INSTALLATION ACTION PLAN

For

RIVERBANK ARMY AMMUNITION PLANT

March 2001

PURPOSE

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year environmental restoration program for an installation. The plan will define Installation Restoration Program (IRP) requirements and propose a comprehensive approach and associated costs to conduct future investigations and remedial actions at each Operable Unit (OU) and Site at the installation and other areas of concern.

In an effort to coordinate planning information between the IRP manager, major army commands (MACOMs), installations, executing agencies, regulatory agencies, and the public, an IAP has been completed for the Riverbank Army Ammunition Plant (RBAAP). The IAP is used to track requirements, schedules and tentative budgets for all major Army installation restoration programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is therefore subject to change during annual review of the document. All remedies are in place at RBAAP, LTM and RAO will continue.

PREPARED BY

RIVERBANK ARMY AMMUNITION PLANT

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REVIEW AND CONCURRENCE

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ACRONYMS & ABBREVIATIONS

CERLA	Comprehensive Environmental Response, Compensation, and Liability Act
DERA	Defense Environmental Restoration Account
DRMO	Defense Reutilization and Marketing Office
DSERTS	Defense Site Environmental Restoration Tracking System
DSMOA	Defense, State Memorandum of Agreement
DTSC	Department of Toxic Substances Control
ER,A	Environmental Restoration, Army (formally called DERA)
FFSRA	Federal Facility Site Remediation Agreement
FS	Feasibility Study
FY	Fiscal Year
IGWTS	
IRA	Interim Remedial Action
IRP	Installation Restoration Program
LTM	Long Term Monitoring
MCL	Maximum Contaminant Level
NE	Not Evaluated
NFA	No Further Action
NFRAP	No Future Remedial Action Planned
NPL	National Priority List
PCB	polychlorinated biphenyl
POL	Petroleum, Oil & Lubricants
RA	Remedial Action
RA(C)	Remedial Action - Construction
RA(O)	Remedial Action - Operation
RAB	Restoration Advisory Board
RBAAP	Riverbank Army Ammunition Plant
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
REM	Removal Action
RI	Remedial Investigation
RIP	Remedy in Place
ROAP	
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RWQCB	Regional Water Quality Control Board
SI	Site Inspection
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
TPH	Total Petroleum Hydrocarbon
TRC	Technical Review Committee
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Center
USAEHA	United States Army Environmental Hygiene Agency (replaced by USACHPPM)
USATHMA	United States Army Toxic and Hazardous Material Agency (replaced by USAEC)
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

SUMMARY

STATUS: NPL Installation with a HRS Score of 63.94

NUMBER OF DSERTS SITES:

11 DSERTS sites
- 2 Active ER,A Eligible DSERTS Sites
- 9 Response Complete DSERTS Sites

DIFFERENT DSERTS SITE TYPES (Of the sites in DSERTS):

2	Contaminated Buildings	1	Landfill
4	Surface Impoundment/Lagoons		
2	Spill Site Areas	2	Waste Treatment Plants

CONTAMINANTS OF CONCERN: Hexavalent Chromium, Cyanide, Zinc

MEDIA OF CONCERN: Groundwater, Soil

COMPLETED REM/IRA/RA:

RA:
- Landfill debris, 1987-88, $475,000
- Interim groundwater treatment system, 1991, $1,700,900
- UST Removals, FY91-94, $564,900

IRA:
- Operations of IGWTS, FY91-94, $4,241,800

REM:
- Waterline Extension, 1992, $1,107,800
- E/P Ponds Soils Excavation 1993, $1,834,700
- Former Landfill Cap, 1995, $1,300,000
- Groundwater Treatment System, 1996, $5,120,000

CURRENT IRP PHASES: RAO 2 Sites LTM 1 Sites

PROJECTED IRP PHASES: RAO 2 Sites LTM 2 Sites

IDENTIFIED POSSIBLE REM/IRA/RA:
- None

FUNDING:

PRIOR YEARS FUNDS:	$ 43,184.1 K
FY 2000 FUNDS:	$ 1,620 K
FUTURE REQUIREMENTS:	$ 16,845 K
TOTAL:	$ 61,649.1K

DURATION:

YEAR OF IRP INCEPTION:	1984
YEAR OF RA COMPLETION FOR ALL SITES	1996
YEAR OF IRP COMPLETION INCLUDING LTM:	2016

INSTALLATION INFORMATION

LOCALE

Riverbank Army Ammunition Plant is located in the center of California's San Joaquin-Sacramento Valley near the city of Riverbank, in Stanislaus County, California. Riverbank has a population of 7,400; the nearest large community is Modesto located 10 miles southwest of the installation and having a population of 150,000. The main plant comprises 145 acres and four industrial waste treatment evaporation/percolation (E/P) ponds cover an additional 28 acres. RBAAP is bordered on the east by pastureland and on the north, west and south by sparse residential areas.

COMMAND ORGANIZATION

MAJOR COMMAND: U.S. Army Materiel Command (AMC)

MAJOR SUBORDINATE COMMAND: U.S. Army Industrial Operations Command (IOC)

INSTALLATION: Riverbank Army Ammunition Plant (RBAAP)

INSTALLATION RESTORATION PROGRAM (IRP) EXECUTING AGENCY

REMEDIAL INVESTIGATION/FEASIBILITY STUDY: U.S. Army Environmental Center

REMEDIAL DESIGN/REMEDIAL ACTION: U.S. Army Corps of Engineers, Sacramento District

REGULATOR PARTICIPATION

FEDERAL: U.S. Environmental Protection Agency (EPA), Region IX

STATE: California Environmental Protection Agency, Department of Toxic Substances Control (DTSC)
California EPA, Regional Water Quality Control Board, Central Valley Region (RWQCB)

REGULATORY STATUS

- National Priorities List (NPL) Installation, February 1990
- Technical Review Committee (TRC) Equivalent, October 1985
- Interagency Agreement, June 1990
- Final Record of Decision (ROD), March 1994
- Construction Completion, September 1997

INSTALLATION DESCRIPTION

Riverbank Army Ammunition Plant is an inactive government-owned/ contractor-operated (GOCO) industrial installation under the jurisdiction of the U.S. Army Armament, Munitions and Chemical Command. RBAAP was constructed in 1942 by the Aluminum Company of America (ALCOA) as an aluminum reduction plant supplying military requirements. The plant was built under the authority of the Defense Plant Corporation. RBAAP started production on May 18, 1943. The plant was designed to produce 40,000 tons of aluminum per year. The plant was closed by order of the War Production Board on August 7, 1944, due to the reduced need for aluminum by the military in World War II.

After closure of the plant in 1944, the facilities were used for the storage of a variety of government surplus materials, including corn and grain. In 1951, the Army gained control of the plant to manufacture steel cartridge cases for joint use by the Army and Navy. The Norris Thermador Corporation (now NI Industries (NI)) was awarded the contract for conversion and operation of the plant. Since 1951, the plant has remained a government owned/ contractor-operated, industrial metal working plant. Manufactured materials, such as cartridge cases, grenades and projectiles are shipped to other ammunition plants for loading operations. Levels of production have fluctuated significantly, with peak periods corresponding to the Korean and Vietnam Conflicts.

RBAAP was proposed for inclusion on the National Priorities List (NPL) with a Hazard Ranking System (HRS) score of 63.94 and was officially named to the NPL on February 16, 1990. Subsequently, an Interagency Agreement was signed by the Army, EPA Region IX, California Department of Health Services (now California EPA - Department of Toxic Substances Control) and California Regional Water Quality Control Board, which became effective in June 1990.

CONTAMINATION ASSESSMENT

In 1979, an Installation Assessment conducted by the Army concluded that areas of the Riverbank Army Ammunition Plant (RBAAP) and the waste disposal ponds located off-site were potentially contaminated with heavy metals and other chemicals as a result of procedures used in past manufacturing operations and waste disposal practices. The assessment also indicated the potential for migration of the contaminants into the subsurface soils and waters.

In April 1984, USATHAMA contracted Envirodyne Engineers, Inc. (EEI) to undertake a two-phase field program to investigate the contamination at the RBAAP. The Exploratory Phase, which was completed in July 1985, indicated groundwater contamination primarily by chromium and cyanide. The Confirmatory Phase, which was completed in October 1986, confirmed levels of contamination in the groundwater at the RBAAP and concluded that the primary sources were the on-site landfill and the Industrial Waste Treatment Plant (IWTP) area.

In December 1986, following the Confirmatory Phase activities, USATHAMA contracted WESTON to conduct an additional round of groundwater sampling. WESTON field personnel collected the samples and EEI laboratory personnel performed analysis. The December 1986 sampling confirmed the levels of chromium and cyanide contamination indicated by the Exploratory and Confirmatory Phases.

During May 1987 through November 1988, WESTON, under contract to USATHAMA, conduct Phase I of the RI program. The Phase I RI activities, which included sampling of potential source areas and more extensive groundwater sampling on and off site, provided a better definition of the results generated by the Exploratory and Confirmatory Phases and placed an emphasis on remediation.

Phase II of the RI effort was conducted between May and August 1990 in accordance with a workplan that was formally reviewed and approved by the EPA and California regulatory agencies under the auspices of the IAG. The Phase II RI activities, which included sampling of potential source areas, more extensive groundwater sampling on- and off-site, and the installation of wells for the Interim Groundwater Treatment System (IGWTS), provided a more comprehensive contamination assessment and set up actions toward remediation of the site. A comprehensive RI report was provided to the regulatory agencies in December 1990 detailing all work completed to dated.

As a result of regulatory review, additional field work was completed at the landfill, the IWTP offload area, and the sanitary sewage treatment plant sludge beds in July and August 1991. An RI Addendum was prepared and subsequently approved by the regulatory agencies in February 1992. A draft Feasibility Study Report was submitted to the regulatory agencies in March 1992 followed by a draft final on 24 September 1992. The FS recommended expansion of the IGWTS to capture and treat the ground water contamination and proposed no action for the IWTP area and former landfill based on minimal risk to human health and the environment. On 24 October 1993, the California RWQCB invoked dispute resolution on the draft final FS report based regarding the landfill, stating that the landfill has in the past contributed to ground water contamination and has the potential to further contaminate the ground water. Dispute resolution was concluded in February 1993 with an agreement by the Army to install and maintain a clay cap at the site as a compromise to avoid further delays in addressing real concerns at the installation. The Proposed Plan was approved in August 1993 and was provided for public review during Aug through September 1993. The Record of Decision was submitted to the regulatory agencies in September 1993 and, after lengthy negotiations over incorporation of the Dispute Resolution Agreement, signed at a 23 March 1994 signing ceremony. RBAAP is the first federal facility to sign a site-wide ROD.

(2) Ground Water Interim Remedial Action: Also, in 1989, an interim remedial action was initiated to address the groundwater contamination problem at RBAAP. A design for an interim groundwater treatment system was developed under contract by Bechtel Engineering under contract to Norris Industries. The design was completed in December 1989, at which time a public meeting was held to discuss the interim action. Construction of the system was completed in December 1990; however, initial startup was delayed until May 1991 because of damage to the system caused by severe freezing conditions. The system was placed into 24-hour operation in September 1991 and has been treating groundwater for both

cyanide and chromium at a rate of approximately 80 gallons per minute.

(3) Domestic Well Monitoring/Replacement Program: In addition to the RBAAP RI activities, USATHAMA established an off-site residential well sampling program in September 1985. The residential well sampling program consists of the quarterly sampling of approximately 70 wells located west of the RBAAP boundary. Residential wells were sampled for chromium and cyanide, the contaminants of concern indicated by the site investigations. Water samples from six wells located west of the RBAAP have indicated levels of chromium in excess of 50 mg/L (drinking water standard). USATHAMA provided bottled drinking water to those affected residents as a temporary measure until new wells could be installed. Deep wells have since been installed by USATHAMA at these residences to provide a permanent drinking water supply of potable quality. In addition, the contaminated wells have been abandoned and sealed to insure against any further use of the contaminated groundwater.

In 1991, a removal action was initiated to provide a permanent potable water supply to the residents. An Engineering Evaluation/Cost Analysis was performed which identified extension of the Riverbank City water system as the most viable alternative. The waterline extension design was completed in April 1992, construction was initiated in May 1992 and completed in November 1992, and all potentially affected residents have been provided service. A ribbon-cutting ceremony was conducted on 4 December 1992.

(4) Evaporation/Percolation Ponds Removal Action: The Phase II Survey, completed in October 1986, concluded the industrial waste ponds, located adjacent to the Stanislaus River, were not a source of groundwater contamination. Approximately 3,600 yd^3 of sediment within the ponds were estimated to be hazardous waste according to the State of California regulations and would require removal.

A draft Engineering Evaluation/Cost Analysis (EE/CA) document for development and comparison of alternatives for remediation of E/P ponds sediments completed and submitted to the regulatory agencies in April 1990, recommending use of the zinc-contaminated sediments as a soil amendment for agricultural land. Comments were received from EPA and California Department of Health Services in June 1990.

A draft final EE/CA was submitted in November 1990 in response to regulatory comments and a revised draft was provided in March 1991, responding to requests for more detail on the soil amendments proposal. During review of the revised draft final EE/CA, it was discovered that California regulations would require classification of the zinc-contaminated sediments as hazardous wastes which would preclude their acceptance as a soil amendment.

In June 1992, the EPA conducted an EPA ecological study of the E/P ponds site which further supported a change to the proposed removal action. Also in June 1992, RWQCB insisted on additional investigation of the E/P ponds for other contaminants, even though past sampling coordinated with both California agencies screened down the contaminants of concern to zinc. This new requirement further delayed agreement on an acceptable approach.

In August 1992, the Army agreed to address RWQCB E/P ponds characterization requirements through expanded confirmatory sampling of the sediments following removal of the known zinc contamination. A revised draft final EE/CA was submitted to the EPA and California in February 1993 recommending hot spot removal of zinc-contaminated sediments for disposal at a hazardous waste landfill and expansion of the confirmatory sampling to confirm the absence of other contaminants. A public meeting was conducted on the removal action on 2 June 1993 as part of the public review period (17 May - 15 June 1993). No objections or concerns were raised during public review. An Action Memorandum was staffed to and signed by the Assistant Secretary of the Army for Environment, Safety and Occupational Health in August 1993. The removal action was conducted during September through October 1993. A final characterization report was completed in May 1994.

PREVIOUS STUDIES

Title	Author	Date
Installation Assessment of Riverbank Army Ammunition Plant, Report No. 144	U.S. Army Toxic and Hazardous Materials Agency	January-90
Installation Assessment of Riverbank Army Ammunition Plant	U.S. Army Toxic and Hazardous	January-90
Final Report - Remedial Investigation of the Riverbank Army Ammunition Plant	Envirodyne Engieers, Inc.	April-87
Riverbank Army Ammunition Plant - Remedial Investigation/Feasibility Study Groundwater Model Calibration Repoty	Roy F. Weston, Inc.	March-98
Air Force Plant 44 Pilot Ground-Water Treatment Plant - Equipment Assessment Report	Bechtel Environmental, Inc.	September-89
Riverbank AAP - Investigation and Evaluation of Underground Storage Tanks	U.S. Army Engineer District - Omaha	September-89
Engineering Evaluation/Cost Assessment Report for the Interim Ground-Water Treatment System Removal Action Selection at the Riverbank Army Ammunition Plant	Bechtel Environmental, Inc	November-89
Ground-Water Extraction and Treatment System 100 Percent IRM Design - Riverbank Army Ammunition Plant	Bechtel Environmental, Inc	December-89
Interim Remedial Measure Plan at the Riverbank Army Ammunition Plant	Bechtel Environmental, Inc	April-90
Water Quality Consultation No. 31-66-GE71-92 - Riverbank Army Ammunition Plant	U.S. Army Environmental Hygiene Agency.	March-91
Wastewater Management Survey No. 32-66-0144-91 - Riverbank Army Ammunition Plant	U.S. Army Environmental Hygiene Agency.	June-91
Remedial Investigation (RI) Report - Riverbank Army Ammunition Plant	Roy F. Weston, Inc.	February-92
Feasibility Study (FS) Report	Roy F. Weston, Inc.	June-93
Riverbank Army Ammunition Plant (RBAAP) Engineering Evaluation/Cost Analysis (EE/CA) for the Evaporation/Percolation (E/P) Ponds	Roy F. Weston, Inc.	February-93
Riverbank Army Ammunition Plant (RBAAP) Proposed Plan	USAEC	August-93
Record of Decision, Riverbank Army Ammunition Plant	USAEC	March-94
Evaporation/Percolation (E/P) Ponds Characterization Report	Roy F. Weston, Inc.	May-94
Riverbank Army Ammunition Plant Conceptual Design Report	Roy F. Weston, Inc.	June-94
Riverbank Army Ammunition Plant Remedial Design of Landfill Closure Work Plan	CH2MHill	June-94

PREVIOUS STUDIES

Title	Author	Date
Riverbank Army Ammunition Plant Remedial Design of Groundwater Extraction and Treatment System Work Plan	CH2MHill	June-94
Riverbank Army Ammunition Plant Landfill Closure 100 Percent Design Document	CH2MHill	December-94
Riverbank Army Ammunition Plant Groundwater Extraction and Treatment System 100 Percent Design Document	CH2MHill	August-95

RBAAP-01
LANDFILL, RBAAP

SITE DESCRIPTION

RBAAP-01 is located in the northern section of the main plant near the eastern boundary. The site is approximately 4.5 acres in size and was the site of surface and trench disposal and burning from 1942 to 1966. All surface debris was removed in 1987.

Wells placed down-gradient of the landfill have indicated that the landfill was a possible source of cyanide and chromium contamination in groundwater. Cyanide contamination has been linked to pot liner from aluminum reduction processes, a RCRA listed waste, has been found in the southern portion of the landfill. Most of the pot liner was removed during previous rubble removal efforts. Chromium contamination has been traced to construction rubble which contained chromium contaminated bricks. These were also removed from the site during a 1987 rubble cleanup effort. Although the landfill was a source of groundwater contamination, the source has been depleted and it no longer poses a threat to groundwater quality. As a compromise during dispute resolution over the draft final FS report, the Army agreed to install and maintain a clay cap at the landfill. The final site-wide ROD documents this remedial action selection.

IRP STATUS

RRSE RATING: High Risk (1A)

CONTAMINANTS OF CONCERN:
Cyanide, Hexavalent chromium

MEDIA OF CONCERN:
Groundwater, Soil

COMPLETED IRP PHASE:
PA/SI, Removal Action, RI/FS, IRA (IGWTS), Proposed Plan, ROD

CURRENT IRP PHASE:
RAO

FUTURE IRP PHASE:
RAO, LTM

PROPOSED PLAN

Long Term Monitoring and Operations will continue.

CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS							
IRA							
RD							
RA(C)							
RA(O)	50						
LTM							
LTO							

PROJECTED TOTAL: $50,000

RBAAP-02
WASTE SALT DISPOSAL PIT

SITE DESCRIPTION

RBAAP-02 is located adjacent to the former landfill to the west. The waste salt pond was constructed for use as an evaporation basin for wash water from the nitrate molten salt annealing process. Completed in 1969, it was never used for this purpose, since anticipated orders were never received. The Installation Assessment incorrectly stated that the pond was used to desiccate sludge from the IWTP in 1975 and that the sludge was eventually removed and taken to a sanitary landfill. According to plant officials the waste salt pond was not used for any disposal operations. Sampling of the pond was not conducted based on this information. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:

None

MEDIA OF CONCERN:

None

COMPLETED IRP PHASE:

PA/SI, RI, ROD

CURRENT IRP PHASE:

NFRAP

FUTURE IRP PHASE:

NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-03
IND WASTE TRMT PLANT (IWTP)

SITE DESCRIPTION

RBAAP-03 is located in the central part of the main plant area. The IWTP at RBAAP was constructed to treat the wastewaters generated from the electroplating, cleaning and metal finishing processes that are operated on site. The IWTP includes facilities for flocculation, clarification, sludge thickening, sludge/liquid separation, and nitrate salt removal. The original storage and equalization tanks used for the IWTP were made of redwood. During periods of low flow to the IWTP the redwood would desiccate, causing gaps between the timbers. Upon filling, fluid would leak through the gaps to the ground until the timbers swelled once again and closed the gaps. From 1973 to 1980 the IWTP was upgraded and the redwood tanks were replaced with concrete tanks. The IWTP has been a focus of the site investigation activities at RBAAP. Based on groundwater contamination in the area, the IWTP area has been identified as a major source of chromium contamination in the groundwater. Investigation of the soils in the area indicates that the soils no longer contain levels of chromium, which would continue to pose a threat to the groundwater, nor do they pose a threat to human health. The final site-wide ROD requires the expansion of the groundwater treatment system to fully capture groundwater contamination emanating from the IWTP.

IRP STATUS

RRSE RATING: High Risk (1A)
CONTAMINANTS OF CONCERN: Hexavalent chromium
MEDIA OF CONCERN: Groundwater, Soil
COMPLETED IRP PHASE:
PA/SI, RI/FS, IRA (IGWTS), RA (Waterline), Proposed Plan, ROD
CURRENT IRP PHASE:
RAO,/LTM
FUTURE IRP PHASE:
RAO, LTM

PROPOSED PLAN

Long Term Monitoring and Operations will continue.

CONSTRAINED COST TO COMPLETE

PHASE	2001	2002	2003	2004	2005	2006	2007+
RI/FS							
IRA							
RD							
RA(C)							
RA(O)	1570	1570	1570	1570	1570	1570	6280
LTM							2058
LTO							

PROJECTED TOTAL: $17,758,000

RBAAP-04
IWTP EFFLUENT SEWER LINE BREAK

SITE DESCRIPTION

In 1972, a major leak was detected in the IWTP effluent pipe, which carries treated wastewater to the E/P ponds, at the location of the pipe intersection with the Hetch-Hetchy Aqueduct. The leak was not discovered for 7 days, during which time approximately 1 million gallons per day of wastewater was being discharged through the pipe. The sewer line at the leak was a force drain, and the force of the liquid caused erosion around the pipe, resulting in wastewater pooling at the ground surface. An unknown amount of treated wastewater leaked from the pipe. During the Confirmatory Phase of the Contamination Survey, an investigation was conducted in the vicinity of the pipe leak. Four investigative borings and one background boring were completed and samples were analyzed for California Title 22 metals. Only concentrations of total chromium, copper, and fluorine were found to be close to or more than three times the background sample values. Therefore, the soil in the vicinity of the IWTP line break is not considered to be contaminated. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:
None

MEDIA OF CONCERN:
None

COMPLETED IRP PHASE:
PA/SI, RI, ROD

CURRENT IRP PHASE:
NFRAP

FUTURE IRP PHASE:
NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-05
BLDG. 13, CHROMIUM TRMT

SITE DESCRIPTION

RBAAP-05 is located in the southern end of Building 13 on the southwestern part of the main plant area. The chromium pretreatment system was installed in 1978 as part of the upgrades to the IWTP to pretreat the waste stream from the zinc chromate dip solution used on the production lines prior to discharge to the IWTP. The treatment system reduced the chromium from a hexavalent state to a trivalent state, which could then be precipitated prior to discharge of the waste stream to the IWTP. No direct sampling was conducted around this system because it is an operating facility. However, the groundwater investigation concluded that the major source of chromium contamination was the leaking tanks of the IWTP prior to the system upgrade. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:

None

MEDIA OF CONCERN:

None

COMPLETED IRP PHASE:

PA/SI, RI, ROD

CURRENT IRP PHASE:

NFRAP

FUTURE IRP PHASE:

NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-06
IWTP H2SO4 SPILL

SITE DESCRIPTION

RBAAP-06 is located within the IWTP area and is the site of a sulfuric acid spill in 1956. The site was reported to be within the IWTP area, which was the focus of the RI program. The IWTP area was found to be clear of contamination at levels, which would adversely impact human health or the environment, including groundwater. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:

None

MEDIA OF CONCERN:

None

COMPLETED IRP PHASE:

PA/SI, RI, ROD

CURRENT IRP PHASE:

NFRAP

FUTURE IRP PHASE:

NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-07
BLDG. 13 PHOSPHORIC SPILL

SITE DESCRIPTION

RBAAP-07 was the site of a phosphoric acid spill in 1978 and is located near the chromium pretreatment system. Through the groundwater investigations the contaminants of concern at RBAAP were narrowed down to chromium and cyanide. Neither of these contaminants were linked to the phosphoric acid spill. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:

None

MEDIA OF CONCERN:

None

COMPLETED IRP PHASE:

PA/SI, RI, ROD

CURRENT IRP PHASE:

NFRAP

FUTURE IRP PHASE:

NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-08
SE STORM RESERVOIR

SITE DESCRIPTION

RBAAP-08 is located in the southeastern part of the main plant area near the eastern boundary. The southeast storm reservoir collects stormwater from the southeast portion of the site, and during times of heavy rainfall, the water from this reservoir is pumped to the northwest storm reservoir. Based on the reported presence of heavy metals in a water sample from the northwest storm reservoir (AEHA, 1974), an investigation of the southeast reservoir was conducted during the Phase I RI efforts. One sediment sample was collected and analyzed for total and hexavalent chromium, total and free cyanide, 1,1-dichloroethylene, and the organic persistent and bioaccumulative toxic substances listed in California Title 22 Codes. Analysis showed the reservoir indicated no contamination above background levels. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:
None

MEDIA OF CONCERN:
None

COMPLETED IRP PHASE:
PA/SI, RI, ROD

CURRENT IRP PHASE:
NFRAP

FUTURE IRP PHASE:
NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-09
NW STORM RESERVOIR

SITE DESCRIPTION

RBAAP-09 is located in the northwest section of the main plant area just south of the grazing area. The northwest storm reservoir collects stormwater from the majority of the main plant area and is the discharge point for excess runoff from the southeast storm reservoir. Overflow from the northwest reservoir discharges to the Oakdale Irrigation Canal. The Installation Assessment (IA) referenced a 1974 AEHA report regarding industrial wastewater of RBAAP. As noted in the IA, one segment of the AEHA study examined the chemical analysis of a water sample from the northwest stormwater reservoir. The results indicated elevated levels of some heavy metals that were then cited as a possible source of contamination at RBAAP. Sampling efforts were conducted during Phase I of the RI to verify the presence of sediment contamination in the reservoir and to determine the potential for contaminant migration. Two sediment samples were taken from the reservoir and analyzed for total and hexavalent chromium, total and free cyanide, 1,1-dichloroethylene, and the organic persistent and bioaccumulative toxic substances listed in California Title 22 Codes. Analysis showed the reservoir contained total chromium at levels greater than 3 times background levels; however, the reservoir is not considered a source of groundwater contamination based on California's Designated Level Methodology (DLM) which models the potential impact of contaminated soils on groundwater. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

PROPOSED PLAN

This site is Response Complete under the IRP.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:
None

MEDIA OF CONCERN:
None

COMPLETED IRP PHASE:
PA/SI, RI

CURRENT IRP PHASE:
NFRAP

FUTURE IRP PHASE:
NFRAP

RBAAP-10
SEWAGE TRMT PLANT/ SLUDGE BEDS

SITE DESCRIPTION

RBAAP-10 is located west of the northern portion of the former landfill area. The sewage treatment plant consisted of a sewage pump station discharging into an Imhoff tank for treatment of the wastewater's. Sludge was periodically drawn from the digestion chamber for drying in the sludge beds. Operation of the system was discontinued when the plant tied into the Riverbank sanitary sewer system in 1987. Sampling was conducted at the sewage beds in August 1991 under the RI addendum effort in order to meet requirements for addressing solid waste management units on the installation. The sampling effort concluded that the sludge beds did not contain chromium or cyanide above background levels. The Feasibility Study recommended no further action for this site, as is documented in the final site-wide ROD.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:

None

MEDIA OF CONCERN:

None

COMPLETED IRP PHASE:

PA/SI, RI

CURRENT IRP PHASE:

NFRAP

FUTURE IRP PHASE:

NFRAP

PROPOSED PLAN

This site is Response Complete under the IRP.

RBAAP-11
PERC/ EVAP PONDS (STANTISLAUS)

SITE DESCRIPTION

RBAAP-11 occupies 27 acres on the banks of the Stanislaus River approximately 1.5 miles north of the main plant area. The E/P Ponds were constructed in 1952 for the disposal of treated effluent generated at RBAAP. The four ponds are separated by a series of berms, which were raised in 1972 to increase capacity. Also berms were installed within each pond to act as baffles to eliminate erosion. The effluent flow is discharged into the first pond and overflow is sent to the second and so forth. The effluent discharged to the ponds evaporates and/or percolates through the existing sediments to the groundwater, thereby precipitating sediments into the bottom of the ponds. The final sediment characterization report, completed in May 1994 following the removal action, concluded that no further action is warranted at the E/P Ponds. The final site-wide ROD documents this recommendation.

IRP STATUS

RRSE RATING: Not Evaluated

CONTAMINANTS OF CONCERN:

Zinc

MEDIA OF CONCERN:

Groundwater, Soil

COMPLETED IRP PHASE:

PA/SI, RI, EE/CA, Removal Action, ROD

CURRENT IRP PHASE:

NFA

FUTURE IRP PHASE:

NFA

PROPOSED PLAN

This site is Response Complete under the IRP.

SCHEDULE

PAST MILESTONES

IRP PA Initiation	Jan 80
PA/SI, Installation	Sep 85
Interim GWTS Design (RBAAP-01 and 03)	Dec 89
Interim GWTS On-line (RBAAP-01 and 03)	May 91
RI (All sites)	Feb 92
FS (All sites)	Jun 93
Waterline Design (RBAAP-01 and 03)	Mar 92
Waterline On-line (RBAAP-01 and 03)	Dec 92
EE/CA (RBAAP-11)	Jun 93
Action Memorandum (RBAAP-11)	Aug 93
Removal Action (RBAAP-11)	Oct 93
Proposed Plan (Site-wide)	Sep 93
ROD (Site-wide)	Mar 94
Remedial Design (Landfill)	Dec 94
Remedial Design (GWTS)	Aug 95
Remedial Action (Landfill)	Oct 95
NPL Delisting Petition	Sep 96
Remedial Action (GWTS)	Sep 96
Construction Completion (side-wide)	Sep 97

SCHEDULE

NO FURTHER ACTION SITES

RBAAP-02 Waste Salt Disposal Pit

RBAAP-04 IWTP Effluent Sewer Line Break

RBAAP-05 Bldg 13, Chromium Treatment

RBAAP-06 IWTP H2SO4 Spill

RBAAP-07 Bldg 13 Phos Spill

RBAAP-08 SE Storm Reservoir

RBAAP-09 NW Storm Reseroir

RBAAP-10 Sewage Treatment Plant/ Sludge Beds

RBAAP-11 Perc/ Evap Ponds (Stantislaus)

Riverbank Army Ammunition Plant
IRP Schedule

(Based on Cost to Complete current funding constraints)

CURRENT PHASE

FUTURE PHASE

DSERTS #	SITE NAME	PHASE	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007+
RBAAP-01	Landfill, RBAAP	RAO							
		LTM							
RBAAP-03	Ind Waste Trmt Plant (IWTP)	RAO							
		LTM							

DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM

Site, 4. Installation Phase Summary Report 1/11/01

Installation: RIVERBANK ARMY AMMO PLANT
Programs: BRAC I, BRAC II, BRAC III, BRAC IV, IRP

Subprograms: Compliance, Restoration, UXO
Installation count for Programs: 1

NPL Options: Delisted, No, Proposed, Yes

Installations count for Programs and NPL: 1
Site count for Programs and NPL: 11

Phase / Status / Sites

PA				SI			
C	**U**	**F**	**RC**	**C**	**U**	**F**	**RC**
11	0	0	0	11	0	0	0

RI / FS				RD		
C	**U**	**F**	**RC**	**C**	**U**	**F**
11	0	0	8	3	0	0

RA(C)				RA(O)			
C	**U**	**F**	**RC**	**C**	**U**	**F**	**RC**
3	0	0	1	0	2	0	0

LTM			
C	**U**	**F**	**N**
0	0	1	10

Remedy / Status / Sites (Actions)

IRA

C	U	F
2 (2)	0 (0)	0 (0)

FRA

C	U	F
3 (3)	0 (0)	0 (0)

RIP Total: 2

RC Total: 9

Reporting Period End Date: 03/31/2001

DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM

Site, 9. RISK INSTALLATION ACTION PLAN REPORT 01/11/2001

Installation: RIVERBANK ARMY AMMO PLANT
Major Command: AMC

SubCommand: OSC
Program Options: IRP, BRAC I, BRAC II, BRAC III, BRAC IV

Subprogram Options: Compliance, Restoration, UXO

Site	RRSE	Media Evaluated	Phase (s) Completed	Phase (s) Underway	Phase (s) Future	#IRA Completed	#IRA Underway	#IRA Future	LTM Status	RIP Date	RC Date
RBAAP-01	1A	GW SL	PA RAC RD RI SI	RAO		1			N	199509	201609
RBAAP-02	NE		PA RI SI						N		199306
RBAAP-03	1A	GW SL	PA RAC RD RI SI	RAO		1			F	199809	201109
RBAAP-04	NE		PA RI SI						N		199306
RBAAP-05	NE		PA RI SI						N		199306
RBAAP-06	NE		PA RI SI						N		199306
RBAAP-07	NE		PA RI SI						N		199306
RBAAP-08	NE		PA RI SI						N		199306
RBAAP-09	NE		PA RI SI						N		199306

Site	RRSE	Media Evaluated	Phase (s) Completed	Phase (s) Underway	Phase (s) Future	#IRA Completed	#IRA Underway	#IRA Future	LTM Status	RIP Date	RC Date
RBAAP-10	NE		PA						N		199306
			RI								
			SI								
RBAAP-11	NE		PA						N		199312
			RAC								
			RD								
			RI								
			SI								

RRSE - Relative Risk Site Evaluation; Risk Category - 1=High, 2=Medium, 3=Low;

Legal Agreement - A = with agreement, B = without agreement; C = Complete, U = Underway, F = Future, N = Not Applicable

Reporting Period End Date: 03/31/2001

REM/IRA/RA ASSESSMENT

PAST REM/IRA/RA

- RBAAP-01, Rubble Removal, $475.1K, FY87-88

- RBAAP-01 and RBAAP-03, Interim Ground Water Treatment System (IGWTS), Installed May 91, $1,700.9K (FY89-91)

- RBAAP-01 and RBAAP-03, Operations of IGWTS, FY91-95 total operating costs of $6,372.7K

- RBAAP-01 and RBAAP-03, Installation of Waterline, Installed Dec 92, $1,107.8K (FY91-93)

- RBAAP-01 and RBAAP-03, Ground Water Monitoring, FY89-95 total costs of $1,563.8K

- RBAAP-11, E/P Ponds Removal Action, $1,834.7K (FY90-92)

- RBAAP-01, Landfill Remedial Action, $1,300.0K (FY95)

- RBAAP-01 and RBAAP-03, GWTS Expansion, $5,120.0K (FY95)

CURRENT REM/IRA/RA

- RBAAP-01 and RBAAP-03, Operations of GWTS, $2,767.6K

- RBAAP-01 Landfill Maintenance , $127.0K

Potential Accelerated Actions:

-A Request for Formal Delist from the NPL was submitted in FY 97.

FUTURE REM/IRA/

- RBAAP-01 and RBAAP-03, Continued Operations of the Groundwater Treatment System, FY97-11, $48,753.0K

- RBAAP-01 and RBAAP-03, Continued Groundwater Monitoring, FY96-16, $5,492.0K

PRIOR YEAR FUNDING

FY80

Recorded Search	$	50,000

FY84

Contamination Survey (Phase I)	$	261,000

FY85

Modification to Phase I Survey	$	14,300

FY86

Contamination Survey	$	603,500
Groundwater Model Development	$	144,100
Replacement of Domestic Wells	$	30,000
Total	**$**	**777,600**

FY87

Comprehensive RI/FS	$	1,587,500
Removal of Landfill Rubble	$	329,200
IRM Design	$	189,300
Quarterly Offpost Monitoring	$	204,400
Groundwater Modeling Support (ANL)	$	40,00
Monthly Water Level Measurement	$	20,000
Modification to FY86 Program (Model)	$	19,800
Offpost Leases	$	400
Total	**$**	**2,390,600**

FY88

Modification to FY87 Program (Landfill Rubble)	$	145,900
Continuation of Offpost Monitoring Program	$	118,000
Replacement of Domestic Wells	$	9,200
Assistance for Claim Settlement	$	3,500
Offpost Well Leases	$	2,100
Total	**$**	**278,700**

FY89

Landscaping/Repair of Personal Property	$	2,300
Offpost Groundwater Sampling	$	99,100
Completion of Ongoing RI/FS	$	1,175,100
Mod to Design of IGWTS	$	123,000
RA (New Brighton WTP)	$	126,000
Transfer of Pilot GWTP from USAF to RBAAP	$	211,500
Treatability Study (E/P Pond Measurements)	$	12,100
Monthly Water Level Measurements	$	22,400
PAO Support	$	20,000
E/P Ponds (RADE)	$	9,900

PRIOR YEAR FUNDING

Property Leases	$	2,100
Modifications to FY87 Comp. RI/FS	$	34,800
UST Removal	$	110,000
Total	**$**	**1,948,300**

FY90

E/P Ponds Sediment Removal	$	894,800
RI Follow-up	$	161,600
Interim Groundwater Treatment System (Design)	$	52,200
Interim Groundwater Treatment System (Install)	$	1,311,200
Off-Post Sampling Program	$	90,500
FY90 Off-Post Property Leases	$	2,000
Public Affairs (RBAAP Support)	$	31,400
Total	**$**	**2,543,700**

FY91

E/P Ponds Technical Support	$	10,000
Pre-ROD RI/FS Follow-up	$	805,300
Interim GW Treatment System (Installation S&A)	$	32,700
Interim GW Treatment System (Operations)	$	241,100
Waterline Extension (S&A)	$	79,000
Waterline Extension (RD/RA)	$	977,500
Monitoring (IGWTS/Off-post Sampling)	$	353,700
FY91 Off-Post Property Leases	$	2,600
E/P Ponds (RA)	$	230,000
Total	**$**	**2,731,900**

FY92

SWMU RFI (RBAP91S007)	$	505,900
IGWTS (Installation S&A) (RBAP91S015)	$	39,900
IGWTS (Operations) (RBAP89F021)	$	565,00
Monitoring (IGWTS/Off-post Sampling) (RBAP89F010)	$	358,400
UST Removal	$	40,000
FY92 Off-Post Property Leases (RBAP91S017)	$	2,700
Total	**$**	**1,511,900**

FY92 Supplemental

E/P Ponds Removal Action (RBAP89F023)	$	709,900
IGWTS (Installation S&A) (RBAP91S015)	$	4,500
IGWTS (Operations) (RBAP89F021)	$	821,400
Total	**$**	**1,535,800**

PRIOR YEAR FUNDING

FY93

Groundwater Monitoring (RBAP89F010)	$	109,000
SWMU RFI (RBAP91S007)	$	608,900
FY93 Off-Post Property Leases (RBAP91S017)	$	2,900
IGWTS (Operations) (RBAP89F021)	$	91,000
IGWTS (Installation S&A) (RBAP91S015)	$	43,000
Remedial Design (RBAP91S005)	$	61,000
Waterline S&A (RBAP91S004)	$	31,300
UST Removal (RBAP89F012)	$	14,900
Shared DERA Costs (RBAP93-007)	$	350,000
Total	**$**	**1,312,000**

FY94

Groundwater Monitoring (RBAP89F010)	$	185,700
FY94 Off-Post Property Leases (RBAP91S017)	$	10,000
IGWTS (Operations) (RBAP89F021)	$	1,825,300
IGWTS (Pilot Study) (RBAP92-007)	$	80,000
Remedial Design (RBAP91S005)	$	500,000
UST Removal (RBAP89F012)	$	400,000
Shared DERA Costs (RBAP93-007)	$	348,000
Total	**$**	**3,349,000**

FY95

Groundwater Monitoring (RBAP89F010)	$	355,000
IGWTS (Operations) (RBAP89F021)	$	2,828,900
Remedial Design (RBAP91S005)	$	308,800
Remedial Action (RBAP91S006)	$	5,677,000
Total	**$**	**9,169,700**

FY96

Groundwater Monitoring (RBAP89F010)	$	550,500
IGWTS (Operations) (RBAP89F021)	$	2,495,600
System Evaluation (RBAP96-008)	$	1,050,000
FY95 Off-Post Property Leases (RBAP91S017)	$	200,000
Remedial Action S&A (RBAP-92-036)	$	1,740,000
Total	**$**	**6,036,100**

FY97

Groundwater Monitoring (RBAP89F010)	$	500,000
IGWTS (Operations) (RBAP89F021)	$	1,879,600
System Evaluation (RBAP96-008)	$	100,000
Leases (RBAP91S017)	$	20,000
Remedial Action S&A (RBAP-92-036)	$	50,000
Landfill Maintenance (RBAP95-005)	$	20,000
Total	**$**	**2,569,600**

PRIOR YEAR FUNDING

FY98

Groundwater Monitoring (RBAP89F010)	$	500,000
Leases (RBAP91S017)	$	20,000
IGWTS (Operations) (RBAP89F021)	$	1,879,600
RA S&A	$	50,000
System Evaluations	$	100,000
Landfill Maintenance	$	20,000
Total	**$**	**2,569,600**

FY99

Groundwater Monitoring (RBAP89F010)	$	155,600
Leases (RBAP91S017)	$	20,000
IGWTS (Operations) (RBAP89F021)	$	1,879,600
RA S&A	$	50,000
System Evaluations	$	94,300
Landfill Maintenance	$	20,000
Total	**$**	**2,219,500**

FY00

Groundwater Monitoring (RBAP89F010)	$	155,600
Leases (RBAP91S017)	$	12,000
GWTS (Operations) (RBAP89F021)	$	1,605,000
System Evaluations	$	95,000
Landfill Maintenance	$	39,000
RAB	$	8,200
Total	**$**	**1,914,800**

TOTAL PRIOR YEAR FUNDS	**$**	**43,184,100**
FISCAL YEAR 2001 FUNDS	**$**	**1,620,000**
FUTURE FUNDS REQUIRED	**$**	**16,845,000**
TOTAL FUNDS FROM INCEPTION TO COMPLETION	**$**	**61,649,100**

Riverbank AAP - FY01 Constrained Cost to Complete

DSERTS #	SITE TITLE	PHASE	FY01	FY02	FY03	FY04	FY05	FY06	FY 07+	SITE TOTAL
RBAAP-01	Landfill, RBAAP	LTM								
RBAAP-01	Landfill, RBAAP	RAO	50	50	50	50	50	50	407	707
RBAAP-03	Ind Waste Trmt Plant	RAO	1570	1570	1570	1570	1570	1570	6280	
RBAAP-03	Ind Waste Trmt Plant	LTM							2058	17758
	FISCAL YEAR TOTALS IN THOUSANDS OF DOLLARS		**$ 1,620**	**$ 1,620**	**$ 1,620**	**$ 1,620**	**$ 1,620**	**$ 1,620**	**$ 8,745**	**$ 18,465**
FY98	**RIVERBANK AAP**	RAO/LTM	1,825	1,825	1,825	1,825	1,825	1,825	7,500	18,450
	DIFFERENCE		$ 205	$ 205	$ 205	$ 205	$ 205	$ 205	$ (1,245)	$ (15)

COMMUNITY INVOLVEMENT

A strong relationship between RBAAP and the community began in 1985 with the formulation of the TRC, the precursor to today's RABs. In 1943, DOD established RABs to increase public participation. RBAAP solicited community interest in forming a RAB, but since the cleanup process was already well underway, the ROD was already signed, and the community had been well informed throughout the process, little interest was expressed in establishing a RAB. Since the community was not in favor of establishing a formal RAB, RBAAP requested exemption to the DOD RAB policy to keep the TRC intact.

DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM

Installation, 7. RAB REPORT 01/11/2001

Command: AMC **SubCommand:** OSC
Installation: RIVERBANK ARMY AMMO PLANT

RAB Established Date: **Reason RAB Not Establish:** Installation Commander or other DoD Component
RAB Adjourned Date: **Reason RAB Adjourned:** official has determined that a RAB is not needed.

TRC Date: 198902

RAB Community Members: **Total RAB Community Members:**

RAB Government Members: **Total RAB Government Members:**

RAB Activities:

RAB Advice

TAPP Application Approval Date:
TAPP Project Title: 03/31/2001
TAPP Project Description:

Purchase Order

Award Number	Award Date	Completion Date