum distance of 20 feet from the burrow.

1.k. Desert tortoise burrows which cannot be avoided shall be excavated by hand either by or under the direction of the authorized biologist. Desert tortoise burrow excavation and subsequent handling of any desert tortoises shall follow guidelines established in Appendix A.

The following information shall be recorded for all desert tortoises that are handled: the location where the desert tortoise was found; the location to which it was moved; the date and time of the action; any other pertinent information, including observations on the health and condition of the desert tortoise, and whether it voided its bladder upon handling; and appropriate length measurements, descriptions of unique markings, a detailed photograph of the fourth left costal scute, and photographs of at least the desert tortoise's anterior area and carapace.

1.l. Code 823E00D shall prepare and submit to the Service for its review and comment an annual report containing:

i. a general summary of all projects that have been initiated on the Station within the one year reporting period and shall include:

- a list of projects which implemented the provisions of this agreement;
- the total number of desert tortoises that were taken, through injury, mortality, or harassment;
- the total acreage of desert tortoise habitat lost or disturbed;
- a summary of the effectiveness of the take minimization measures; and
- a discussion of any problems encountered and recommendations on how to reduce or eliminate these problems.

ii. A specific summary of each project undertaken. This report shall detail:
- the project name;
- a project description;
- the project location (map);
- the total acreage of the project;
- the total number of desert tortoises that were taken, through injury, mortality, or harassment;
- the acreage of desert tortoise habitat lost and its relative condition;
- measures taken to ensure that take has been minimized or eliminated;
- follow-up data on success of impact (take) minimization efforts;
-any problems encountered with respect to implementing the provisions of the management plan; and
- the information collected on all desert tortoises as specified in term and condition 1.k of this biological opinion.

1.m. Should unforeseen problems arise or the Station propose activities that are not compatible with the continued implementation of the Desert Tortoise Management Plan, the Station shall reinitiate the formal section 7 consultation process. In addition, reinitiation of the consultation process shall be required if the criteria promulgated at 50 CFR 402.16 are met. These criteria are stated at the conclusion of this biological opinion.

2. Only qualified personnel authorized under the auspices of this biological opinion shall handle desert tortoises. Tom Campbell, Susan Williams, and Beverly Kohfield of the Station's Environmental Project Office are hereby authorized to handle desert tortoises as described in this biological opinion. If the Station wishes to use other Navy employees or outside contractors to handle desert tortoises, the names and credentials shall be supplied to the Service for its review and approval at least 15 days prior to the onset of the activities which they are being authorized to monitor.

3. All trash and food items shall be promptly contained within raven-proof containers. These containers shall be regularly removed from the project sites to reduce the attractiveness of the area to common ravens and other desert tortoise predators.

4. The authorized biologist(s) shall follow the general handling methods contained in the guidelines in Appendix A. This biological opinion does not authorize replacement of lost fluids in any desert tortoise with a syringe, the drawing of blood, or notching of the shell to mark animals. Marking of desert tortoises using the epoxy method as described in Arizona Game and Fish Department et al. (1991) is authorized.

5. Desert tortoises moved from harm's way within the vicinity of a project site shall be marked for future identification. An identification number using the acrylic paint/epoxy covering technique shall be placed on the fourth ~~5th~~ costal scute (Fish and Wildlife Service 1991). 35-mm slide photographs of the carapace, plastron, and the fourth costal scute shall be taken.

6. All personnel shall check beneath their vehicles while in desert tortoise habitat prior to moving the vehicle. If a desert tortoise is found beneath the vehicle, an authorized biologist shall move the desert tortoise as described in this biological opinion or the vehicle operator shall wait until the desert tortoise has moved away from the vehicle. The authorized biologist shall ensure that any desert tortoises moved in this manner will not be exposed to temperatures that could be harmful to the desert tortoise. All personnel shall be advised of the potential for desert tortoises to take refuge under vehicles and of the proper procedures to follow in that event. This information shall be incorporated into all educational briefings on the desert tortoise.

Disposition of Dead, Injured, or Sick Desert Tortoises

Upon locating dead, injured, or sick desert tortoises, initial notification must be made within three working days of the finding to the Service's Division of Law Enforcement in Torrance, California, at (310) 297-0062. The Service's Ventura Office should also be notified at (805) 644-1766. Written notification to both offices must be made within five calendar days and include the date, time, and location of the carcass, a photograph, and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The Station shall endeavor to place the remains of intact desert tortoises with educational or research institutions holding the appropriate State and Federal permits per their instructions. If such institutions are not available or the shell has been damaged, the information noted above shall be obtained and the carcass left in place. The Station should consider marking the carcass in a manner that would not be toxic to other wildlife to ensure that it would not be re-recorded in the future.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution by the Station prior to implementation of the action. Injured animals should be transported to a qualified veterinarian. Should any treated desert tortoises survive, the Service should be contacted regarding the final disposition of the animals.

Conservation Recommendations

In furtherance of the purposes of the Endangered Species Act (sections 2 c and 7(a)(1)) that mandate Federal agencies to utilize their authorities to carry out programs for the conservation of listed species, we recommend implementing the following actions:

1. The Station should instruct all personnel in the appropriate procedures to follow if a desert tortoise is encountered on a road where it may be at risk from vehicle traffic. They should also be advised that these procedures may also be followed when traveling outside of Navy lands.

2. The Station should consider cooperating with the Bureau of Land Management (Bureau) in monitoring common raven use within the Station. The Bureau's Desert District Office in Riverside may be able to provide the Station with standard raven monitoring techniques.

3. The Station should attempt to coordinate any enhancement or restoration of desert tortoise habitat that is adjacent to public lands with the Bureau to maximize the beneficial effects of both agencies' efforts.

4. The Station should investigate methods of restoring disturbed habitat to more natural conditions if it can be determined that the disturbed area is unlikely to be used for future activities. Regarding restoration efforts, the Station may wish to contact Dr. Jerry Freilich of Joshua Tree National Park at (619) 347-4528. Joshua Tree National Park has implemented restoration efforts at numerous locations within its boundaries.

The Service requests notification of the implementation of any conservation recommendations so we can be kept informed of actions that either minimize or avoid adverse effects, or that benefit listed species or their habitats.

Conclusion

This concludes the reinitiation of formal consultation on the proposed Desert Tortoise Habitat Management Plan for the Station at China Lake. Reinitiation of formal consultation is required if: 1) the amount or extent of incidental take is reached; 2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this biological opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16). Any questions or comments should be directed to Kirk Waln at the Ventura Field Office at (805) 644-1766.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

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Appendix F

Draft Programmatic Agreement for Cultural Resources

APPENDIX F - DRAFT PROGRAMMATIC AGREEMENT

Draft Programmatic Agreement among the United States Navy, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding Ongoing and Evolving Military Operations and Cultural Resources Management Programs at the Naval Air Weapons Station, China Lake, California

Whereas, the United States Navy (Navy) has determined that the proposed implementation of the Comprehensive Land Use Management Plan (CLUMP) at the Naval Air Weapons Station (NAWS) China Lake may have an effect on historic properties listed or eligible for listing in the National Register of Historic Places (NRHP). Implementation of the CLUMP (Attachment A) includes ongoing and proposed increases to established and evolving military research and development, test and evaluation, training activities; operations, maintenance and construction activities; the implementation of the Integrated Cultural Resources Management Plan (ICRMP) (Attachment B), and other environmental resource management initiatives (the Undertaking); and

Whereas, the Navy has consulted with the Advisory Council on Historic Preservation (Council) and the California State Historic Preservation Officer (SHPO) according to the regulations at 36 CFR Part 800 (64 FR 27071-27084) implementing Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470f); and

Whereas, the Navy, with the concurrence of the Council and the SHPO, intends to facilitate its compliance with Section 106 of the NHPA for the Undertaking through the execution and implementation of this Programmatic Agreement (PA) because the Navy (1) cannot fully determine the effects of the Undertaking on historic properties (36 CFR Part 800.14 (b)(1)(ii); (2) will implement certain routine historic properties management activities ((36 CFR 800.14(b)(1)(iv); (3) will further identify properties eligible for inclusion in the NRHP (historic properties); and (4) will determine the effects of the Undertaking on historic properties, and take into account the effects of the Undertaking on historic properties by implementing an Integrated Cultural Resources Management Plan that constitutes a departure from the normal Section 106 process (36 CFR 800.14(b)(1)(v); and

Whereas this PA does not replace previous agreements, i.e., Programmatic Memorandum of Agreement Between The Commander, Naval Weapons Center, California State Historic Preservation Officer, and Advisory Council on Historic Preservation for the preservation and protection of historic and cultural property that may be affected by the Navy Geothermal Development Program (1979) and Memorandum of Agreement among the Commander Naval Weapons Center, the Owens Valley Paiute-Shoshone Band of Indians, and the Kern Valley Indian community for access to the Coso Hot Springs); and

Whereas, the Navy has consulted with the SHPO in accordance with 36 CFR 800.6(a), notified the Council in accordance with 36 CFR 800.6(a)(1)(C) and will execute this PA with Council's participation in accordance with 36 CFR 800.14(b)(2)(iii) and

Whereas, the Indian Tribes who have traditionally inhabited or used the lands within NAWS China Lake have been identified and have been given the opportunity to participate in the development of this Agreement, ICRMP, and CLUMP, and will continue to be provided the opportunity to participate in the review, revision, and updating of the ICRMP; and whereas these Indian Tribes have also been invited to participate in the development of NAWS' Native American Consultation Protocols and to concur in this PA in accordance with 36 CFR 800.2 as an element of the NAWS' proposed CLUMP implementation.

Now therefore, the Navy, the Council, and the SHPO agree that the Undertaking shall be implemented in accordance with the following stipulations to satisfy the Navy's NHPA Section 106 and Section 110 (16 U.S.C. 470h-2) responsibilities for all individual actions included in the Undertaking.

Stipulations

To the extent of its legal authority and in coordination with the Council and SHPO, NAWS China Lake shall ensure that the following stipulations are carried out:

1.0 Applicability

The undertaking to which this PA pertains involves the administration of military activities and environmental resources management programs within the 1.1 million-acre NAWS installation at China Lake. NAWS China Lake is located in the upper Mojave Desert of California, approximately 150 miles northeast of Los Angeles (see Appendix 1). NAWS ranges extend over 1.1 million acres and are in an ecological transition zone between the Basin and Range and the Mojave Desert Provinces.

The Navy's mission at China Lake is the operation and maintenance of the full-spectrum research, development, test and evaluation center for weapons systems associated with air warfare, aircraft weapons integration, and electronic warfare systems. The China Lake ranges support a wide range of air and ground operations for air warfare test and training and other defense related activities. NAWS is also entrusted with the stewardship of the environmental resources at China Lake and is responsible for the conservation and protection of resources present on these lands. This PA applies to all aspects of the NAWS undertaking as defined in the CLUMP and ICRMP.

2.0 Implementation and Professional Standards

2.1 The Commanding Officer, NAWS China Lake, shall designate a point-of-contact at NAWS China Lake with the authority to implement this PA on the Commanding Officer's behalf and to conduct the stipulated coordination and consultation with other signatories, concurring parties, Tribes, and other concerned agencies, organizations, and persons.

2.2 The historic preservation program prescribed in the ICRMP shall be implemented under the direct supervision of a person or persons meeting at a minimum the Secretary of Interior's *Professional Qualifications Standards* (48 FR 44738-44739) in the appropriate disciplines. This stipulation shall not, however, preclude the Navy or any agent thereof from using persons when under the supervision of people who meet the *Professional Qualification Standards*.

2.3 The historic preservation program prescribed in the ICRMP shall be implemented in accordance with the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation.

3.0 Definitions

The definitions found at 36 CFR 800.16 apply throughout this PA.

4.0 Draft Integrated Cultural Resources Management Plan (ICRMP)

4.1 NAWS China Lake shall implement its ICRMP, which details NAWS China Lake's Historic Preservation Program to inventory, manage, and treat historic properties as outlined in Attachment B.

4.2 A preliminary draft ICRMP was prepared and submitted to the SHPO, the Council, and the Tribes for review and comment. Review comments have been fully considered and have been appropriately incorporated into the draft ICRMP. The draft ICRMP will be mailed to SHPO, Council, and Tribes via registered or certified mail for their review and comment.

4.3 Upon written agreement by the SHPO, and the Council, and in concurrence with the Tribes, the final ICRMP will be implemented under authority of this PA as the NAWS China Lake Historic Preservation Program for compliance with NHPA Section 106 and Section 110 for all actions or programs within the scope of the ICRMP and the CLUMP. The scope of the ICRMP is defined as the entire NAWS China Lake installation. The Area of Potential Effect (APE) for individual undertakings shall be determined on a project-by-project basis and as defined by the baseline land use patterns presented in the CLUMP.

5.0 Annual Review and Reporting

5.1 Implementation of the ICRMP will be monitored by the SHPO, the Council, the Tribes, and other interested parties through the *Annual NAWS China Lake Historic Preservation Compliance Report* (Annual Report) as prescribed in the ICRMP. The Annual Report shall include a complete summary of all actions taken at NAWS China Lake that pertain to cultural resources; changes, deletions, or additions that may have occurred during the reporting year; status report of implementation of planned actions as stated in the ICRMP, and a revised timeline for implementation of the ICRMP. The Annual Report shall cover the Fiscal Year, from October to October. It will be made available to signatories, consulting parties, and other interested parties in December of the same year.

5.2 Should NAWS China Lake determine that a change to the ICRMP is warranted in order to modify, add, or delete certain element(s) of the Historic Preservation Program, NAWS China Lake will give notice and consult in writing with the SHPO, to determine if the proposed change constitutes a significant revision of the NAWS China Lake Historic Preservation Program. The SHPO shall have 30 days to respond in writing to NAWS China Lake's proposed change(s) to the ICRMP. If the SHPO concurs that a proposed change does not constitute a significant revision to the ICRMP, the NAWS shall proceed to revise and implement the appropriate elements of the plan. If the SHPO believes the proposed change to the ICRMP is a significant revision to NAWS China Lake Historic Preservation Program, the signatories shall proceed to consult according to Stipulation 8.0 of this PA. Should the SHPO object regarding a proposed change to the ICRMP, the parties shall proceed according to Stipulation 7.0 of this PA.

When the Annual Report is sent to all signatories, consulting parties, and other interested parties, if any signatory or consulting party wishes to change (add, delete, or modify) any part of NAWS Historic Preservation Program as defined by the ICRMP, notice in writing will be made to NAWS China Lake who will then notify in writing all parties. All parties will have 30 days in which to comment. If there is concurrence among all parties, the change under review will be made to the ICRMP at that time. If there is disagreement among the parties, procedures outlined in Section 9.0 Resolving Objections will be followed. All revisions to the ICRMP will be included in the following Annual Report.

6.0 NHPA Section 106 Compliance Before Implementation of the ICRMP

6.1 Until the ICRMP accepted by the SHPO and Council, NAWS China Lake shall complete Section 106 review for each undertaking in accordance with 36 CFR 800.4 through 800.6.

6.2 In the event that unrecorded or unanticipated properties that may be eligible for inclusion in the National Register are located during any test or training event, or maintenance or construction activity, NAWS China Lake will immediately terminate actions in the vicinity of the property. NAWS will then determine the geographic bounds of the property, and will take all reasonable measures to avoid or minimize harm to the property until consultation with the SHPO regarding the eligibility and effects of the Undertaking can be determined.

6.3 NAWS China Lake will notify the SHPO at the earliest possible time, and consult to develop and implement actions that will resolve any adverse effect of the undertaking consistent with 36 CFR 800.6(b). NAWS China Lake will notify the SHPO of any time constraints, and NAWS and the SHPO will mutually agree upon time frames for consultation.

6.4 NAWS will also comply with all other appropriate Federal laws and regulations (e.g., Native American Graves Protection and Repatriation Act (25 U.S.C 3001), Archaeological Resources Protection Act (16 U.S.C. 470aa-470mm), etc.) that apply in discovery situations.

7.0 Native American Consultation Protocols

NAWS China Lake will develop consultation procedures (protocols) in cooperation with participating tribes to establish uniform methods and procedures for meeting Native American consultation requirements as specified in 36 CFR 800. Native American consultation protocols, when finalized, will be incorporated as an Appendix of the ICRMP.

8.0 Public Involvement

NAWS China Lake will involve the public in the review of this PA and the draft ICRMP as an element of the environmental review process for the CLUMP and its associated Draft Environmental Impact Statement (DEIS). The CLUMP is undergoing public review using the Navy's public involvement procedures in accordance with the National Environmental Policy Act (NEPA). The DEIS evaluates the potential effects on eligible historic properties that may result from implementing the alternative actions being proposed by NAWS. Copies of the PA will be incorporated in the appendix of the DEIS and copies of the Draft ICRMP will be made available for public review by being placed in four public repositories (libraries) throughout the China Lake area.

9.0 Resolving Objections

9.1 Should any signatory to this PA or any Native American consulting party object at any time, to the manner in which the terms of this PA are implemented, or to any documentation prepared in accordance with and subject to the terms of this PA, NAWS will immediately notify the other signatories of the objection, request their comments on the objection within 14 days following receipt of NAWS notification, and then proceed to consult with the objecting party for no more than 30 days to resolve the objection. NAWS will honor the request of any other signatory to participate in the consultation and will take any comments provided by the other signatories into account. If at the end of the 30-day consultation period, NAWS determines that the objection cannot be resolved through such consultation, NAWS will:

> Forward all documentation relevant to the objection to the Council in accordance with 36 CFR 800.2(b)(2). Any comments provided by the Council within 30 days after its receipt of all relevant documentation, and all other comments received, will be taken into account by NAWS in reaching a final decision regarding the objection. NAWS will notify all signatories and Native American consulting parties in writing of its final decision within 14 days after it is rendered. NAWS shall have the authority to make the final decision resolving the objection.

9.2 NAWS' responsibility to carry out all other action under this PA that are not the subject of the objection will remain unchanged. NAWS may implement that portion of the Undertaking subject to objection under this stipulation after complying with either subsection 8.1(a) or 8.1(b) of this stipulation.

9.3 At any time during implementation of the terms of this PA should an objection pertaining to the PA or ICRMP be raised by a member of the public, NAWS shall immediately notify the other signatories in writing of the objection and take the objection into account. NAWS shall consult with the objecting party and, if the objecting party so requests, with any or all of the other signatories, for no more than 30 days. Within 14 days following closure of this consultation period, NAWS will render a decision regarding the objection and notify all parties of its decision in writing. In reaching its final decision, NAWS shall have the authority to make the final decision resolving the objection. Any dispute pertaining to the NRHP eligibility of cultural resources covered by this PA will be addressed by NAWS in accordance with 36 CFR 800.4(2).

10.0 Amendments, Non-compliance and Termination

10.1 If any signatory believes that the terms of this PA are not being honored or cannot be carried out, or that an amendment to its terms should be made, that signatory will immediately consult with the other signatories to consider and develop amendments to this PA in accordance with 36 CFR 800.4.(7) and 800.6.(8).

10.2 If this PA is not amended as provided for in this stipulation, NAWS or the SHPO, or the Council may terminate this PA. The party terminating this PA will provide all other signatories with a written explanation of the reasons for termination.

10.3 If this PA is terminated and NAWS determines that the Undertaking will proceed, NAWS shall comply with 36 CFR 800.14(b)(20(v).

11.0 Duration of the PA

11.1 The signatories shall consult to reconsider the terms of this PA within five (5) years of the date this PA is executed, and subsequently every five (5) years after each date of execution of a renewal of this PA. Reconsideration may include continuation of the PA as originally executed, as amended, or termination.

11.2 This PA will be in effect through NAWS implementation of the Undertaking, and will terminate and have no further force or effect when NAWS, in consultation with the other signatories, determines that the terms of this PA have been fulfilled in a satisfactory manner. NAWS will provide the other signatories with written notice of its determination and of termination of this PA.

11.3 If the administration of all or part of the NAWS China Lake installation is transferred to another military service, or government agency, or if the property is disposed of by the United States, this PA and ICRMP shall be considered null and void and shall have no other force or effect.

12.0 Anti-Deficiency Act

All requirements set forth in this PA requiring expenditure of NAWS funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. Section 1341). No obligation undertaken by NAWS under the terms of this PA shall be interpreted to require a commitment to expend funds not appropriated for a particular purpose. If NAWS cannot perform any obligation set forth in this PA because of unavailability of funds, that obligation must be renegotiated among NAWS, the SHPO, and Council.

13.0 Effective Date

This PA shall take effect on the date that it has been fully executed by NAWS, the SHPO, and the Council.

Execution of this PA by NAWS, the SHPO, the Council, and subsequent implementation of its terms, evidence that NAWS has afforded the Council a reasonable opportunity to comment on the Undertaking and its effects on historic properties that NAWS has taken into account the effects of the Undertaking on historic properties, and that NAWS has satisfied its responsibilities under Section 106 of the NHPA and applicable implementing regulations for all aspects of the Undertaking.

Signatory Parties

United States Navy Commanding Officer, NAWS China Lake

California SHPO

ACHP

Concurring Parties

The following Tribal entities have been invited to participate in this Programmatic Agreement as concurring parties. The following list is provided in alphabetical order:

Advisory Council California Indian Policy
P.O. Box 168
Kernville, CA 93238

Chairperson, Benton Paiute Reservation
Star Route 4, Box 56-A
Benton, CA 93512

Chairperson, Big Pine Reservation
P.O. Box 700
Big Pine, CA 93513

Chairperson, Bishop Reservation
P.O. Box 548
Bishop, CA 93515

Chairperson, Bridgeport Indian Colony
P.O. Box 37
Bridgeport, CA 93517

Chairperson, Fort Independence Reservation
P.O. Box 67
Independence, CA 93526

Chairperson , Lone Pine Paiute Shoshone Community Council
P.O. Box 747
Lone Pine, CA 93545

Chairperson, Timbi-sha Shoshone Tribe
P.O. Box 206
Death Valley, CA 92328

Appendix G

Hazardous Materials and Wastes

Table G-1
Hazardous Waste Accumulation Areas

Location	Type
Maintenance Garage – Murray Jr. High	90-day
GSE - Naval Air Facility	Satellite
GSE – Oil/Water Separator	90-day
COSO - Geothermal	90-day
Lower Baker	Satellite
CT-4	90-day
CT-1	90-day
Building 70003 – Echo Range	90-day
Building 70134 – Superior Valley	Satellite
Building 32557 – IOB	90-day
Building 32557 – IOB	Satellite
Building 31999 – SNORT	Satellite
Building 31501 – Area R	Satellite
Building 31501 – Area R	Satellite
Building 31487	90-day
Building 31175/31167 – WSL	90-day
Building 31144 – SNORT	90-day
Building 31053 - Main Magazine	Satellite
Building 31044 – Main Magazine	Satellite
Building 30994 – EOD	Satellite
Building 20200 – Ordnance Assembly	Satellite
Building 20001 - Hangar 1 - Flightline	90-day
Building 20000 – Hangar 3 (Outside)	90-day
Building 20000 – Hangar 3 (Inside)	Both
Building 20000 – Hangar 3 (Inside)	Satellite
Building 16183 – CLPL	Satellite
Building 16161	Satellite
Building 16111 - Skytop	90-day
Building 16082	Satellite

Table G-1
Hazardous Waste Accumulation Areas *(continued)*

Location	Type
Building 16015 – Skytop	Satellite
Building 15987 – SWPL	Satellite
Building 15980 – Tank	90-day
Building 15955 – SWPL	Satellite
Building 15955 – SWPL	90-day
Building 15950 – Tank	90-day
Building 15810 – Tank	90-day
Building 15741/2 – Tank	90-day
Building 15714 – SWPL	Satellite
Building 15709 – SWPL	Satellite
Building 15702 – Tank	90-day
Building 15702 – SWPL	Satellite
Building 15700 – SWPL	90-day
Building 15590 – Tank	90-day
Building 15574 – SWPL	Satellite
Building 15574 – SWPL	Satellite
Building 15568 – SWPL	Satellite
Building 15560 – SWPL	90-day
Building 15530 – Tank	90-day
Building 15520 – Tank	90-day
Building 15510 – SWPL	Satellite
Building 13110 – CLPL	90-day
Building 13100 – Tank	90-day
Building 13060 – Tank	90-day
Building 12537 – SWPL	Satellite
Building 12528 – SWPL	Satellite
Building 12050 – Skytop	Satellite
Building 11680 – SWPL	Satellite

Table G-1
Hazardous Waste Accumulation Areas *(continued)*

Location	Type
Building 11550 – SWPL	90-day
Building 10972 – CLPL	Satellite
Building 10690 – CLPL	Satellite
Building 10657 – CLPL	Satellite
Building 10631 – CLPL	Satellite
Building 10584 – CLPL	Satellite
Building 10582 – CLPL	Satellite
Building 10566 – CLPL	Satellite
Building 10181 – CLPL	90-day
Building 10082 – CLPL	Satellite
Building 10081 – CLPL	Satellite
Building 10080 – CLPL	Satellite
Building 10080 – CLPL	Satellite
Building 03882 – Chemistry Wing	90-day
Building 02631/2 – Golf Course	Satellite
Building 02612 – PW	90-day
Building 02612 – PW	Satellite
Building 02602 – Auto Hobby Shop	90-day
Building 01403 – Medical Clinic	Satellite
Building 00984 – PW Transportation	90-day
Building 00018 – Retail Shop	90-day
Building 00005 - Machine Shop	90-day
Auto Hobby Shop – O/W Separator	90 day
Building 01403	Satellite
Ground Operations	Satellite
Junction Ranch	90-day
FFTF – Fuel/Water Separator	90-day
HWSTF – Next to Trailer	90-day

Table G-1
Hazardous Waste Accumulation Areas *(continued)*

Location	Type
HWSTF – Non-RCRA Bins	90-day
IOB – Oil/Water Separator	90-day
K2 – Fuel/Water Separator	90-day
Main Magazines – All	90-day
Minideck – Fuel/Water Separator	90-day
WSL – Large Fuel/Water Separator	90-day
WSL – Small Fuel/Water Separator	90-day
GSE – Oil/Water Separator	90-day
Auto Shop at High School	90-day

Table G-2
List of Tier-Permitted Treatment Units

Tier	Unit ID	Description
ACTIVE UNITS		
Conditional Exemption	CRUSHER1	Drum Crusher at HWSTF
Conditional Authorization	570B-ACID	Acid Neutralization - Bldg 1570B
Permit by Rule	PHOTO2	Photo Lab-Sliver Recovery/Distillation

Table G-3
Summary of NAWS China Lake Installation Restoration Program Sites

Site	Site Name	Cause of Contamination	Medium	Status*
1	Armitage Airfield Dry Wells (Building 20023)	Substandard jet fuel was disposed of into dry wells	Soil, possible ground water	Removal & RI/FS
2	Aircraft Washdown Drainage Ditches - Armitage Airfield	Used engine fluids and solvents from maintenance activities were discharged into an unlined ditch	Soil, ground water	RI/FS
3	Armitage Airfield Leach Pond	Sanitary and industrial waste from airfield operations were discharged into an evaporation/ leach pond	Ground water, soil	RI/FS
4	Beryllium-Contaminated Equipment Disposal Area	Beryllium-contaminated equipment and structures were burned and buried	Soil	NFA
5	Burro Canyon Open Burning/Open Detonation (Building 32529)	Propellant, Explosive and Pyrotechnic (PEP) and some non-PEP materials	Air, soil	NFA
6	T-Range Disposal Area	Disposal of PEP materials and contaminated trash by open burning; residual wastes were buried in unlined trenches	Air, soil	Removal
7	Michelson Laboratory Drainage Ditches (Building 00005)	Acid and chemical wastes were discharged into unlined ditches	Soil, ground water	RI/FS
8	Salt Wells Drainage Channels	Chemical waste waters were discharged into natural drainage channels	Soil, possibly ground water	RI/FS
9	Salt Wells Asbestos Trenches	Asbestos from various Station activities was disposed of in three slit trenches	Soil	NFA
10	Salt Wells Disposal Trenches	Solid and liquid wastes from Salt Wells labs were disposed of in ten slit trenches	Soil	NFA
11	China Lake Propulsion Labs (CLPL) Evaporation Ponds (Buildings 10570 and 10580)	Wastewater from PEP machining operations was discharged into unlined ponds	Ground water, soil	NFA
12	SNORT Road Landfill	Old gravel quarry was filled with hazardous and non-hazardous wastes from various activities	Soil, ground water	RI/FS
13	Oily Waste Disposal Area (Water Road)	Waste oils from maintenance activities and grease traps were disposed of in two slit trenches	Soil, ground water	RI/FS & removal
14	ER Range Septic System (Buildings 31434, 31440, 31433, and 31439)	Lab and sanitary waste from five septic tanks were disposed of through leach lines	Soil, ground water	NFA

Table G-3
Summary of NAWS China Lake Installation Restoration Program Sites *(continued)*

Site	Site Name	Cause of Contamination	Medium	Status*
15	R-Range Septic System (Water Road) (Buildings 31434, 31440, 31433, and 31439)	Industrial and sanitary wastes from a lab were discharged to a surface ditch and leach field	Soil, ground water	RI/FS
16	G-1 Range Septic System (Building 30881)	Sanitary and lab wastes were disposed of through leach lines	Soil, ground water	NFA
17	G-2 Range Septic System (Building 30994)	Sanitary, explosive, and photo lab wastes were disposed of through leach lines	Soil, ground water	NFA
18	CLPL Leach Fields (Buildings 11050, 13040, and 14000)	Sanitary and industrial wastes, including PEP and photo lab wastes, were disposed of in leach fields	Soil	RI/FS
19	Baker Range Waste Trenches	Miscellaneous range wastes were disposed of in one large slit trench	Soil	NFA
20	Division 36 Ordnance Waste Area	Miscellaneous range wastes were disposed of in two slit trenches	Soil	NFA
21	CT-4 Disposal Area	Hazardous wastes from weapons testing were disposed of in a slit trench	Soil	NFA
22	Pilot Plant Road Landfill	Wastes from Navy housing and Public Works were disposed of in 12 trenches	Soil, ground water	RI/FS
23	K-2 South Disposal Area	Range wastes and possibly chlordane were disposed of in three slit trenches	Soil	NFA
24	K-2 North Disposal Area	Range wastes were disposed of in two slit trenches	Soil	NFA
25	G-2 Range Disposal Area	Miscellaneous range wastes were disposed of in three slit trenches	Soil	NFA
26	G-2 Range Ordnance Waste Area	Miscellaneous range wastes were disposed of in two slit trenches	Soil	NFA
27	NAF Disposal Site	Solid and liquid wastes from aircraft operations were disposed of in two slit trenches	Soil, ground water	NFA
28	Old DPDO Storage Yard	Possible spills of PCBs from leaking transformers; no evidence of spills found	Soil	NFA
29	C-1 Range East Disposal Area	Range wastes, chlordane and possibly unexploded ordnance were disposed of in three trenches	Soil	RI/FS

Table G-3

Summary of NAWS China Lake Installation Restoration Program Sites *(continued)*

Site	Site Name	Cause of Contamination	Medium	Status*
30	C-1 Range West Disposal Area	Range wastes and possibly unexploded ordnance were disposed of in two trenches	Soil	NFA
31	Public Works Pesticide Rinse Area	Pesticide- and herbicide-contaminated rinse waters were spilled on the ground	Soil	RI/FS & removal
32	Golf Course Pesticide Rinse Area (Building 02333)	Pesticide- and herbicide-contaminated rinse waters were spilled on the ground	Soil	RI/FS & removal
33	Michelson Lab Dry Wells (Building 00005)	Small amounts of fluid from pack-up power batteries were spilled or drained into dry wells	Soil, possible ground water	RI/FS
34	Lauritsen Road Landfill	Inert and hazardous wastes were disposed of in several large trenches	Soil	NFA
35	SNORT Track Accident	A small amount of beryllium-contaminated materials were buried at this site	Soil	NFA
36	SNORT Storage Sheds (Buildings 20100, 25008, 25009, 25028, and 25021)	Several small spills of hazardous materials occurred in small storage sheds	Soil	NFA
37	Golf Course Landfill	Waste from the general China Lake community was disposed of in this small landfill	Soil	NFA
38	Cactus Flat Disposal Trenches	Wastes from special test programs were disposed of in two small trenches	Soil	NFA
39	CGEH-1 Geothermal Waste	Drilling mud and oil wastes were disposed of in an open pit	Soil	NFA
40	Randsburg Wash #1 (South Range)	Range wastes were disposed of in three slit trenches	Soil	NFA
41	Randsburg Wash #2 (South Range)	General and hazardous wastes were disposed of in two large pits	Soil	NFA
42	Randsburg Wash #3 (South Range)	One-time disposal of 30 drums of fuel, which was burned in the drums	Soil	NFA
43	Minideck (Building 31164)	Firefighting chemicals and unburned jet fuel were discharged into an unlined pond	Ground water, soil	RI/FS
44	Armitage Field Fire Fighting Training Area	Firefighting chemicals and unburned jet fuel spilled off the paid and several pits were used for disposal of fuels	Soil	RI/FS

Table G-3
Summary of NAWS China Lake Installation Restoration Program Sites *(continued)*

Site	Site Name	Cause of Contamination	Medium	Status*
45	NAF Maintenance Area	Aircraft maintenance wastes were disposed of in an unlined ditch	Soil	RI/FS
46	Dunkit Drainage Ditch (Building 15950)	Wastewater and chemicals from rocket motor casing cleaning were discharged into an unlined ditch.	Soil	RI/FS
48	Weapons Survivability Holding Ponds (Bldg. 31169, 73118 and 31179)	Petroleum hydrocarbons	Soil	NFA
47	Michelson Lab Sewer System (Building 00005)	Industrial wastewater from the Public Works compound and Michelson Lab were discharged to lined ponds	Ground water	Removal & RI/FS
49	Salt Wells Propulsion Lab Industrial Waste Ponds and Sumps	Rinse water from various activities involved in propellant and explosive research was disposed of in ponds and sumps	Ground water, soil	Removal
50	Airplane Oil Disposal Trench (Buildings 20220 and 20250)	Waste engine oil was disposed of in a trench	Soil	Removal
51	Area R East (Building 31531)	Vehicle maintenance, hazardous materials storage and inert waste disposal trenches may have resulted in ground contamination	Soil	Removal
52	Area R Warhead Firing Arena (Building 31588)	No evidence of waste disposal	None	NFA
53	Area R Laser Lab Leachline (Building 31516)	Sanitary wastes were disposed of in a leach field	Soil	NFA
55	Area R Solvent Rinse Tank and Vicinity (Buildings 31503, 31504, and 31562)	Contaminated fluids may have escaped from the solvent rinse tank	Soil	RI/FS
56	Area R Static Firing Rocket Test Stands (Buildings 31505, 31568, 31569, and 31615)	Mercury, and possibly acids, bleaches, and unidentified chlorinated solvents were released during the test firings of liquid propellant rockets	Air, soil	Removal
57	Area R Warhead Research Pit (Building 31600)	Construction debris was dumped in this area	Soil	NFA
58	Armitage Field VX-5 Line Shack Storage Area (Building 00031)	Asphalt appears contaminated from the storage of hazardous hydraulic fluid, oil, jet fuel and solvents	Soil	Removal

Table G-3
Summary of NAWS China Lake Installation Restoration Program Sites *(continued)*

Site	Site Name	Cause of Contamination	Medium	Status*
59	B-2 Spotting Tower 3 Quonset Hut (Buildings 30069 and 30072)	Area was used as a storage yard for the aircraft tire and brake shop	Soil	NFA
60	B-2 Spotting Tower 3 Quonset Hut (Buildings 30069 and 30072)	Range wastes may have been dumped in this area	Soil	NFA
61	B-3 Tower Dump	Range wastes were disposed of in a small trench	Soil	NFA
62	B-4 Start-Up Area (Buildings 30144 and 30145)	Wastewater from range operations was discharged to a septic system and dry well	Soil, possible ground water	Removal
63	Dempsey Dumpster Station	Rinse water from dumpster cleaning	Soil	NFA
64	Earth & Planetary Sciences Leach Fields (Buildings 31567 and 31568)	Industrial wastewater was discharged to a septic system	Soil	RI/FS
65	G-2 Range Gun Mounts (Near Building 30964)	Guns were cleaned in the area	Soil	NFA
66	HANS Test Site (Building 32543)	Jet fuel was used in burn tests on composite materials, especially carbon fibers	Soil	NFA
67	Flightlines Lane Haven Dump	Solid waste from a mobile home park was disposed of in this area	Soil	NFA
68	Public Works Old PCB Transformer Storage Area	Possible PCB leakage	Soil	NFA
69	Public Works Vehicle Paint Shop & Drainage Catch Basin (Buildings 00576 and 02664)	Contaminants from Public Works paint shop activities, such as paint and solvents, drained into the surface runoff collection basin	Ground water, soil	RI/FS
70	Public Works Tank Truck Dry Well (Buildings 01088 and 02622)	Although this facility was constructed for de-fueling tanker trucks, there is no evidence that it was used for this purpose, but it was used for washing trucks	Soil, possible ground water	RI/FS
71	Public Works Heavy Duty Equipment Repair Shop Storage Area	Hazardous materials stored in this area may have spilled or leaked	Soil	NFA
72	Railroad Engine House (Building 1055)	Waste oil from diesel locomotives was discharged into a concrete-lined pit that drained into a dry well	Soil, possible ground water	RI/FS

Table G-3

Summary of NAWS China Lake Installation Restoration Program Sites *(continued)*

Site	Site Name	Cause of Contamination	Medium	Status*
73	Randsburg Wash Black Powder Assembly Building (Building 7007) (South Range)	Wastewater from black powder handling activities may have been discharged into floor drains	Soil	NFA
74	Randsburg Wash Central Site Old Leach Field (Buildings 70001, 70002, 70003, 70004, 70005, and 70006) (South Range)	Industrial wastewater from a photo lab, and maintenance and machine shops was discharged to a septic system	Soil	NFA
75	Randsburg Wash Gas Station (Building 70005) (South Range)	Vehicle maintenance activities	Soil	NFA
76	Randsburg Wash Gun Line (Buildings 70024, 70025, and 70031) (South Range)	Gun cleaning operations	Soil	NFA
77	Sludge Pit (Water Road)	Road oil was disposed of in a pit	Soil	NFA
78	SNORT Old Photographic Lab Sumps (Building 25010)	Photo processing wastes were discharged to a sump	Ground water, soil	NFA
80	POI small locations	Various operation activities	Soil	PA

Notes:

In preparing this table, Site 79 was erroneously included. Initial investigations at Site 79 performed between 1999 and 2000 found that no releases of hazardous substances occurred, only the use of ordnance for its intended purpose. The site has been removed from the Installation Restoration Program and instead will continue to be managed as an active range.

*Removal = recommended for interim removal actions
RI = Remedial Investigation
FS = Feasibility Study
NFA = Navy recommendation for no further action subject to approval by the state agencies
PA = Preliminary Assessment

Table G-4
Current Underground Fuel Storage Tanks

Tank ID	Gallons	Contents	Construction Type	Status	Comments
Kern 1-1R	550	Diesel	Double Wall	In use	Meets current requirements
Kern 4-21R	12,000	Unleaded	Double Wall	In use	No further action
Kern 4-22R	12,000	Unleaded	Double Wall	In use	No further action
Kern 5-4	10,000	Diesel	Double Wall	In use	No further action
Kern 5-5	20,000	Gasoline	Double Wall	In use	No further action
Kern 6-1	6,000	JP-8	Double Wall	In use	No further action

Table G-5
Above-ground Liquid Fuel Storage Tanks

Bldg. No.	Location	Gallons	Contents	Status
20242	Hangar 4 Emergency Generator	70	Diesel	In use
14050	Pump Station	100	Diesel	In use
	Junction Ranch So. 40 Generator	110	Diesel	In use
20007	Boiler Plant 3 Emerg Generator	140	Diesel	In use
20007	Boiler Plant 3 Pump #1	140	Diesel	In use
20007	Boiler Plant 3 Pump #2	140	Diesel	In use
20007	Boiler Plant 3 Pump #3	140	Diesel	In use
20007	Boiler Plant 3 Pump #4	140	Diesel	In use
20007	Boiler Plant 3 Pump #5	140	Diesel	In use
16096	Skytop	200	Diesel	In use
16097	Skytop	200	Diesel	In use
02329	Golf Course	250	Diesel	In use
20214	NAF Gas Station	250	Diesel	In use
20242	Hangar 4 Pump #1	300	Diesel	In use
20242	Hangar 4 Pump #2	300	Diesel	In use
20242	Hangar 4 Pump #3	300	Diesel	In use
00585	Sewage Plants Operations	300	Diesel	In use
01389	Fuel/Oil Separator	400	Fuel Oil	In use
00984	Public Works Compound	500	Waste Oil	In use
01341	Shelter Generator	500	Diesel	In use
01342	Public Works Compound	500	Waste Oil	In use
20214	GSE Maintenance Building	500	JP-8	In use
20286	Aircraft Fuel Storage Facility	500	Diesel	In use
31408	Balloon Storage	500	Unlabeled	Inactive
00583	Admin Generator	550	Diesel	In use
50119	Well #15	550	Diesel	In use
01103	Water Tank	550	Diesel	In use
00001	Administration Generator	550	Diesel	In use
02329	Golf Course	700	Gasoline	In use
25002	SNORT Range	700	Gasoline	In use
	Junction Ranch Vehicle Fueling	700	Gasoline	In use

Table G-5
Above-ground Liquid Fuel Storage Tanks *(continued)*

Bldg. No.	Location	Gallons	Contents	Status
70155	NATO Communication Site	750	Diesel	In use
01403	Dispensary/Dental Clinic	1,000	Diesel	In use
16157	Skytop	1,000	Diesel	In use
32557	Generator Shop South of IOB	1,000	Diesel	In use
32571	IOB Gas Station	1,000	Diesel	In use
70156	Superior Valley	1,000	Diesel	In use
31218	Aircraft Survivability	1,400	Waste Oil	In use
01389	HAZWAS Facility # 1	2,000	Waste Oil	In use
01389	HAZWAS Facility # 2	2,000	Waste Oil	In use
01389	HAZWAS Facility # 3	2,000	Waste Oil	In use
01389	HAZWAS Facility # 4	2,000	Waste Oil	In use
	Aircraft Survivability	2,000	Waste Oil	In use
	South Range Central Site	2,000	Diesel	In use
	Aircraft Survivability at K-2	2,000	Waste Fuel	In use
11030	CLPL Gas Station	2,000	Gasoline	In use
70120	South Range Central Site	2,000	Gasoline	In use
70134	Superior Valley	3,000	Diesel	In use
20198	NAF Drone Facility	3,500	10/10 Oil	In use
	Skytop	4,000	Diesel	In use
20286	Aircraft Fuel Storage Facility (tank 1)	4,000	JP-8	In use
20286	Aircraft Fuel Storage Facility (tank 2)	4,000	JP-8	In use
20209	Fire Fighting Training Pad	5,000	Waste JP-8	In use
20243	Fire Fighting Training Pad	5,000	Waste JP-8	In use
20244	Fire Fighting Training Pad	5,000	Waste JP-8	In use
32571	IOB Gas Station	6,000	Gasoline	In use
20216	NAF Gas Station	10,000	Gasoline	In use
31220	Aircraft Survivability (tank 1)	10,000	JP-5/JP-8	In use
31220	Aircraft Survivability (tank 2)	10,000	JP-5/JP-8	In use
01197	Public Works Bulk (tank 1)	12,000	Diesel	In use

Table G-5
Above-ground Liquid Fuel Storage Tanks *(continued)*

Bldg. No.	Location	Gallons	Contents	Status
01197	Public Works Bulk (tank 2)	12,000	Diesel	In use
01197	Public Works Bulk	12,000	Gasoline	In use
20286	Aircraft Fuel Storage Facility (tank 1)	200,000	JP-8	In use
20286	Aircraft Fuel Storage Facility (tank 2)	200,000	JP-8	In use

Table G-6
UST Contamination Sites

Site No.	UST Database Tank ID#	Site Name/Location	Medium Contaminated	Status
1	Kern3-1	NAF Gas Station	Soil, ground water	Free product removal from two monitoring well and ground water monitoring program.
2	Kern4-1	Boiler Plant No. 1	Soil, ground water	Ground water monitoring
3	Kern4-13 and 4-14	Public Works Gas Station	Soil, ground water	Free product removal from five soil vapor extraction monitoring wells and groundwater monitoring program.
4	S.B.2-16	CLPL Gas Station	Soil	On-going investigation.
5	S.B.1-2 and 1-3	IOB Gas Station	Soil, groundwater	Ground water monitoring.
6	Kern4-41 and 4-42	Prior NEX Bldg. 02330	Soil	Ground water monitoring.
7	S.B.6-2	Randsburg Wash Gas Station	Soil	On-going investigation.
8	Kern3-8, 3-9, 3-10, 3-11, 3-12, and 3-13	Old NAF Fuel Farm	Soil, groundwater	Pending Closure. Soil and Groundwater remediation being conducted under IRP Site No. 1 Removal Action.