

FINAL

DEFENSE DISTRIBUTION DEPOT SAN JOAQUIN–TRACY SITE

**RECORD OF DECISION
REMEDY FOR NORTHWESTERN CORNER
GROUNDWATER OPERABLE UNIT**

July 2011

TABLE OF CONTENTS

	<u>Page</u>
PART 1: DECLARATION	
1.0 SITE NAME AND LOCATION	1
2.0 STATEMENT OF BASIS AND PURPOSE	1
3.0 ASSESSMENT OF THE NORTHWESTERN CORNER GROUNDWATER OPERABLE UNIT	1
4.0 DESCRIPTION OF THE SELECTED REMEDY	1
5.0 STATUTORY DETERMINATIONS.....	2
6.0 ROD DATA CERTIFICATION CHECKLIST	2
7.0 AUTHORIZING SIGNATURES	3
PART 2: DECISION SUMMARY	
1.0 SITE NAME, LOCATION, AND BRIEF DESCRIPTION	5
2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES	5
2.1 Remedial Investigation	5
2.2 Interim Remedial Action.....	9
2.3 OU 1 Groundwater ROD	9
2.4 Site-Wide Comprehensive ROD.....	10
2.5 Post-ROD Investigations of Dieldrin in the NWC.....	10
2.6 NWC Dieldrin Feasibility Study.....	11
3.0 COMMUNITY PARTICIPATION	12
4.0 SCOPE AND ROLE OF THE RESPONSE ACTION	13
5.0 SITE CHARACTERISTICS.....	13
5.1 Physical Setting.....	13
5.2 Surface Water Hydrology	14
5.3 Regional Geology	14
5.4 Site Geology and Groundwater Hydrology	14
5.5 Nature and Extent of Contamination	17
5.5.1 Dieldrin Source	17
5.5.2 Migration Pathways	17
5.5.3 Plume Extent.....	18
5.5.4 Sampling Strategy.....	18
5.5.5 Other Site-Specific Factors	18
6.0 CURRENT AND POTENTIAL FUTURE LAND AND WATER USES	21

TABLE OF CONTENTS (Continued)

PART 2: DECISION SUMMARY (Continued)

	<u>Page</u>
7.0	SUMMARY OF SITE RISKS 22
7.1	Human Health Risks 22
7.1.1	Toxicity 22
7.1.2	Potential Receptors 23
7.1.3	Uncertainty 25
7.2	Ecological Risks 25
8.0	REMEDIAL ACTION OBJECTIVES 26
9.0	DESCRIPTION OF ALTERNATIVES 26
9.1	Description of Remedy Components 27
9.1.1	Alternative 1 27
9.1.2	Alternative 2 28
9.1.3	Alternative 3 28
9.1.4	Agreed Upon Alternative 29
9.2	Common Elements and Distinguishing Features of Each Alternative 29
9.2.1	ARARs 30
9.2.2	Long-Term Reliability of Remedy 30
9.2.3	Untreated Waste and Treatment Residuals 30
9.2.4	Estimated Time for Design and Construction 30
9.2.5	Estimated Time to Meet Remedial Action Objectives 30
9.2.6	Cost 30
9.2.7	Use of Presumptive Remedies and/or Innovative Technologies 31
9.3	Expected Outcomes of Each Alternative 31
10.0	COMPARATIVE ANALYSIS OF ALTERNATIVES 31
10.1	Threshold Criteria 33
10.1.1	Overall Protection of Human Health and the Environment 33
10.1.2	Compliance with ARARs 34
10.2	Primary Balancing Criteria 34
10.2.1	Long-Term Effectiveness and Permanence 34
10.2.2	Reduction of Toxicity, Mobility, or Volume through Treatment 35
10.2.3	Short-Term Effectiveness 35
10.2.4	Implementability 36
10.2.5	Cost 36
10.3	Modifying Criteria 36
10.3.1	State/Support Agency Acceptance 36
10.3.2	Community Acceptance 37
11.0	PRINCIPAL THREAT WASTES 37
12.0	SELECTED REMEDY 37
12.1	Summary of the Rationale for the Selected Remedy 37
12.2	Detailed Description of the Selected Remedy 37

TABLE OF CONTENTS (Continued)

PART 2: DECISION SUMMARY (Continued)

	<u>Page</u>
12.3 Cost Estimate for the Selected Remedy	42
12.4 Expected Outcomes of Selected Remedy	44
13.0 STATUTORY DETERMINATIONS.....	45
13.1 Protection of Human Health and the Environment.....	45
13.2 Compliance with ARARs	45
13.2.1 Chemical-Specific ARARs	45
13.2.2 Location- and Action-Specific ARARs and TBCs	47
13.3 Cost Effectiveness.....	47
13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable	47
13.5 Preference for Treatment as a Principal Element.....	50
13.6 Five-Year Review Requirements	50
REFERENCES	50

PART 3: RESPONSIVENESS SUMMARY

1.0 OVERVIEW	53
2.0 BACKGROUND OF COMMUNITY INVOLVEMENT	53
3.0 SUMMARY OF PUBLIC COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD	53
4.0 REMAINING CONCERNS	53

ATTACHMENT A – Final Dispute Resolution Letter, 14 April 2010

Appendices

- Appendix A – Addendum to the Real Property Master Plan Digest
- Appendix B – Response to Comments and Informal Dispute Documentation

LIST OF TABLES

	<u>Page</u>
7-1 Dieldrin Concentrations, Toxicity Factors, Carcinogenic Risk and Hazard Estimates, NWC Groundwater OU, Human Health Risk Assessment	23
10-1 Relative Ranking of Remedial Alternatives Against CERCLA Criteria	32
12-1 Cost Estimate Summary for the Selected Remedy	43
12-2 Summary of Present Worth Analysis.....	44
13-1 ARARs and TBCs for the NWC Groundwater Operable Unit, Tracy Site.....	48

LIST OF FIGURES

1-1 Location of the Tracy Site.....	6
1-2 Dieldrin Plume, Wells, and CPTs Associated with the NWC, Tracy Site.....	7
5-1 Location and Status of Plumes, Tracy Site	16
5-2 Hydrogeologic Cross-Section A-A', NWC Dieldrin Plume, Tracy Site	19
12-1 On-Site Portions of the NWC Dieldrin Plume Requiring Land Use Controls, Tracy Site	40

LIST OF ACRONYMS AND ABBREVIATIONS

ACL	aquifer cleanup level
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
Cal/EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
CPT	cone penetrometer test
CVRWQCB	Central Valley Regional Water Quality Control Board
DCE	dichloroethene
DDD	4,4'-dichlorodiphenyldichloroethane
DDE	4,4'-dichlorodiphenyldichloroethene
DDT	4,4'-dichlorodiphenyltrichloroethane
DLA	Defense Logistics Agency
DoD	Department of Defense
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ESD	explanation of significant difference
FFA	Federal Facilities Agreement
HHRA	human health risk assessment
HQ	hazard quotient
IG	infiltration gallery
IRM	interim remedial measure
kg _{BW}	kilogram body weight
mg	milligram
msl	mean sea level
NCP	National Contingency Plan
NPL	National Priorities List
NWC	Northwestern Corner
OEHHA	Office of Environmental Health Hazard Assessment
OMB	Office of Management and Budget
OU	operable unit
PCE	tetrachloroethene
RAO	remedial action objective
RAR	relevant and appropriate requirement

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

RfD	reference dose
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SF	slope factor
SSL	sanitary sewage lagoon
TCE	trichloroethene
URS	URS Group, Inc.
VOC	volatile organic compound
WDR	waste discharge requirement
µg/L	micrograms per liter
°F	degree Fahrenheit
2,4-D	2,4-dichlorophenoxyacetic acid

PART 1: DECLARATION

1.0 SITE NAME AND LOCATION

Site Name: Tracy Defense Depot (USARMY)—Currently designated the Defense Distribution Depot–San Joaquin–Tracy Site (Tracy Site), it includes the active depot and an adjoining annex property.

Site Location: Tracy, California.

National Superfund Database Identification Number: CA4971520834.

2.0 STATEMENT OF BASIS AND PURPOSE

This decision document presents the remedial action selected by the Defense Logistics Agency (DLA) and the U.S. Environmental Protection Agency (EPA) to address the dieldrin-contaminated Northwestern Corner (NWC) Groundwater Operable Unit (OU) at the Tracy Site, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. The selected action is also in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Part 300) and Chapter 6.8 of the California Health and Safety Code (Section 25300 et seq.). This decision is based on pertinent and relevant information contained in the Administrative Record file for this site.

The State of California concurs with the selected remedy.

3.0 ASSESSMENT OF THE NORTHWESTERN CORNER GROUNDWATER OPERABLE UNIT

The response action selected in this record of decision (ROD) is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this site that may present an imminent and substantial endangerment to public health or welfare.

4.0 DESCRIPTION OF THE SELECTED REMEDY

The selected remedy in this ROD is specific to this unique situation of dieldrin-contaminated groundwater in the NWC Groundwater OU at the Tracy Site. Other groundwater plumes containing only volatile organic compounds (VOCs) or a mixture of VOCs and dieldrin located elsewhere beneath and down-gradient from the Tracy Site are addressed in the *Operable Unit No. 1 Record of Decision, DDRW-Tracy, California* (Woodward-Clyde Consultants, 1993), and the *DDJC-Tracy Site-Wide Comprehensive Record of Decision* (Radian International, 1998a).

The selected remedy for the NWC Groundwater OU will remove dieldrin from groundwater to the extent technically and economically feasible for a maximum of three years, consistent with the 14 April 2010 dispute resolution agreement (Attachment A). The selected remedy involves:

- Design and installation of a groundwater extraction and treatment system in the NWC Groundwater OU. The system will include four groundwater extraction wells and a liquid-phase granular activated carbon treatment unit, with the treated water to be discharged to infiltration galleries on the Tracy Site.
- Operation and maintenance of the system for a period up to three years.

- Institution and inspection of on-site land use controls on the Tracy Site during extraction and treatment and, as appropriate, after the conclusion of extraction and treatment operations.
- Monthly monitoring of the four extraction wells, quarterly monitoring at eight monitoring wells, reporting of the results in quarterly monitoring reports during groundwater extraction and treatment, and the preparation of an interim remedial action completion report and preliminary project completion report.

5.0 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining on site above concentrations that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to verify that the remedy is, or will be, protective of human health and the environment. Five-year reviews will be conducted if LUCs are deemed appropriate after completion of the three-year remedial action in accordance with CERCLA §121(c).

6.0 ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this site, which is located on the Tracy Site at 25600 S. Chrisman Road, Tracy, California.

- Chemical of concern and its respective concentrations in the NWC (Part 2, Section 2.0)
- Baseline risk represented by the chemical of concern (Part 2, Section 7.0)
- How source materials constituting principal threats are addressed (Part 2, Section 11.0)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater analyzed in the baseline risk assessment and ROD (Part 2, Section 12.4, Section 5.0, Section 6.0; and Part 2, Section 7.0, respectively)
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Part 2, Section 12.4)
- Estimated capital, annual operation and maintenance, periodic and total present worth costs, discount rates, and the number of years over which the remedy cost estimates are projected (Part 2, Section 12.3)
- Key factor(s) that led to selecting the remedy (Part 2, Section 12.1)

7.0 AUTHORIZING SIGNATURES

The DLA and the EPA jointly select the remedy described in Section 12 of this Record of Decision for the Northwestern Corner Site.



Lawrence R. Tatman Date
Site Director
DLA Installation Support at San Joaquin
Defense Logistics Agency



Phillip R. Dawson Date
Staff Director
DLA Installation Support Environmental Management
Defense Logistics Agency



Michael Montgomery Date
Assistant Director
Federal Facilities and Site Cleanup Branch
Region 9
U.S. Environmental Protection Agency



Allen Wolfenden Date
Performance Manager
Brownsfield and Environmental Restoration
Sacramento Cleanup Branch
Department of Toxic Substances Control
California Environmental Protection Agency

for


Pamela Creedon Date
Executive Officer
Central Valley Region
Regional Water Quality Control Board
California Environmental Protection Agency

This page intentionally left blank

PART 2: DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

The Tracy Site was identified as the Tracy Defense Depot (USARMY) when it was added to the National Priorities List (NPL) in 1990. The Tracy Site National Superfund Database Identification Number is CA4971520834. The first record of decision (ROD) executed for the Tracy Site documents the remedial action for Operable Unit (OU) 1, the volatile organic compound (VOC)-contaminated groundwater plumes, on and off depot, that are emanating from the Tracy Site. The primary chemicals of concern (COCs) in OU 1 groundwater are dissolved concentrations of the solvents trichloroethene (TCE) and tetrachloroethene (PCE), as documented in the *Operable Unit No. 1 Record of Decision, DDRW-Tracy, California* (Woodward-Clyde Consultants, 1993). The remedial action for dieldrin (a pesticide) commingled with TCE and PCE in OU 1 groundwater is documented in the *DDJC-Tracy Site-Wide Comprehensive Record of Decision* (Radian International, 1998a). The current ROD establishes the remedy for the Northwestern Corner (NWC) Groundwater OU, which was not included in the 1998 ROD and consists of groundwater containing only dieldrin contamination that underlies the NWC of the Tracy Site and adjoining privately owned land.

The Defense Logistics Agency (DLA) is the lead agency for the Tracy Site. The U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board–Central Valley Region (CVRWQCB) provide oversight under the 1991 Federal Facility Agreement (FFA) for the site.

The Tracy Site is in unincorporated San Joaquin County, 1.5 miles southeast of the City of Tracy, California (Figure 1-1). The site is designated in the City of Tracy Master Plan as a public facility, the same land use designation as the Tracy Municipal Airport (City of Tracy, 2010). Land use on the Tracy Site is controlled by the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* (formerly the *Installation Master Plan*), which effectively manages the land use as industrial (R&K Engineering, 2009). The operating portion of the Tracy Site is on a 448-acre triangular parcel, and the Tracy Site annex is 460 acres of agricultural land adjoining the northern boundary of the operating depot. The NWC Groundwater OU occupies approximately 6.2 acres encompassing parts of the operating portion of the Tracy Site depot, the Tracy Site annex, private agricultural property, and a segment of a Union Pacific railroad right-of-way (Figure 1-2). In this ROD, the NWC Groundwater OU is defined by the estimated extent of dieldrin concentrations exceeding 0.05 micrograms per liter ($\mu\text{g/L}$) in groundwater. The Tracy Site depot portion of the NWC is primarily used for recreational activities by depot personnel; it is a landscaped, irrigated area, except for an asphalt parking lot at the southern end.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

This section recounts the history of investigation and enforcement activities at the Tracy Site with an emphasis on the NWC.

2.1 Remedial Investigation

DLA began the remedial investigation (RI) of the Tracy Site in 1980. In that same year, 12 monitoring wells were constructed to evaluate whether chemicals released on the site migrated to groundwater (USATHAMA, 1980). VOCs were detected in groundwater samples, and in May 1984, the CVRWQCB was informed that TCE and PCE were detected in samples from three monitoring wells at concentrations exceeding the California Department of Health Services action levels of 5 $\mu\text{g/L}$. From 1986 to 1992, the

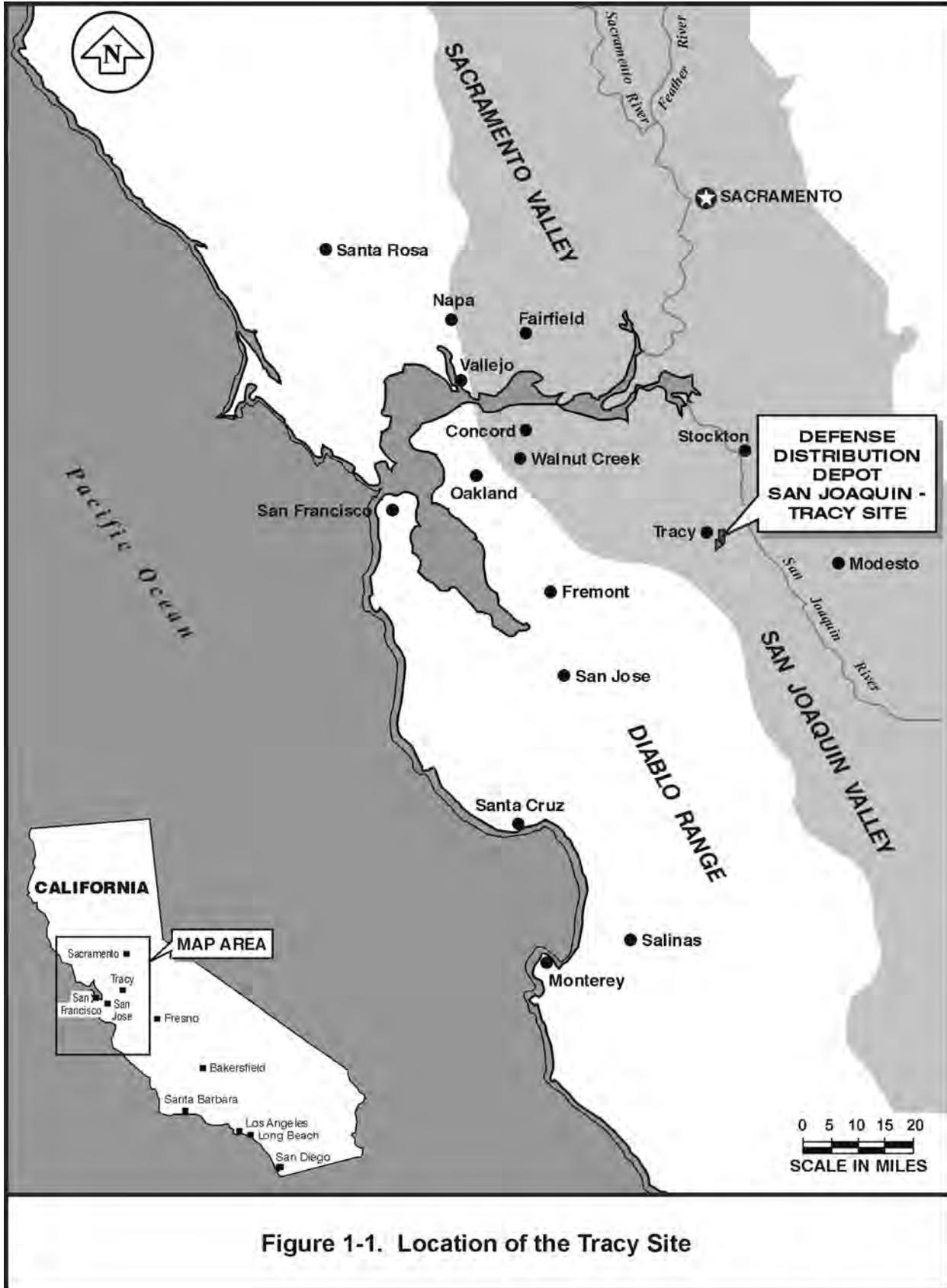


Figure 1-1. Location of the Tracy Site

Tracy\Dioldrin\06-09-Tracy-Dioldrin-loc-map.cdr - VMG 01/04/11 SAC2



This page intentionally left blank

RI identified soil contaminated with metals, VOCs, pesticides, herbicides, fuel hydrocarbons, and several semivolatile organic compounds, and groundwater contaminated with VOCs, pesticides, herbicides, and fuel hydrocarbons (Radian Corporation, 1986; Montgomery Watson, 1994; Woodward-Clyde Consultants, 1996). The RI identified VOC plumes that had migrated from source areas on the Tracy Site downgradient beneath privately owned agricultural land. One of the VOC plumes contained the pesticide dieldrin (Woodward-Clyde Consultants, 1993).

After determining the approximate extent of the VOC plumes, DLA constructed and operated an interim remedial measure (IRM) consisting of a groundwater extraction, treatment, and discharge system to remediate the most contaminated portion of the VOC plume migrating toward the northern boundary of the Tracy Site.

In August 1990, the Tracy Site was placed on the NPL. In June 1991, the FFA was executed by DLA, EPA, California Department of Health Services, and CVRWQCB.

2.2 Interim Remedial Action

The design of the IRM was reviewed and accepted by EPA, DTSC, and CVRWQCB in 1990. The IRM design included three gravity-fed injection wells to be installed in the NWC for the purpose of discharging groundwater that had been treated through air stripping to remove VOCs. The State of California issued waste discharge requirements (WDRs) in Order No. 90-275 to regulate discharges from the IRM after treatment. Concentration limits were set at 1.0 µg/L for TCE and PCE in effluent from the treatment plant; however, no concentration limit was set for dieldrin.

The injection wells were installed in late 1990 and early 1991 as part of the IRM extraction, treatment, and discharge system. Five monitoring wells were also installed near the IRM injection wells in 1991. Dieldrin was inadvertently introduced to groundwater in the NWC through the operation of injection wells IW001, IW002, and IW003 during three periods of operation that began in 1991 and ended in 1995. This occurred because the air stripper used in treating the groundwater was not designed to remove dieldrin. Figure 1-2 shows the locations of injection and monitoring wells that were present in the NWC in 1995.

During testing of the IRM in 1992, dieldrin was detected in groundwater effluent from the air stripper; the highest detected concentration was 0.236 µg/L (Montgomery Watson, 1995a). In 1993, dieldrin was first detected in groundwater samples collected from four NWC monitoring wells (LM106A, LM107C, LM109B, LM110C). The injected effluent from the IRM treatment plant was not identified as the source of dieldrin in these wells for several years (Montgomery Watson, 1996a; Rust, 1999).

2.3 OU 1 Groundwater ROD

In August 1993, the final OU 1 ROD was signed to implement the remedy for contaminated groundwater, selected based on evaluation of the remedial alternatives presented in the *DDRW-Tracy Remedial Investigation/Feasibility Study Report* (RI/FS report). The OU 1 ROD established numeric aquifer cleanup levels (ACLs) for PCE, TCE, and 1,1-dichloroethene (DCE). The presence of dieldrin, 4,4'-dichlorodiphenyltrichloroethane (DDT), simazine, and 2,4-dichlorophenoxyacetic acid (2,4-D) in Tracy Site groundwater was acknowledged in the OU 1 ROD; however, the ROD stated that the chemicals were to be further evaluated in the *DDJC-Tracy Site-Wide Comprehensive ROD*. The selected remedy for OU 1 included groundwater extraction, ex situ treatment using air stripping to remove volatile COCs, and infiltration of treated groundwater via injection wells and surface impoundments.

New WDRs were established by CVRWQCB in Order Number 94-275, which set a daily maximum dieldrin effluent concentration limit of 0.1 µg/L and a monthly mean concentration of 0.05 µg/L.

After attempts to rehabilitate the injection wells, groundwater injection in the NWC of the Tracy Site was suspended as an infeasible effluent disposal method in 1995 due to poor injection well design, high operational costs, and improper flow control at the wellheads (Montgomery Watson, 1995b).

The remedy for OU 1 was modified with an explanation of significant differences (ESD) in 1995 (Montgomery Watson, 1996b). The ESD revised the concentration limits in treatment plant effluent for six pesticides and herbicides. However, the effluent concentration limit for dieldrin was the same as established by CVRWQCB Order No. 94-275.

The RI/FS report erroneously concluded that dieldrin in groundwater originated from non-point sources (e.g., agricultural activities) and was not caused by Tracy Site activities (Montgomery Watson, 1996a). The RI/FS report also erroneously concluded that the dieldrin detections at wells in the NWC were most likely from a source west of the Tracy Site, and no remedy for the dieldrin was evaluated in the RI/FS report.

2.4 Site-Wide Comprehensive ROD

The *DDJC-Tracy Site-Wide Comprehensive Record of Decision* added dieldrin as a COC for groundwater, established a cleanup level of 0.05 µg/L based on a 1998 State of California action level for groundwater, and added nine pesticide extraction wells to the OU 1 remedy (Radian International, 1998a). None of the extraction wells were located in the NWC because it was not identified as a location with contaminated groundwater in the ROD. Wellhead treatment with liquid-phase granular activated carbon was selected as the treatment to remove dieldrin from extracted groundwater to the ACL of 0.05 µg/L. Wellhead treatment was subsequently installed for six extraction wells.

2.5 Post-ROD Investigations of Dieldrin in the NWC

An investigation of dieldrin in the NWC was planned in 1998 to identify the source of dieldrin detected in groundwater samples collected from wells in that area; determine the horizontal and vertical extent and magnitude of contamination; and determine the size and appropriate extraction, conveyance, and discharge systems (Radian International, 1998b). Collection of near surface soil samples and groundwater from the Upper and Middle Geologic Horizons was intended to meet the objectives of the investigation. Depending on the results of the investigation, the installation of an extraction well and aquifer testing of the well would be undertaken to determine the radius of influence of the well and potential extraction rate.

Results from the investigation of 17 borings in the NWC indicated that dieldrin contamination was not present deeper than 85 feet below ground surface (bgs) and there were no surface or continuing sub-surface sources of dieldrin in the NWC of the Tracy Site. Dieldrin was detected at concentrations ranging from not detected levels (approximately 0.005 µg/L) to 0.25 µg/L. This investigation resulted in the recommendation to destroy injection wells IW001, IW002, and IW003; install a monitoring well at the northern boundary of the Tracy Site in the NWC; analyze samples from the well and two existing piezometers for dieldrin; and reach a decision on extraction of groundwater from the NWC on the basis of the monitoring data (Rust, 1999). In 1999, monitoring well LM174AU was installed, and sampling and analysis were initiated.

In the *OU 1 Pesticides Extraction and Treatment System Remedial Design (30%)* report (URS Group, Inc. [URS], 2000), aquifer testing was identified as a data need to support design of an extraction system for

groundwater containing dieldrin in the NWC. An aquifer test of LM174AU was proposed to address this data need. An aquifer test was performed at LM174AU in 2001.

No extraction system for the NWC was included in the *OU 1 Pesticide Remedial Design (100%)* submittal, which included the designs for seven extraction wells in the sanitary sewage lagoon (SSL) plume, one of several plumes addressed in the OU 1 ROD (URS, 2002). The 100 percent design submittal stated that the NWC dieldrin contamination had not been fully characterized and that sampling of the existing monitoring wells would continue.

In 2003, DLA asserted that the dieldrin plume was naturally attenuating because of the chemical's high adsorption coefficient for particles of organic carbon in the aquifer solids (URS, 2003). EPA, DTSC, and CVRWQCB required that the northern extent of dieldrin contamination in groundwater be determined.

A cone penetrometer test (CPT)/HydroPunch investigation was undertaken on the private property in the NWC. Dieldrin was not detected in any of the 12 groundwater samples collected on the property in September 2004 (URS, 2005). DLA interpreted these results as supporting the hypothesis of natural attenuation, and suggested that the nature and extent of dieldrin in the NWC could be better characterized and delineated by collecting additional HydroPunch samples.

With EPA, DTSC, and CVRWQCB concurrence, DLA conducted additional saturated soil and groundwater sampling in 2005 and 2006. Thirty-five locations were sampled to the north, east, south, and west of the previously documented dieldrin plume extent. Samples were collected from four depths at each location. Dieldrin was reported at concentrations ranging from less than the analytical detection limit to 0.26 µg/L. The extent of dieldrin contamination was better defined by the sampling effort. The results also provided evidence that natural attenuation of dieldrin is occurring (URS, 2007). Representatives of EPA, DTSC, and CVRWQCB agreed with the conclusions that the dieldrin plume was adequately characterized and that it had not migrated after injection.

In 2007, DLA proposed monitored natural attenuation with institutional controls as the remedy for dieldrin in the NWC. An ESD to the OU 1 ROD was suggested as the method to document the remedy modification. The regulatory agencies requested documentation that remediation of dieldrin in the NWC by extraction and treatment was technically and economically infeasible. DLA decided to prepare a feasibility study report to select a remedy for the NWC because the NWC plume was not addressed in the OU 1 ROD. The CVRWQCB stated that an aquifer test should be performed to determine if dieldrin mass can be removed by groundwater extraction in the NWC.

To support development of an FS, in 2008 DLA conducted an additional CPT/HydroPunch investigation, installed two extraction wells (EW055B and EW056A) and four monitoring wells, and conducted a 30-day aquifer test at both of the new extraction wells (URS, 2010). During the test at EW056A, dieldrin concentrations in groundwater varied from 0.16 to 0.24 µg/L; dieldrin concentrations were less than the detection limit of 0.02 µg/L in samples collected from EW055B. Results of the investigation confirmed that concentrations of dieldrin exceeding 0.05 µg/L are not present deeper than 85 feet bgs and do not extend beyond the Tracy Site boundaries to the west and northwest. The plume does extend beyond the Tracy Site beneath the Union Pacific railroad right-of-way and a short distance to the northeast beyond the narrow strip of the Tracy Site annex onto private property (Figure 1-2).

2.6 NWC Dieldrin Feasibility Study

DLA conducted an FS for remediation of dieldrin in groundwater. In the *Northwestern Corner Dieldrin Plume Feasibility Study Report*, three alternatives were evaluated: (1) no action, (2) land use controls, and (3) extraction and treatment (URS, 2010). In the draft final FS, DLA identified land use controls as the

preferred alternative. However, the State of California did not concur and on 1 July 2009 initiated the informal dispute process with DLA, as prescribed in the FFA. Resolution was not attained during the informal dispute period, and EPA invoked formal dispute on 13 October 2009. The dispute was resolved through an agreement on 14 April 2010. In resolution of the dispute, another remedial alternative was added and was agreed upon as the preferred alternative. This remedial alternative will be referred to as the “Agreed Upon Alternative” in this ROD. The Agreed Upon Alternative consists of removing dieldrin mass from groundwater in the NWC using extraction and treatment to the extent technically and economically feasible. DLA will also implement land use controls to limit exposure to any residual dieldrin concentrations that could prevent unlimited use of the site. The dispute resolution process was documented in the final FS report.

A proposed plan presented the Agreed Upon Alternative for the NWC Groundwater OU to the public. The public was invited to read the plan and provide comments in writing or by speaking at the public meeting.

3.0 COMMUNITY PARTICIPATION

Public outreach is a key component in the CERCLA process. Outreach activities relating to the NWC of the Tracy Site are summarized in this section.

The Environmental Services Branch DLA Installation Support at San Joaquin has maintained a community involvement program since the 1980s. The key components of this program include the following:

- Providing general information updates to the community through distribution of the depot’s *Environmental Update* fact sheets to a community mailing list that includes interested parties (approximately 200 addresses) and all mailing addresses within the postal zones surrounding the depot (more than 3,000 addresses).
- Notifying the community of program milestones and providing opportunities for public review and comment through public notices placed in local newspapers, as required under CERCLA.
- Holding public meetings to present milestone documents and solicit public review and comment, as required under CERCLA.

In accordance with *A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents* (EPA, 1999), DLA distributed a proposed plan for dieldrin-contaminated groundwater in the NWC of the Tracy Site. The public comment period was from 19 October to 18 November 2010. A notice of the public comment period and public meeting was published in the following newspapers:

Tracy Press (Friday, 15 October 2010)
Manteca Bulletin (Monday, 18 October 2010)
Stockton Record (Monday, 18 October 2010)
Vida en el Valle (Stockton edition) (Wednesday, 20 October 2010)

The FS and proposed plan were made available to the public in the Administrative Record file located at the Defense Distribution Depot San Joaquin – Tracy Site, 25600 S. Chrisman Road, Tracy, California, and at the Tracy Public Library, 20 East Eaton Avenue, Tracy, California.

The public meeting was held on 3 November 2010 to present the proposed plan to the community and to solicit public input on remedial alternatives presented in the proposed plan. At this meeting, representatives from DLA, EPA, CVRWQCB, and DTSC were available to answer questions about the site and the proposed plan. There were no comments from the public on the proposed plan during the meeting, and no written comments were received during the public comment period.

4.0 SCOPE AND ROLE OF THE RESPONSE ACTION

The remedial action documented in this ROD is specific to the unique situation of dieldrin-contaminated groundwater in the NWC Groundwater OU. This is the second of two operable units for remediation of groundwater at the Tracy Site. Groundwater plumes containing only VOCs or the mixture of VOCs and dieldrin contamination elsewhere beneath the Tracy Site are referred to as OU 1. The *Operable Unit No. 1 Record of Decision, DDRW-Tracy, California*, documents the remedy for VOCs in groundwater, and the *DDJC-Tracy Site-Wide Comprehensive Record of Decision* added a treatment and a cleanup level for dieldrin; however, neither of these previous RODs for the Tracy Site selects a response action for dieldrin in groundwater beneath the NWC. The NWC Groundwater OU differs from OU 1 because it does not contain VOC contamination, the NWC dieldrin plume is isolated from other plumes, and dieldrin was introduced into groundwater in this area by injection. The construction of the OU 1 remedy is complete and remediation is presently ongoing.

Cleanup of sources of contamination in vadose zone soils on the Tracy Site has been performed through a series of excavation and soil vapor extraction remedial actions. There is no dieldrin contamination in the surface or vadose zone soil in the NWC. Therefore, the selection of a soil remedy is not necessary to protect human health and the environment. DLA eliminated the source of the dieldrin in the NWC Groundwater OU in 1995 when discharge of air stripper effluent from the IRM treatment system to the injections wells was halted. The three injection wells were destroyed in 1999.

5.0 SITE CHARACTERISTICS

Most of the NWC dieldrin plume is located beneath the Tracy Site. However, a small portion of the plume extends under private agricultural land and a railroad right-of-way, and onto the southwestern part of the Tracy Site annex.

5.1 Physical Setting

The Tracy Site is in the San Joaquin Valley west of the San Joaquin River and approximately 1.5 miles southeast and outside the city limits of the City of Tracy (Figure 1-1). The Tracy Site is an industrial facility used for the distribution of supplies to military customers. The active installation and the adjacent annex property together encompass 908 acres; approximately 75 percent of the active installation is covered with warehouses, shops, storage areas, and roads. The area of the NWC Groundwater OU occupies the northwestern corner of the active depot and a small, triangular portion of the annex property (Figure 1-2). The NWC Groundwater OU includes a recreational area for depot employees that is covered with grass, trees, and other vegetation, with the exception of a parking lot at the southern end. Prior to the construction of the depot, the NWC area was much like it is today, with the exception of the recreational facilities and landscaping. There are no known cultural resources of archeological or historical significance at the Tracy Site. The annex area is unpaved agricultural land; its only permanent structure is Groundwater Treatment Plant (GWTP) 2. The land adjoining the NWC Groundwater OU to the west, north, and northeast are used for agriculture. A Union Pacific railroad right-of-way dissects the DLA-owned portion of the NWC into two parts.

The ground surface of the Tracy Site ranges in elevation from 110 feet above mean sea level (msl) on the southwest to 45 feet above msl on the northeast. The NWC Groundwater OU has an elevation of approximately 75 feet msl.

The climate at the Tracy Site is characterized by dry, hot summers and wet, mild winters. Average summer temperatures range from 60 to over 100 degrees Fahrenheit (°F), and average winter temperatures range from 30°F to 50°F. The majority of precipitation occurs between December and April. Rainfall has averaged 10.9 inches per year since 1973. In wetter years, as much as 21.47 inches of rain have fallen; in drier years, as little as 4.85 inches have fallen.

5.2 Surface Water Hydrology

The principal drainages in the vicinity of the Tracy Site are Tom Paine Slough north of the depot, Corral Hollow Creek south of the depot, and the San Joaquin River east of the depot. Stormwater runoff within the depot is collected in drains that discharge to an unlined stormwater detention pond (Figure 5-1). Water infiltrates and migrates toward the water table beneath the unlined stormwater detention pond. Wastewater from the depot is treated at the depot's wastewater treatment plant prior to discharge to the unlined sanitary sewage lagoons in the northern portion of the depot, southeast of the stormwater detention pond.

Currently, all treated groundwater is discharged to groundwater at infiltration galleries (IG) 2 through IG6 on the Tracy Site annex. The orchards and agricultural farmland on the Tracy Site annex and surrounding area are watered primarily by flood irrigation. Unlined ditches between farm fields and roads convey stormwater runoff and irrigation drainage to local percolation swales.

5.3 Regional Geology

The geological deposits from the surface to a depth of 20 to 30 feet bgs originated from materials eroded from the Diablo Range that were carried to the north and east by streams or winds. One buried braided stream channel has been identified in the area from boring logs (Montgomery Watson, 1996a). The stream channel deposits trend approximately northeasterly across the Tracy Site.

5.4 Site Geology and Groundwater Hydrology

The geology of subsurface deposits to a depth of approximately 211 feet bgs at the depot has been compiled from data collected during monitoring well logging, CPT logs, time-domain electromagnetic surveys, evaluation of agricultural well logs, and logging of extraction well and piezometer borings. Surface soils are loams to sandy loams that have been disturbed by agricultural development followed by industrial development.

For the purpose of environmental investigations at the Tracy Site, the subsurface deposits have been divided informally into four geologic units designated the Above Upper, Upper, Middle, and Lower Geologic Horizons (Woodward-Clyde Consultants, 1993; Montgomery Watson, 1995c). The Lower Geologic Horizon also includes a Below-Lower Geologic Horizon beneath the Tracy Site annex. The depth, thickness, and lithology of the geologic horizons vary across the Tracy Site. With the exception of the Above Upper Geologic Horizon, the horizons consist of sand, silty sand, clayey sand, and gravel separated by silt and clay.

The following geologic features are present beneath in the NWC Groundwater OU (URS, 2010):

- From ground surface to approximately 25 feet bgs (50 msl), the lithology is dominated by clay and clayey silt, which are likely to have low permeability.

- From 25 feet bgs (50 feet msl) to approximately 40 feet bgs (35 feet msl), sand deposits, which are likely to have high permeability, are present. Each sand deposit ranges from 5 to 8 feet thick and appears to be continuous to the south; continuity of the sand deposits beneath the Union Pacific railroad and Tracy Site annex to the northeast is uncertain.
- The lithology from 40 feet bgs (35 feet msl) to approximately 90 feet bgs (-15 feet msl) is characterized by fine-grained silts and clays (low-permeability material) interbedded with discontinuous deposits of sands and gravels (high-permeability material).
- From approximately 90 feet bgs (-15 feet msl) to 103 feet bgs (-28 feet msl), sands (including interbeds of well-graded gravels) are prominent. This sand and gravel deposit appears to be laterally continuous beneath the Tracy Site and off-site areas.
- The deposits from 103 feet bgs (-25 feet msl) to 150 feet bgs (-75 feet msl), the maximum depth investigated in the NWC, are mostly clay and silt deposits with interbedded gravel or sand deposits.

The geologic horizons defined during the RI (Above Upper, Upper, Middle, Lower, and Below Lower Geologic Horizon) (Woodward-Clyde, 1993; Montgomery Watson, 1995c) have been simplified and grouped into hydrologic zones. In the NWC Groundwater OU, they are:

- Upper Hydrologic Zone:
 - Depth range: 17 to 65 feet bgs (58 to 10 feet msl)
 - Saturated thickness: 48 feet
- Middle Hydrologic Zone:
 - Depth range: 65 to 100 feet bgs (10 to -25 feet msl)
 - Saturated thickness: 35 feet
- Lower Hydrologic Zone:
 - Depth range: 100 to 190 feet bgs (-25 to -115 feet msl)
 - Saturated thickness 90 feet

Groundwater occurs at approximately 20 feet bgs in the NWC Groundwater OU. Groundwater in the Upper Hydrologic Zone beneath the Tracy Site is generally unconfined; in the Middle and Lower Hydrologic Zones, there is some degree of confinement.

Historically, groundwater flow in the vicinity of the Tracy Site has generally been to the north-northeast under the influence of topography and agricultural well pumping. Currently, groundwater flow is generally northeasterly in the Upper and Middle Hydrologic Zones at the Tracy Site with local variations caused by OU 1 groundwater extraction (pumping) and infiltration. Locally in the Upper and Middle Hydrologic Zones and broadly in the Lower Hydrologic Zone, hydraulic gradients suggest north-northeasterly groundwater flow. These flow conditions are also true in the NWC. The horizontal gradient averages approximately 0.002 in the Upper Hydrologic Zone. Vertical gradients at the Tracy Site, including the NWC, are generally downward from the Upper to Middle Hydrologic Zones and variable from upward to downward depending on geographic location and season between the Middle and Lower Hydrologic Zones.

Annual peak groundwater elevations occur during July through September each year. Historical water level data suggest that the rise in water levels occurs approximately 18 months after rain falls in the winter.

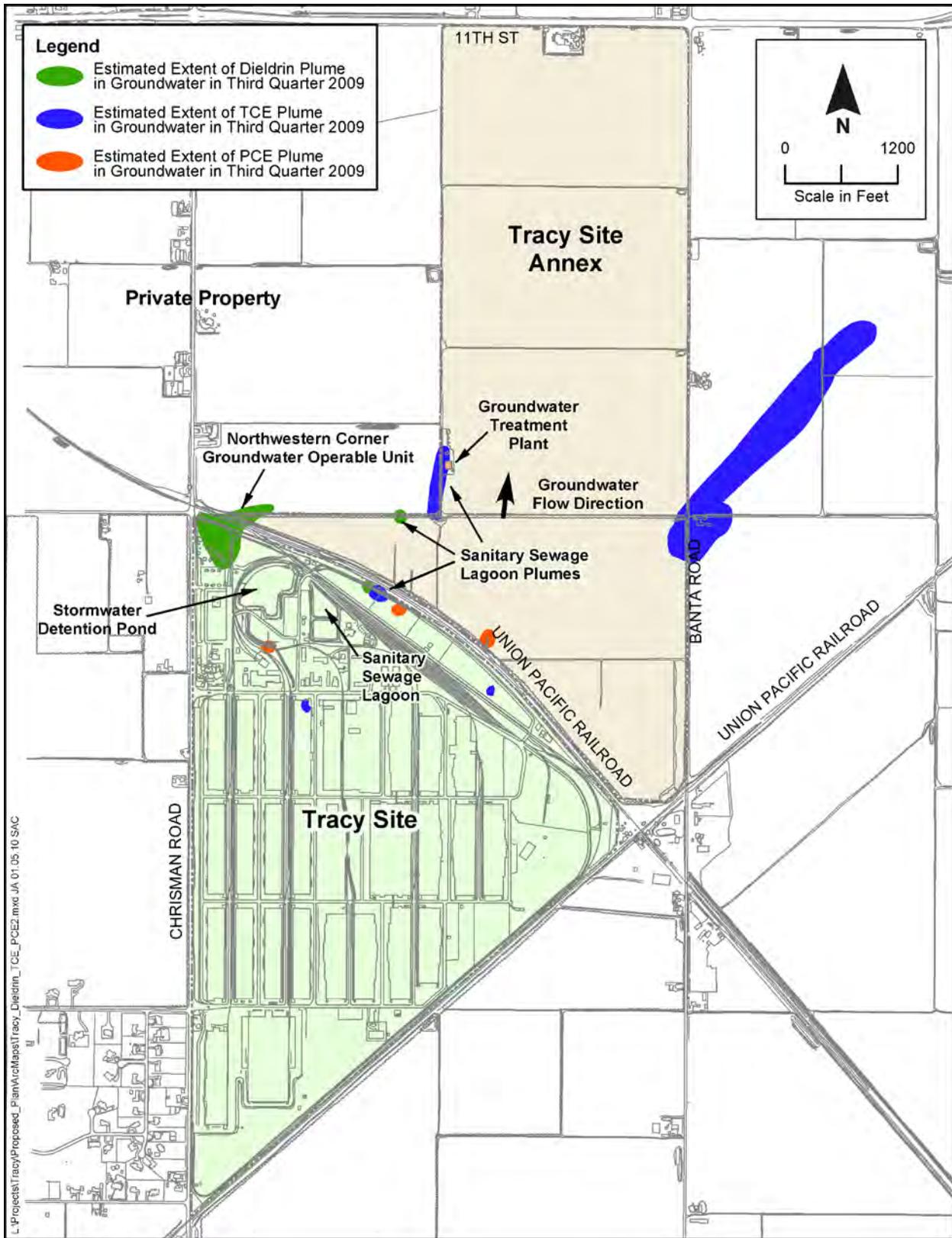


Figure 5-1. Location and Status of Plumes, Tracy Site

5.5 Nature and Extent of Contamination

5.5.1 Dieldrin Source

The source of dieldrin at the Tracy Site is the SSL, east of the NWC. The SSL plume, containing TCE, PCE, and pesticides, was the first Tracy Site plume to undergo remediation. Operation of the IRM extraction and treatment system began in 1990 to capture the SSL plume. The IRM system included six extraction wells, an air stripper, three injection wells, two piezometers, and 10 monitoring wells (ENSOTECH, 1991). The three injection wells, IW001 through IW003, were installed in the NWC area in late 1990 and early 1991 as part of the original IRM for discharge of groundwater treated to remove TCE and PCE from the SSL plume (Figure 1-2). Extracted groundwater was treated for VOCs only by air stripping, and the effluent that contained dieldrin and another pesticide, chlordane, was discharged to the injection wells. Chlordane has rarely been detected in groundwater samples collected in the NWC. Groundwater injection into the three injection wells in the NWC area was suspended as an infeasible effluent disposal method in 1995 because of poor well construction, high operational costs, and improper flow control at the wellheads (e.g., the wells could not accommodate a flow rate high enough to support full-scale OU 1 design) (Montgomery Watson, 1995b). The injection wells were destroyed in December 1999.

Dieldrin was detected in two NWC surface soil samples and one vadose zone soil sample during the RI. The locations of the detections were widely separated and concentrations were not great enough to warrant remediation (Montgomery Watson, 1994). In a subsequent CPT investigation, no dieldrin was detected in surface soil or vadose zone samples (Rust, 1999). With destruction of the injection wells, the source of dieldrin contamination in the NWC was permanently eliminated. No further source removal is necessary in the NWC.

5.5.2 Migration Pathways

The only migration pathway for dieldrin in the NWC is groundwater. After dieldrin was released to the saturated zone, migration travel directions and travel distances were initially controlled by sandy deposits that occur adjacent to the screen intervals of the former injection wells. However, the predominant lithologies beneath the NWC are interbedded fine-grained silts and clays. Deposits of coarse-grained sands and gravels are thinner than clay and silt deposits from the ground surface to 150 feet bgs throughout the NWC (Figure 5-2).

Two injection wells (IW001 and IW002) had three screen intervals, and the third (IW003) had two. The depths of screens in the injection wells ranged from 20 feet to 100 feet bgs. The former injection wells were screened across the higher permeability sand and gravel zones with the expectation that those zones would accept most of the discharge. However, groundwater carrying dieldrin also entered the fine-grained layers in the Upper and Middle Hydrologic Zones. The concentration isopleths for dieldrin drawn on the cross-section in Figure 5-2 show that dieldrin was distributed into fine-grained layers as well as coarse-grained layers cross-gradient, downgradient, and upgradient from the injection wells.

A review of quarterly potentiometric surface maps indicates that there has consistently been a north-northeasterly horizontal gradient in the Upper and Middle Hydrologic Zones of the Tracy Site since 1995, when injection was stopped. Groundwater is expected to continue to have a north-northeasterly gradient unless pumping wells with screens in the Upper and Middle Hydrologic Zones are installed near the NWC, which could change the gradient.

5.5.3 Plume Extent

The NWC dieldrin plume that has a concentration greater than 0.05 µg/L covers an area of approximately 6.2 acres and extends vertically from approximately 20 feet bgs to 85 feet bgs (Figures 5-1 and 5-2). This plume extent was estimated based on dieldrin concentrations detected in samples collected at monitoring wells sampled during the third quarter of 2009 and HydroPunch samples collected in 2006 and 2008 (URS, 2007 and 2010). The horizontal and vertical extents of dieldrin concentrations that exceed 0.05 µg/L have been determined except on the southern and northeastern ends of the NWC where concentrations between not detected levels (approximately 0.02 µg/L) and 0.07 µg/L may be present in the Middle Hydrologic Zone (Figure 5-2).

The mass of dieldrin is estimated to be approximately 0.01 pound in the NWC Groundwater OU (URS, 2010). The volume of groundwater in which dieldrin concentrations exceed 0.07 µg/L is defined laterally and vertically within the Upper and Middle Hydrologic Zones (20 feet to 85 feet bgs).

5.5.4 Sampling Strategy

All sampling in the NWC at the Tracy Site since 1999 has focused on the saturated zone. The soil samples collected in the NWC during the RI did not suggest there was pesticide contamination that would require remediation of soil (Montgomery Watson, 1994). Soil samples collected in 1998 confirmed the earlier conclusion regarding soil contamination (Rust, 1999). NWC groundwater sample analysis targeted organochlorine pesticides that had been detected, along with VOCs, in the SSL plume before the IRM testing began. Contamination in groundwater beneath the NWC is almost entirely dieldrin. From 1993 to 2006, concentrations between 0.04 µg/L and 0.1 µg/L of the pesticides heptachlor epoxide, chlordane, 4,4'-dichlorodiphenyldichloroethene (DDE), 4,4'-dichlorodiphenyldichloroethane (DDD), and DDT were detected sporadically in samples from monitoring wells (e.g., Radian Corporation/International, 1996 through 2001; URS, 2002 through 2008). VOCs have been detected in NWC groundwater, at concentrations just above the detection limit, in only two samples (Montgomery Watson, 1995a). Dieldrin is the only COC in groundwater beneath the NWC.

5.5.5 Other Site-Specific Factors

The site-specific factors that may affect response actions in the NWC of the Tracy Site are described in this section.

There is uncertainty regarding the effectiveness of groundwater extraction in the Upper and Middle Hydrologic Zones, where clay and silt deposits – in which dieldrin mobility would be expected to be greatly retarded – are most abundant. This uncertainty was one of the reasons that the comprehensive pump and treat alternative was not selected as the remedy.

Portions of the dieldrin plume extend beneath non-government properties. The potential for future activities on those properties, such as operation of a high-yield agricultural well near the plume, introduces uncertainty into predictions of future plume stability and the protectiveness of response actions limited to on-site contamination. The installation and operation of such a well could draw the plume downgradient from the NWC Groundwater OU and farther onto privately held land. This uncertainty will be partially addressed through the selected action that will reduce dieldrin concentrations in the more permeable /transmissive deposits.

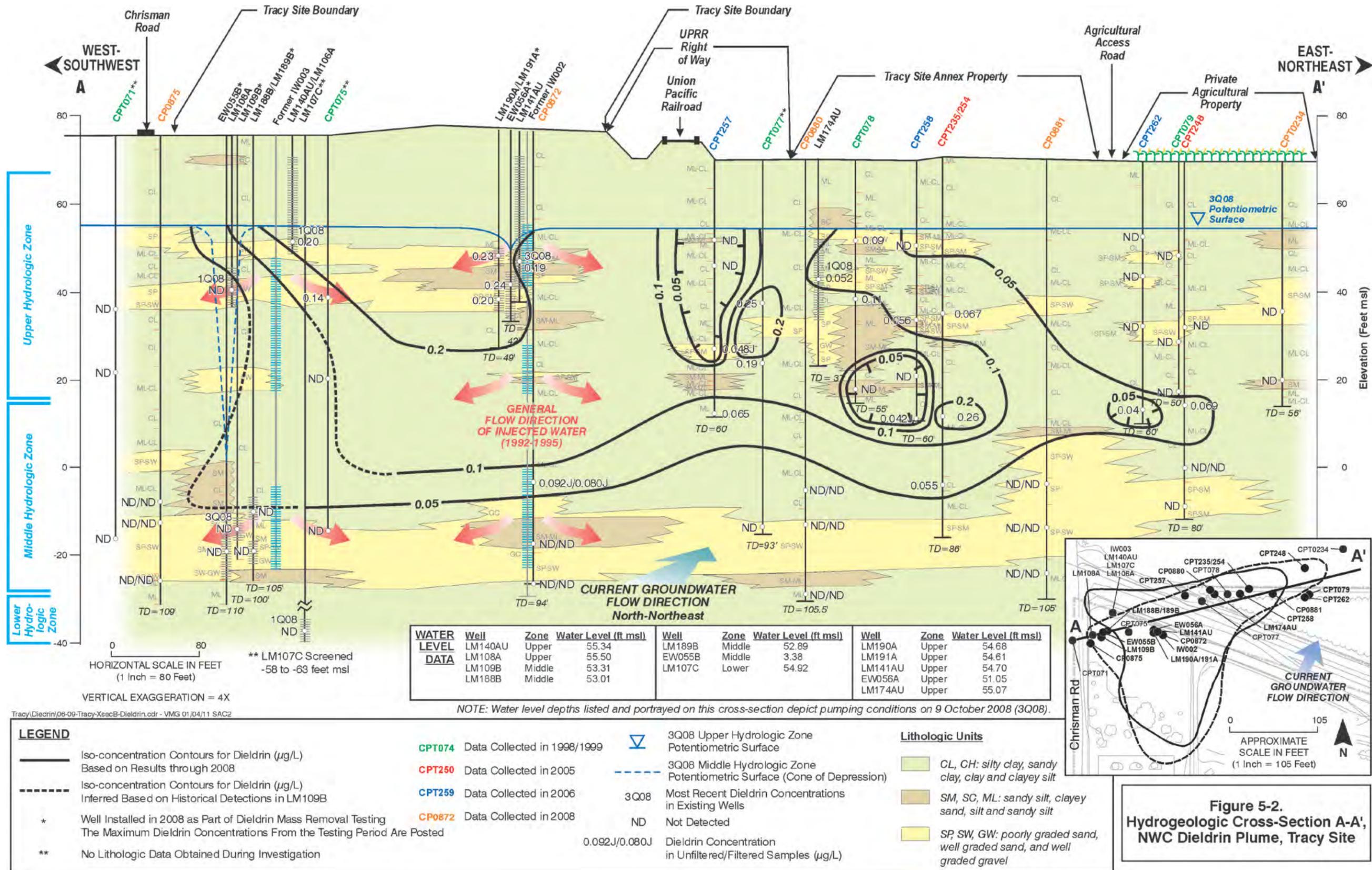


Figure 5-2.
Hydrogeologic Cross-Section A-A',
NWC Dieldrin Plume, Tracy Site

This page intentionally left blank

6.0 CURRENT AND POTENTIAL FUTURE LAND AND WATER USES

Prior to construction of the Tracy Site, the historical land use was primarily agricultural (irrigated cropland and orchards and pasture for livestock grazing) and industrial (railroad transportation). In 1942, the Tracy Site originated as a “sub depot” of the United States Army’s Quartermaster Corps, Oakland Army Depot. In 1963, operational control of the site was transferred to DLA, though the Army retains ownership of the property. The oldest buildings at the Tracy Site were built in 1942. No building or location at the site is currently identified as eligible for the National Register of Historic Places.

Current supply activities at the Tracy Site include storage, handling, preservation, packaging, and shipment of food, medical, construction, clothing, electronic, industrial, and general supplies and equipment to military services within the western United States and throughout the Pacific region.

Depot land is designated as a public facility in the *City of Tracy General Plan* and, as of 2010, is outside of the City of Tracy’s sphere of influence (City of Tracy, 2010). Three water supply wells in the southern portion of the depot provide all potable water, process water, and fire suppression water for the Tracy Site.

The area surrounding the Tracy Site comprises mixed-use light industrial, agricultural, and residential areas (City of Tracy, 2010). At the eastern corner of the depot, two major Union Pacific railroad lines intersect; small parcels to the south and east of the railroad intersection are designated for industrial or commercial use. Other areas outside of the City of Tracy sphere of influence include agricultural land consisting of orchards and row crops. These agricultural lands lie to the north (including the annex property), east, and south of the depot; scattered rural single-family residences are also present in these areas. To the west of the depot and within the City of Tracy limits are single-family residences in a low-density residential development. To the northwest of the depot and within the City of Tracy sphere of influence is an area designated for urban reserve, which is a designation for land outside of an urban growth boundary that will provide for future expansion.

Land use is industrial on the portion of the NWC within the Union Pacific railroad right-of-way, and that use is expected to continue in the future. The privately held property north of the annex in the NWC is used for agriculture, and that use is expected to continue into the future. On most agricultural land and residential properties adjoining the Tracy Site, private water supply wells provide drinking water.

There are no plans to change the current land use of the DLA-controlled parcels in the NWC Groundwater OU. Land use controls for the NWC Groundwater OU established in this ROD are consistent with the land use controls for OU 1, which were added to the OU 1 remedy in the 2004 ESD (URS, 2004). The OU 1 land use controls are as follows:

- Prevent domestic use of contaminated groundwater (untreated).
- Protect infrastructure associated with OU 1 groundwater monitoring, extraction, treatment, and disposal systems.
- Implement notification procedure for construction activities or land use changes in the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest*.
- Maintain administrative controls (i.e., *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* appendix and notification procedures).

- Perform annual reviews to ensure compliance with controls and to correct any deficiencies in the notification procedure.
- Follow defined procedures in the event of a change in land use.

When properly enforced, the land use controls prevent receptor exposure to contaminated groundwater beneath the Tracy Site depot and annex including the NWC Groundwater OU.

Groundwater is not extracted within the railroad right-of-way, and because of its narrow width and the use of the railroad track, it is unlikely that a well would be drilled on that land in the future.

Groundwater is not being extracted for use on the private agricultural property within the NWC. The nearest residential groundwater well is approximately 825 feet north of the NWC Groundwater OU. Dieldrin has never been detected in samples of water from this well, which have been collected since sampling began in 2003. The installation of future water supply wells is governed by San Joaquin County Ordinance Code Section 9-1115, which requires permitting and Environmental Health Division approval for all new groundwater wells. There is no indication that the private land owner is planning new wells on the property. The land owner uses water supplied by the local irrigation district for agriculture, and already has a domestic well. If a well is proposed near the NWC Groundwater OU, San Joaquin County has agreed to notify both the DLA and CVRWQCB. DLA will coordinate with those agencies to evaluate the proposed location and screen interval of the well.

7.0 SUMMARY OF SITE RISKS

The response action selected in this ROD is necessary to protect public health or welfare or the environment from exposure to dieldrin from the NWC Groundwater OU that may present a substantial endangerment to public health or welfare. The potential endangerment that would be caused by exposure was determined through a human health risk assessment (HHRA).

7.1 Human Health Risks

An HHRA was conducted to evaluate the threat to human health from the presence of dieldrin in groundwater underlying the NWC Groundwater OU at the Tracy Site. The HHRA was developed in accordance with EPA and California Environmental Protection Agency (Cal/EPA) guidance for conducting risk assessments and with outcomes of ongoing negotiations between DLA and regulatory agency representatives. Appendix C of the *Northwestern Corner Dieldrin Feasibility Study Report* provides the detailed HHRA, including methods and results.

7.1.1 Toxicity

Dieldrin is the only COC in the NWC Groundwater OU. EPA and the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) recognize dieldrin as a probable human carcinogen, based on an increased development of liver tumors following oral administration to rodents. Oral exposure of rodents to dieldrin also causes other non-cancer toxic responses in the liver and other organ systems. The relationship between exposure to dieldrin and the development of adverse health effects in people, the dose–response relationship, is expressed as a slope factor (SF) for carcinogenicity and as a reference dose (RfD) for noncancer effects. The SF is the result of mathematically fitting a response function (e.g., fitting a curve or line on a graph) to the lower end of the available dose–response data and is expressed as the risk per milligram (mg) of exposure per kilogram body weight (kg_{BW}) per day, displayed as $(\text{mg}/\text{kg}_{\text{BW}}\text{-day})^{-1}$. An RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an

appreciable risk of deleterious effects during a lifetime, and is expressed as a mg/kg_{BW}-day dose. Toxicity values characterizing the points of departure for cancer and noncancer effects resulting from oral and dermal exposure to dieldrin were obtained from established EPA's Risk Information System or the Cal/EPA OEHHA toxicity criteria database. Table 7-1 provides the toxicity values used in the HHRA.

Table 7-1. Dieldrin Concentrations, Toxicity Factors, Carcinogenic Risk and Hazard Estimates, NWC Groundwater OU, Human Health Risk Assessment

Dieldrin Concentrations and Toxicity Factors	
Noncancer Health Hazard Oral Reference Dose	5.00E-05 milligrams/kilogram-day
Cancer Risk – Oral Slope Factor	(1.6E+01 milligrams/kilogram-day) ⁻¹
Oral Absorption Factor	1 (dimensionless)
Noncancer Health Hazard Dermal Reference Dose	5.00E-05 milligrams/kilogram-day
Cancer Risk – Dermal Slope Factor	(1.6E+01 milligrams/kilogram-day) ⁻¹
Dieldrin Concentration – Maximum	0.3 micrograms/liter
Dieldrin Concentration – 95% Upper Confidence Limit	0.0745 to 0.125 micrograms/liter
Carcinogenic Risk and Hazard Estimates	
EPA Residential Receptor	
Maximum multi-pathway cancer risk	3E-04
Minimum multi-pathway cancer risk	9E-05
DTSC Residential Receptor	
Maximum multi-pathway cancer risk	3E-04
Minimum multi-pathway cancer risk	7E-05
Industrial Worker Receptor	
Maximum multi-pathway cancer risk	2E-05
Minimum multi-pathway cancer risk	4E-06
EPA Residential Receptor	
Multi-pathway maximum noncancer hazard risk	0.2
Multi-pathway minimum noncancer hazard risk	0.7
DTSC Residential Receptor	
Multi-pathway maximum noncancer hazard risk	0.5
Multi-pathway minimum noncancer hazard risk	2
Industrial Worker Receptor	
Multi-pathway maximum noncancer hazard risk	0.06
Multi-pathway minimum noncancer hazard risk	0.01

7.1.2 Potential Receptors

An assumption of the HHRA was that groundwater would be the hypothetical future source of water for domestic use in a residential setting or would be the future source of drinking water for industrial or commercial workers. The domestic or industrial use of groundwater is hypothetical because there are neither current nor expected uses of groundwater from under the NWC Groundwater OU. The residential use scenario incorporates estimated exposure to dieldrin consumed as drinking water and contacted during bathing, while the industrial use scenario incorporates estimated exposure to dieldrin only when consumed as drinking water. There is no current or expected future use of groundwater from the NWC Groundwater OU. Consequently, this HHRA evaluates only hypothetical residents and workers. Owing to

slight differences in some computational methods used by EPA and Cal/EPA DTSC, this HHRA evaluates two types of hypothetical residential receptors:

- **EPA Residential** receptor – EPA methods for estimating residential exposure include, in part, use of age-adjusted factors that combine childhood and adult exposures for exposure to carcinogens, but are based on adult exposure factors for noncarcinogens (EPA, 2010).
- **DTSC Residential** receptor – DTSC methods for estimating residential exposure explicitly separate a 6-year duration of exposure as a child and a 24-year duration of exposure as an adult for overall exposure to carcinogens and to noncarcinogens (DTSC, 1994).

An **Industrial Worker** receptor constitutes the third type of receptor, and exposure estimation methods between EPA and DTSC are similar. Default values for quantifying exposure to these types of receptors have been developed by EPA and DTSC. A construction worker receptor was not evaluated in the HHRA because groundwater occurs at approximately 20 feet bgs, which is deeper than the typical construction excavation.

The exposure routes through which human receptors could come into contact with site-related chemical contaminants are called complete exposure pathways. If there is no potential for contact between a contaminant and a receptor (i.e., an incomplete exposure pathway), then there is no plausible basis for an HHRA. The pathways considered for the hypothetical exposure of people to dieldrin in groundwater include the following:

- Ingestion, using NWC groundwater as the source of drinking water for residences or industrial buildings.
- Dermal contact, using NWC groundwater as a source of water for domestic use (e.g., bathing) in a residence. (Workers would not bathe on site; therefore, they would not have direct contact with groundwater.)

Inhalation is a potential route of exposure to gases and vapors and to airborne particulate matter (e.g., dust). However, the molecular properties of dieldrin preclude its classification as a volatile chemical, and dust exposure is not relevant to groundwater-based exposure pathways. Consequently, inhalation is not a complete pathway for exposure of Tracy Site receptors, so it was not evaluated for this HHRA.

Health risk for potentially carcinogenic chemicals is described in terms of the probability of developing cancer over a lifetime. For quantitative HHRAs, this probability is defined as the incremental probability that an individual will develop cancer (i.e., the theoretical excess cancer risk above the background rate) over a lifetime as a direct result of the exposure in question (EPA, 1989). For example, an incremental cancer risk of one-in-one-million means that an individual's chance of developing cancer has increased by 1×10^{-6} . Multiple calculations of the incremental cancer risk were performed for the three types of receptors, both maximum and 95 percent upper confidence limit for the arithmetic mean of dieldrin concentrations, two exposure pathways, and six exposure scenarios. The concentrations used and maximum and minimum calculated risks are provided in Table 7-1. The incremental cancer risk estimated for a hypothetical resident who drinks, bathes, and cooks with water from the NWC Groundwater OU for 30 years ranges from 9×10^{-5} to 3×10^{-4} . The incremental cancer risk estimated for a Tracy Site worker who drinks water from the NWC Groundwater OU every workday for 25 years ranges from 4×10^{-6} to 2×10^{-5} .

A noncancer hazard estimate is the ratio of an exposure estimate to the RfD; it is expressed as a hazard quotient (HQ), which is a mathematical index for the relationship between exposure and toxicity. If an

HQ is greater than 1 (i.e., exposure is greater than the toxicity concentration), then this is an indication that the exposure pathway should be evaluated in greater detail. If the HQ is less than 1, then exposure is less than the point-of-departure concentration and adverse effects are not expected. The HQ for hypothetical residents ranges from 0.2 to 2. The HQ for Tracy Site industrial workers is 0.01 to 0.06.

7.1.3 Uncertainty

All risk assessments involve, to varying degrees, the use of assumptions, professional judgments, and imperfect data, which result in uncertainty in the final estimates of risk and hazard. This section summarizes key uncertainties that may be influential to the decision-making process concerning dieldrin in groundwater of the NWC Groundwater OU. General uncertainties are not addressed, as these are intrinsic to the risk assessment process and common to all HHRAs (e.g., exposure factors and toxicity criteria). Key uncertainties include the following:

- Residential use of groundwater that originates in the NWC Groundwater OU is not an expected future use under any reasonably foreseeable future condition. New residential developments within the City of Tracy are required to use City-supplied water (City of Tracy, 2010). There are currently no water supply wells in the NWC of the Tracy Site that could pump dieldrin-contaminated groundwater for domestic or agricultural purposes. Future water supply well construction on the site is restricted by land use controls. East of the city boundary, there is only one domestic well located on private agricultural property near the NWC. It is monitored by DLA for dieldrin. Dieldrin has not been detected in water from the well; therefore, there is no current risk to the water users from dieldrin. Future water supply well construction on this land is not anticipated by DLA, San Joaquin County, or the City of Tracy.
- Workplace consumption of groundwater is also not a reasonably foreseeable future condition. Water for on-depot use and consumption comes from wells located at the southern end of the depot, more than 1 mile from the NWC dieldrin plume. Furthermore, there are land use controls to prevent the use of untreated groundwater.
- The approach used in this assessment develops protective (conservative) estimates of exposures for land uses which likely indicate a risk or hazard that is greater than actually encountered by the population of receptors that utilize the site (e.g., no residential land use, and no residential or industrial use of NWC groundwater).
- The available analytical database has inherent uncertainties, in part, because of the large number of analyses for which no concentrations were detected above the analytical detection limits.
- The use of maximum detected concentrations ignores a large number of low concentrations and below detection limit results that are part of the overall set of available data; however, this conservative assessment is balanced by use of the 95% Upper Confidence Limit.

Despite the uncertainties, this assessment indicates that unrestricted land use and domestic use of groundwater from the NWC Groundwater OU, and worker consumption of groundwater, could pose unacceptable health risks. However, unrestricted land use and domestic or occupational use of groundwater are not reasonably anticipated future uses.

7.2 Ecological Risks

There are no risks to plants or animals because contaminated groundwater from the NWC Groundwater OU is not being brought to the surface, and there is no exposure. With extraction and treatment, there will

be a slight increase in potential for ecological risk. In the unlikely event of a large volume release of groundwater between the extraction wellheads and the treatment plant, some of the released water could run off and reach a surface water drainage where animals or plants may be impacted.

8.0 REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) describe what the remedial action for dieldrin will accomplish. The RAOs for the NWC Groundwater OU remedial action are as follows:

1. Remove dieldrin from groundwater beneath the NWC to the extent technically and economically feasible.
2. Protect human health and the ecological receptors from exposure to dieldrin in groundwater.

The Agreed Upon Alternative will meet the first RAO by removing dieldrin from groundwater beneath the NWC of the Tracy Site using extraction and treatment for a maximum of three years with four extraction wells. The goal of the remedy is to attain a concentration of 0.05 µg/L; however, non-attainment of the goal will not prolong the pumping component of the remedy. The Agreed Upon Alternative will meet the second RAO through land use controls, as appropriate, that will prevent exposure of humans, plants, and animals to groundwater containing dieldrin and that will restrict installation of extraction wells that could influence plume migration into currently uncontaminated portions of the aquifer. There are currently no water supply wells in the NWC of the Tracy Site that could pump dieldrin-contaminated groundwater for domestic or agricultural purposes, and future water supply well construction near the Tracy Site is not anticipated by DLA, San Joaquin County, or the City of Tracy. The selected remedy will restrict the installation of future water supply wells drilled in or near the plume on government-owned land, as appropriate.

The RAOs also serve as metrics to facilitate the five-year review determination of protectiveness of human health and the environment.

9.0 DESCRIPTION OF ALTERNATIVES

The remedial alternatives that were developed and evaluated in the *Northwestern Corner Dieldrin Plume Feasibility Study Report* are as follows:

Alternative 1 – No Action: As required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), this alternative is included in all feasibility studies as a baseline against which to compare other alternatives.

Alternative 2 – Land Use Controls: This alternative would involve implementing institutional land use controls to prohibit human consumption of dieldrin-contaminated groundwater from the NWC. Land use controls specific to the NWC Groundwater OU will be established. These controls would be enforced by DLA through the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* for the on-depot portion of the NWC plume. Off-depot exposure would be limited through means such as:

- Purchase of the affected property by the government.
- Imposition of a restrictive easement prohibiting groundwater extraction from beneath the impacted property.
- Application of San Joaquin County Codes restricting groundwater extraction.

The alternative also contains a monitoring element to verify plume stability and enforcement of land use controls.

Alternative 3 – Groundwater Extraction, Ex Situ Treatment, and Discharge: Based on data collected from a dieldrin mass-removal pump test in the NWC, an estimated 78 extraction wells would be necessary to remediate the plume within the 0.05 µg/L isopleth. The alternative would also involve constructing a granular activated carbon treatment system and percolation ponds for disposal of treated groundwater. This alternative also includes land use controls and a monitoring program, as described for Alternative 2.

DLA proposed Alternative 2 as the preferred alternative in the draft final *Northwestern Corner Dieldrin Plume Feasibility Study Report*. This became the subject of a formal dispute between the State of California and DLA. In resolution of the dispute, DLA, EPA, and the State of California agreed upon a new preferred alternative to remove dieldrin to the extent technically and economically feasible. This alternative consists of:

- Four extraction wells pumping for a maximum of three years.
- Treatment of extracted groundwater with activated carbon to remove dieldrin.
- Discharging treated water through infiltration galleries.
- Monitoring of dieldrin concentrations in samples from four extraction wells and eight monitoring wells during the operation of the NWC Groundwater OU extraction and treatment system.
- Land use controls preventing construction of water wells on government property in the NWC.

9.1 Description of Remedy Components

9.1.1 Alternative 1

Evaluation of the No Action alternative (Alternative 1) is required by the NCP. The No Action alternative provides a baseline against which other alternatives are compared. Under this alternative, no action is taken to alter current conditions.

Mass Removal Components:

- None

Containment Components:

- Natural attenuation (for example, sorption)

Exposure Control Components:

- None

Operation and Maintenance:

- None

Monitoring:

- Five-year reviews in conjunction with OU 1 and soil site reviews
- NWC Groundwater OU monitoring wells

9.1.2 Alternative 2

Alternative 2 would protect human health and the environment through land use controls alone.

Mass Removal Components:

- None

Containment Components:

- Natural attenuation (for example, sorption)

Exposure Control Components:

- Purchase or lease affected land
- Implement buffer zone
- Prohibit installation of water supply wells on the NWC of the Tracy Site through the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* and San Joaquin County ordinance

Operation and Maintenance:

- None

Monitoring:

- Five-year reviews in conjunction with OU 1 and soil site reviews
- NWC Groundwater OU monitoring wells
- CPT/HydroPunch investigation on adjacent private property once every five years

9.1.3 Alternative 3

Alternative 3 would involve actions to remove dieldrin from the environment with the intent of assuring long-term protection of groundwater users. This alternative was conceptually designed to reduce dieldrin concentrations in the plume to 0.05 µg/L or less using groundwater extraction, treatment, and discharge.

Mass Removal Components:

- 78 groundwater extraction wells pumping for as long as 30 years
- Treatment of extracted groundwater with activated carbon to remove dieldrin
- Discharge of treated groundwater water into soil above the water table on the Tracy Site

Containment Components:

- Hydraulic control caused by the operation of groundwater extraction wells for as long as 30 years
- Natural attenuation (for example, sorption)

Exposure Control Components:

- Prohibit installation of water supply wells on the adjacent private property through San Joaquin County ordinance

Operation and Maintenance:

- Operation and maintenance of groundwater extraction and treatment system until remediation goals are met, for as long as 30 years

Monitoring:

- Five-year reviews in conjunction with OU 1 and soil site reviews
- NWC Groundwater OU extraction and monitoring wells
- CPT/HydroPunch investigation on adjacent private property once every five years

9.1.4 Agreed Upon Alternative

As a result of the formal dispute resolution process, DLA, EPA, DTSC, and CVRWCB reached an agreement on a remedy on 14 April 2010. The resolution of the dispute was the new preferred alternative, referred to as the Agreed Upon Alternative, which retained the elements of extraction and treatment, to the extent technically and economically feasible, along with monitoring and the application of land use controls, as appropriate, to limit exposure to any residual dieldrin concentrations that could prevent unlimited use of the site. The dispute resolution process was documented in the final FS report.

Mass Removal Components:

- Four groundwater extraction wells pumping for a maximum of three years
- Treatment of extracted groundwater with activated carbon to remove dieldrin to meet WDRs
- Discharge of treated groundwater through infiltration galleries on the Tracy Site

Containment Components:

- Natural attenuation (for example, sorption)

Exposure Control Components:

- Implement land use controls, as appropriate, that prohibit installation of water supply wells on the NWC of the Tracy Site through the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest*
- Annual inspections to confirm compliance with land use controls, as appropriate.

Operation and Maintenance:

- Operation and maintenance of the groundwater extraction and treatment system for a maximum of three years
- Performance monitoring to document compliance with WDRs

Monitoring:

- Baseline and performance monitoring of dieldrin concentrations in groundwater samples from four extraction wells (monthly) and eight monitoring wells (quarterly) during groundwater extraction and treatment for a maximum of three years
- Five-year reviews in conjunction with OU 1 and soil site reviews, as appropriate.

9.2 Common Elements and Distinguishing Features of Each Alternative

The common elements of the four alternatives are passive plume containment through natural processes (for example, sorption) and five-year remedy protectiveness reviews, as appropriate. Under each alternative, water levels would be measured and water samples would be collected for dieldrin analysis at a series of monitoring wells for a minimum of three years. The resulting data would be used to determine remedy performance and/or verify plume stability.

Actions under Alternatives 1 and 2 would not attempt to actively remediate the dieldrin plume. These alternatives were considered viable because of evidence that the dieldrin plume has not moved since 1995 and because groundwater in the area of the NWC plume is not extracted for beneficial use. Alternative 3 and the Agreed Upon Alternative would result in an action to remove dieldrin from the environment.

Alternative 3 was conceptually designed to reduce dieldrin concentrations in groundwater to 0.05 µg/L or less through extraction and treatment for as long as 30 years. The Agreed Upon Alternative would use extraction and treatment to remove dieldrin for a maximum of three years, consistent with the dispute resolution agreement (Attachment A).

9.2.1 ARARs

There are no applicable or relevant and appropriate requirements (ARARs) for Alternative 1; however, Alternative 1 does not meet the threshold criteria of overall protectiveness of human health and environment. The Agreed Upon Alternative and Alternatives 2 and 3 will comply with ARARs.

All treatment residuals produced through remedial actions will be handled in accordance with ARARs.

9.2.2 Long-Term Reliability of Remedy

All but Alternative 1 rely on land use controls, if appropriate, for protection from residual risks at the site over the long term. Land use controls are considered moderately reliable because they rely on physical monitoring to better ensure overall protectiveness of the site use controls. Technology options, Alternative 3 and the Agreed Upon Alternative, are considered reliable over the long term but each depends on proper design, implementation, and maintenance.

9.2.3 Untreated Waste and Treatment Residuals

Alternatives 1 and 2 would leave all of the dieldrin in the environment and would not result in any generation or treatment of residual waste. Alternative 3 and the Agreed Upon Alternative would remove some of the dieldrin from the environment and would generate residual waste in the form of spent activated carbon that would require off-site transport and treatment and/or disposal.

9.2.4 Estimated Time for Design and Construction

Alternatives 1 and 2 do not have design or construction components. The time frame to implement land use controls for Alternative 2 would be one year or less. All components of Alternative 3 can be designed and constructed in two years or less. All components of Agreed Upon Alternative can be designed and constructed in one year or less.

9.2.5 Estimated Time to Meet Remedial Action Objectives

The RAO of dieldrin mass removal to the extent technically and economically feasible would not be met in the short or long term with Alternatives 1 or 2 since neither alternative includes contaminant removal. The RAO also would not be met with Alternative 3 since the proposed 78 well extraction network may be technically feasible but it is not an economically feasible method for extracting dieldrin mass. The ROD signatories have agreed that this RAO can be met by operating a four-well extraction system for a maximum of three years.

The RAO of protection of human and ecological receptors from exposure to dieldrin in the NWC Groundwater OU cannot be met in the short term with Alternative 1, but it can be met in the short term with the remaining three alternatives through implementation of land use controls.

9.2.6 Cost

The cost estimate for each alternative is based on estimates of capital, periodic, and operation and maintenance costs, including decommissioning costs. The present worth costs for Alternatives 1, 2,

and 3 calculated in the feasibility study using a 5 percent discount rate and a 30-year performance period are \$0, \$860,000, and \$21,800,000, respectively. These costs exclude five-year review reporting costs, which were not included in the feasibility study. The present worth cost for the Agreed Upon Alternative, excluding five-year review costs and using a 5 percent discount rate, is \$2,170,000. The costs for the Agreed Upon Alternative are detailed in Section 12.3.

9.2.7 Use of Presumptive Remedies and/or Innovative Technologies

A presumptive remedy is a technology that EPA believes, based on its past experience, generally will be the most appropriate remedy for a specific type of site. EPA establishes presumptive remedies to accelerate the evaluation of proposed remedies by focusing the feasibility study efforts. EPA expects that a presumptive remedy, when available, will be used for all CERCLA sites except under unusual circumstances.

An innovative technology is a process that is used to treat contaminated materials (e.g., soil or groundwater) or hazardous waste that is approaching commercial viability but does not have an established history of full-scale implementation that can be used to predict performance under various operating conditions. Innovative technologies have the potential to provide site-specific and/or program-wide benefits such as more effective remediation or time and cost savings compared to conventional technologies.

EPA does not have a presumptive remedy for remediating dieldrin in groundwater. However, a presumptive technology for treatment of organic compounds, including organochlorine pesticides, in extracted groundwater includes granular activated carbon (EPA, 1996). No innovative technology for removal of dieldrin from groundwater at concentrations less than 1 µg/L was identified.

9.3 Expected Outcomes of Each Alternative

Ingestion and domestic or commercial use of dieldrin-contaminated groundwater could pose a future risk to human health if an exposure pathway is completed (URS, 2010). With Alternative 3, concentrations of dieldrin in groundwater may be reduced to a level that would allow unlimited use and unrestricted exposure in the long term. With the Agreed Upon Alternative, dieldrin mass will be extracted from groundwater to the extent technically and economically feasible, but the remaining dieldrin concentration in groundwater may not be reduced to a concentration that would allow unlimited use and unrestricted exposure. With Alternatives 2, 3, and the Agreed Upon Alternative, groundwater use would be restricted through land use controls until groundwater is remediated or attenuates to a concentration that allows for unlimited use and unrestricted exposure. The potential for unlimited use and unrestricted exposure for the NWC Groundwater OU would be evaluated by assessing the residual risk at the site.

10.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP identifies nine criteria to be used to evaluate the different remediation alternatives individually and against each other to aid in remedy selection. The alternatives were compared on the basis of the nine evaluation criteria. The criteria are listed in the left column of Table 10-1. Each alternative is given a ranking of high, mid-level, or low for criteria 1 through 7. Under the criterion of costs, a low cost alternative has a high ranking and a high cost alternative has a low ranking. The alternative with the best overall ranking is generally the preferred alternative. The first two criteria are threshold criteria, which are requirements that any alternative must meet to be eligible for selection.

Table 10-1. Relative Ranking of Remedial Alternatives Against CERCLA Criteria

	Alternative 1: No Action	Alternative 2: Land Use Controls	Alternative 3: Extraction with 78 Wells, Treatment, Discharge	Agreed Upon Alternative: Extraction with 4 Wells, Treatment, and Discharge for 3 Years
1. Overall Protection of Human Health and the Environment	LOW	HIGH	HIGH	HIGH
2. Compliance with ARARs	LOW	HIGH	HIGH	HIGH
3. Long-Term Effectiveness and Permanence	LOW	MID-LEVEL	HIGH	HIGH
4. Reduction of Toxicity, Mobility, or Volume through Treatment	LOW	LOW	MID-LEVEL	MID-LEVEL
5. Short-Term Effectiveness	MID-LEVEL	HIGH	LOW	LOW
6. Implementability	LOW	HIGH	LOW	MID-LEVEL
7. Cost	HIGH	MID-LEVEL	LOW	MID-LEVEL
Overall Comparative Ranking for Criteria 1 through 7	LOW	HIGH	MID-LEVEL	HIGH
8. State Agency Acceptance	DTSC and CVRWQCB did not accept alternatives 1 or 2, and favored the Agreed Upon Alternative.			
9. Community Acceptance	Community participation was solicited; however, no written or oral comments were received during the public comment period.			
ARAR = applicable or relevant and appropriate requirement CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act CVRWQCB = California Central Valley Regional Water Quality Control Board DTSC = California Department of Toxic Substances Control				

Application of criteria 8 and 9 was based on input from the State of California (DTSC and CVRWQCB) and the community. The eighth criterion, state acceptance, was determined after the feasibility study was reviewed and the Agreed Upon Alternative was accepted by the regulatory agencies. The ninth criterion, community acceptance, was evaluated after the community had the opportunity to review the alternatives in the proposed plan. The public comment period provided members of the community with the opportunity to read and comment on the alternatives; however, no written or oral comments were received during the comment period.

The comprehensive analysis of Alternatives 1, 2, and 3 was originally presented in the draft final *Northwestern Corner Dieldrin Plume Feasibility Study Report*. That analysis is summarized below.

Alternative 1, the no action alternative, is presented in accordance with the NCP requirement that every feasibility study include a baseline for comparison with other alternatives. Under Alternative 1, no remedial action is taken. Alternative 1 does not meet required criterion 1 (overall protection of human health and the environment) because it does not allow for any actions to ensure that human health and the environment are protected. Therefore, Alternative 1 does not meet the threshold criteria and cannot be the preferred alternative for the NWC Groundwater OU.

Alternative 2 would place land use controls on government and adjacent private land in a specific buffer zone around the dieldrin plume. The feasibility study found that this alternative ranked high on four criteria, including required criteria 1 and 2, and that it ranked at mid-level for cost and long-term effectiveness and permanence. DLA identified Alternative 2 as the preferred alternative based on its evaluation in the draft final *Northwestern Corner Dieldrin Plume Feasibility Study Report*. This proposed preferred alternative became the subject of a formal dispute between the State of California and DLA over whether it met ARARs. In resolution of the dispute, DLA, EPA and the State of California agreed to a new alternative, which is discussed below.

Alternative 3 would involve the construction of a 78-well extraction, treatment, and discharge system to remove dieldrin from groundwater. This alternative ranks high on the two threshold criteria and long-term protectiveness. However, it ranks low on short-term effectiveness, implementability, and cost, which resulted in a mid-level ranking, lower than the Alternative 2 ranking.

The Agreed Upon Alternative would involve the construction of 4 extraction wells, extraction and treatment of groundwater to remove dieldrin for three years. The extracted groundwater would be treated using activated carbon, and the treated effluent would be discharged to soil on the site. Land use controls would be imposed on-site during the three years of pump and treat to prevent construction of groundwater wells that could interfere with the system or result in contact with contaminated groundwater. At the conclusion of pump and treat, no further action by DLA will be required except for institution of on-site land use restrictions, as appropriate. This alternative meets the threshold criteria, ranks highest overall among the alternatives, and will satisfy the following statutory requirements of CERCLA §121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; (4) utilize permanent solutions and resource recovery technologies to the maximum extent possible; and (5) satisfy the preference for treatment as a principal element. DLA, EPA, and the State of California accept the Agreed Upon Alternative. There were no public comments. A detailed evaluation of the Agreed Upon Alternative against the nine evaluation criteria is provided in this section.

10.1 Threshold Criteria

10.1.1 Overall Protection of Human Health and the Environment

This criterion assesses whether the alternative provides adequate protection of human health and the environment. It describes how human health risks are eliminated, reduced, or controlled through treatment, engineering controls, and/or institutional controls. It also assesses protection of the environment from further degradation. The overall assessment of protectiveness draws on the evaluations of long-term effectiveness and permanence and short-term effectiveness. This criterion is considered a threshold requirement and must be met by the selected alternative.

The Agreed Upon Alternative will provide protection of human health and the environment by reducing and controlling risk through mass removal and treatment of the COC and through land use controls. This alternative will protect human health and the environment by removing dieldrin from the groundwater using extraction wells and carbon treatment and by preventing exposure of humans, plants, and animals to groundwater containing dieldrin through land use controls. There are currently no water supply wells in the NWC of the Tracy Site that could pump dieldrin-contaminated groundwater for domestic or agricultural purposes, and future supply well construction near the NWC of the Tracy Site is not anticipated by DLA, San Joaquin County, or the City of Tracy. Therefore, short-term protection from dieldrin exposure is achieved. Long-term protection of human health and the environment will be achieved by removing dieldrin to the extent technically and economically feasible, consistent with the dispute resolution agreement, and instituting on-site land use controls, as appropriate.

10.1.2 Compliance with ARARs

Compliance with ARARs evaluates whether the alternative meets promulgated federal and state environmental statutes, regulations, and other requirements that are either applicable or relevant and appropriate to the site. This criterion is also a threshold requirement that must be met by the selected alternative unless EPA grants an ARAR waiver.

There is no chemical-specific ARAR for dieldrin, such as a maximum contaminant level for drinking water. The *DDJC-Tracy Site-Wide Comprehensive Record of Decision* established an ACL for dieldrin of 0.05 µg/L for OU 1 based on a 1998 California action level.

An ACL for dieldrin will not be established for the NWC Groundwater OU; however, pursuant to the dispute resolution agreement (Attachment A), DLA will attempt to achieve “dieldrin mass removal with a goal to reduce dieldrin concentration to 0.05 µg/L.” If this goal is not met after 3 years of extraction and treatment of contaminated groundwater, DLA will evaluate the risks to human health and the environment from the remaining concentration of dieldrin in groundwater, and, along with EPA and the State of California, will determine whether it is necessary to continue land use controls to reduce exposure to dieldrin in the groundwater.

There are no location-specific ARARs for the NWC Groundwater OU. The NWC does not include floodplains, riparian areas, known fault zones, wetlands, or historic places. A colony of burrowing owls (*Athene cunicularia*), a California species of special concern, has been observed on the Tracy Site but not in the NWC. However, the *DDJC-Tracy Site-Wide Comprehensive Record of Decision* takes into consideration as TBCs several regulations relating to threatened and endangered plant and animal species that may be present in the NWC. The Tracy Site is located within the historic range of six sensitive species: the San Joaquin kit fox (federally listed as endangered), the giant garter snake (federally and California listed as threatened), the Swainson’s hawk (California listed as threatened), the western yellow-billed cuckoo (California listed as threatened), the burrowing owl (California species of special concern), and the valley elderberry longhorn beetle (federally listed as threatened).

There are three action-specific ARARs for the NWC Groundwater OU remedial action. The first ARAR is Waste Discharge Requirement (“WDR”) Order No. 98-053 issued by the CVRWQCB, which establishes discharge prohibitions and effluent limitations for groundwater extraction and treatment systems. The second ARAR is the requirement for land use covenants under California Civil Code Section 1471 (a&e); 22 California Code of Regulations (CCR) 67390.2 – 67391.1, and CERCLA § 120, which would be applicable if levels of dieldrin that do not allow unrestricted use remain in groundwater at the NWC of the Tracy Site and the federal government decides to transfer the Tracy Site to a non-federal entity. The third ARAR is the federal and state hazardous waste regulations for identification and listing of hazardous waste, 40 CFR 261.11 through 261.24; 22 CCR 6626.11 and 22 CCR 66261.20 through 66261.24, which are applicable for wastes generated during the construction and operation of the remedial action.

The Agreed Upon Alternative complies with ARARs.

10.2 Primary Balancing Criteria

10.2.1 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once RAOs have been met.

This criterion includes the consideration of residual risk that will remain on site following remediation, and the adequacy and reliability of controls.

The Agreed Upon Alternative will provide long-term effectiveness and permanence. This alternative will remove dieldrin in groundwater using extraction and treatment for a maximum of three years, and will maintain reliable protection of human health and the environment over time by implementing land use controls. Land use controls will be maintained until contaminant concentrations in groundwater are at such levels to allow for unlimited use and unrestricted exposure. The potential for unlimited use and unrestricted exposure for the NWC Groundwater OU will be evaluated by assessing the residual risk at the site. An initial risk assessment was completed for the NWC FS. That risk assessment, including any additional sampling data obtained during the three years of active pumping, will be used to determine if the site is suitable for unlimited use and unrestricted exposure. If land use controls are necessary to protect human health and the environment over time, reviews at least every five years will be conducted to evaluate the effectiveness of the land use controls.

10.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy. This criterion looks at such factors as whether treatment or recycling processes are employed, the amount of contaminant that will be destroyed, treated or recycled, the degree of expected reduction in toxicity, mobility or volume, the degree to which treatment is irreversible, the type and quantity of residuals that will remain, and the degree to which treatment reduces threats posed by the contaminants.

By implementing the Agreed Upon Alternative, less than one pound of dieldrin will be removed from groundwater by treatment with activated carbon. The removal of dieldrin will decrease the volume, mobility, and toxicity. The removal of dieldrin will reduce the potential health threats from using groundwater to the extent that the treated groundwater can be returned to the aquifer. The carbon containing dieldrin will be taken off the Tracy Site to a facility where the dieldrin will be removed from the carbon.

10.2.3 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse effects that may be posed to workers, the community, and the environment during construction and operation of the remedy.

Under the Agreed Upon Alternative, construction of four groundwater extraction wells will take approximately four months. These extraction wells will be used to extract groundwater for three years. Eight existing groundwater monitoring wells will be monitored during the three-year period. Treatment will occur in an activated carbon vessel constructed in the NWC. Exposure of workers to contaminated aquifer materials and liquids could occur during well drilling. The potential for direct contact with contaminants in groundwater also occurs during extraction of groundwater for treatment or monitoring, and during [transport and] treatment of contaminated groundwater. Risk mitigation measures and site monitoring will be implemented to minimize impacts on workers, the public, and the environment. Workers will be required to wear appropriate levels of protection to avoid exposure during construction, operation, maintenance, and monitoring activities. Oversight, administrative and engineering controls, and personal protective equipment will also be used to minimize the potential for exposure. Until they are removed after three years of extraction, the aboveground extraction and treatment system components will create minor visual and auditory nuisances to workers at the Tracy Site, as the system will be located on the northern boundary of the Tracy Site, away from mission activities.

The Agreed Upon Alternative has potential to have short-term impacts on workers involved in well drilling, groundwater treatment, groundwater sampling, and treated water discharge. However, these are necessary tasks to implementing the alternative. If proper health and safety protocols are established and enforced, impacts on workers, the public, and the environment will be minimized.

10.2.4 Implementability

Implementability addresses the technical and administrative feasibility of a remedial action from design through construction and operation. Factors include the availability of services and materials and coordination with other governmental entities (including regulatory agencies).

The Agreed Upon Alternative is moderately easy to implement. All materials and services needed for implementation are readily, commercially available. Operation and maintenance of the treatment system will include standard activities such as cleaning and replacement of well components, regeneration of activated carbon, and maintenance of equipment. Enforcement of land use controls will be performed without difficulty because procedures already exist for enforcing and monitoring land use controls on the Tracy Site.

10.2.5 Cost

The cost estimate for the Agreed Upon Alternative is based on estimates of capital, operation and maintenance, and periodic costs. The present worth costs are projected for 30 years using a 2.7 percent discount rate. EPA's *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* states that it is appropriate to apply the real discount rates found in Appendix C of the Office of Management and Budget (OMB) Circular A-94 for Federal Facility Sites being cleaned up using Superfund authority (EPA, 2000). In Appendix C of OMB Circular A-94, revised in December 2009, the real discount rate (nominal interest rate minus inflation rate) for 30-year projects is 2.7 percent. Real discount rates are rates from which the inflation premium has been removed and are based on the economic assumptions from the 2011 Budget. The feasibility study used a 5 percent discount rate, which was updated with the current 2.7 percent rate used in this ROD. The present worth cost for the selected alternative is \$2,390,000. In order to compare the Agreed Upon Alternative cost to the costs presented in the feasibility study, the Agreed Upon Alternative cost was also calculated using a 5 percent discount rate. For comparability purposes, the second calculation did not include five-year reviews (since the alternatives in the feasibility study did not include five-year reviews). The present worth cost for the Agreed Upon Alternative using a 5 percent discount rate is \$2,170,000. Those costs are presented in Table 12-3. The present worth costs for Alternative 1, 2, and 3 presented in the feasibility study are \$0, \$860,000, and \$21,800,000, respectively.

10.3 Modifying Criteria

10.3.1 State/Support Agency Acceptance

This criterion evaluates the technical and administrative issues and concerns the state may have regarding the alternative. DTSC and CVRWQCB endorse the Agreed Upon Alternative, which was developed during the formal dispute resolution process. This acceptance is documented in the dispute resolution agreement (Attachment A).

10.3.2 Community Acceptance

This criterion identifies community support for, reservations about, or opposition to various components of the selected alternative. During the public comment period for the proposed plan, 19 October through 18 November 2010, no comments were submitted (via mail or in person) to the DLA. Therefore, DLA has not identified any public concern regarding the Agreed Upon Alternative for the NWC Groundwater OU. An overview of the public comment period is provided in the Responsiveness Summary of this ROD.

11.0 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. Principal threat wastes are those source materials considered highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. The source of contamination was eliminated when the discharge of treated groundwater to the injection wells ceased. Contaminated groundwater generally is not considered to be a source material.

There are no principal threat wastes at the NWC Groundwater OU.

12.0 SELECTED REMEDY

12.1 Summary of the Rationale for the Selected Remedy

The Agreed Upon Alternative will remove dieldrin from the NWC Groundwater OU. This alternative meets the NCP threshold criteria and provides an acceptable balance of trade-offs among the alternatives. DLA, EPA, CVRWQCB, and DTSC agree that the Agreed Upon Alternative has a ranking higher than other alternatives considered in the feasibility study and is the selected remedy. There was no public comment on the Proposed Plan.

12.2 Detailed Description of the Selected Remedy

The selected remedy for the NWC of the Tracy Site dieldrin plume is provided below:

DLA agrees to implement an action to pump and treat (P&T) groundwater to remove dieldrin to the extent technically and economically feasible in the area of the facility known as the NWC Dieldrin Plume, consistent with this agreement. The State agrees that the proposed action, taken consistent with the following agreement, provides substantive compliance with the State's applicable ARARs in that this unique site consists of a limited plume of non-dissolved phase dieldrin that is subject to partial removal from the groundwater.

All parties (DLA, U.S. EPA, and the State of California) agree:

- 1) DLA will design, install, and operate a P&T system to remove the dieldrin, to the extent technically and economically feasible, from groundwater at the NWC of DDJC-Tracy.*
- 2) The P&T system will consist of four extraction wells, three to be located on the northern edge of the DDJC-Tracy property boundary and one near the former injection locations. The extraction wells will be installed in the permeable channels of the Middle and Upper Hydrogeologic Zones (Draft Final NWC Dieldrin Plume Feasibility Study Report, June 2009). Extraction well construction will be optimized*

- by location and depth, the latter not exceeding 65 feet below ground surface, for maximum on-site and off-site dieldrin mass removal with a goal to reduce dieldrin concentrations to 0.05 µg/L.*
- 3) *DLA will operate the P&T system for a period of up to three years, during which time it will optimize the system, as designed and built, through methods such as altering flow rates at individual extraction wells. Groundwater samples will be collected monthly from the four extraction wells and quarterly from the eight existing monitoring wells already being utilized in support of the DDJC-Tracy Annual Well Monitoring program.*
 - 4) *DLA will submit sampling results from the four extraction and eight monitoring wells in the Quarterly and Annual Monitoring Reports and will include the amount of dieldrin mass being removed. DLA will also prepare a Preliminary Project Completion Report containing the results at the conclusion of the three-year pumping period.*
 - 5) *DLA will cease operation of the P&T system after a period of three years, beginning after the four wells are fully operational and functional, even if the dieldrin removal goal of 0.05 µg/L has not been met.*
 - 6) *At the conclusion of the P&T, subject to Section 121c of CERCLA, no further action by DLA will be required except for institution of on-site land use restrictions as appropriate. No containment zone will be needed at the conclusion of the P&T.*
 - 7) *DLA agrees to seek funding for construction and operation of a limited P&T system to include the four extraction wells.*

On-site land use restrictions will be instituted during the three years of groundwater extraction and treatment. Following this three-year period, land use controls will remain, as appropriate. The land use restrictions were developed using the Sample Federal Facility Land Use Control ROD Checklist with Suggested Language (EPA, 2006).

Figure 12-1 shows the portions of the NWC dieldrin plume on the depot and annex where groundwater use controls will be implemented (based on data collected through 2008). Section 6.0 describes current and reasonably anticipated future land uses at the Tracy Site, and Section 7.0 documents the risk exposure assumptions and the risks necessitating the land use controls. As stated in Section 8.0, the objective of the land use controls is to protect human health and the ecological receptors from exposure to dieldrin in groundwater.

The land use control objective for the NWC Groundwater OU will be achieved by:

- Prohibiting installation of water supply wells on the NWC of the Tracy Site through the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest*. The description of the land use controls for NWC Groundwater OU that will be provided as an appendix in the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* is provided in Appendix A.

- Protecting infrastructure associated with the NWC Groundwater OU monitoring, extraction, treatment, and disposal systems.
- Posting appropriate signage at the NWC Groundwater OU Site indicating restrictions on groundwater use and production well installations.
- Implementing notification procedure for construction activities or land use changes through the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest*.
- Maintaining administrative controls (i.e., *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* and notification procedures).
- Performing annual reviews to ensure compliance with instituted controls and to correct any deficiencies in the notification procedure.
- Following defined procedures in the event of a change in land use.

DLA will implement, monitor, maintain, and enforce the land use controls as follows.

- The *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* will be modified to include a map showing the area of the NWC Groundwater OU with land use controls (e.g., Figure 12-1) and to specify that the on-site portions of the NWC dieldrin plume are restricted from installation of water supply wells. The Master Plan will refer to the DLA Installation Support at San Joaquin Environmental Program Manager if more information is needed. These modifications will be incorporated into the Master Plan within 90 days of the final signature on this ROD. DLA will notify EPA, DTSC, and CVRWQCB in advance of any changes to internal procedures that affect the land use controls.
- The DLA Installation Support at San Joaquin Environmental Program Manager will review all proposed construction projects at the Tracy Site and issue a record of environmental consideration. If any component of a proposed project is inconsistent with the land use control objective, the requester will be required to modify the project plans to be consistent with the land use controls.
- DLA will address any activity that is inconsistent with the land use control objective or use restriction, or any other action that may interfere with the effectiveness of the land use controls, as soon as practicable. In no case will the process be initiated later than 10 days after the date DLA becomes aware of the inconsistency.
- DLA will notify EPA, DTSC, and CVRWQCB as soon as practicable but no later than 10 days after discovery of any activity that is inconsistent with the land use control objective or use restriction, or any other action that may interfere with the effectiveness of the land use controls. Within 10 days of sending the initial notification related to the inconsistency, DLA will provide notification explaining how the inconsistency was or will be addressed.
- DLA will notify EPA, DTSC, and CVRWQCB at least 45 days in advance of any proposed land use change that is inconsistent with the land use control objective, any anticipated action that may disrupt or interfere with the effectiveness of the land use controls, any action that might alter or negate the need for the land use controls, or any anticipated transfer of the property subject to the land use controls.

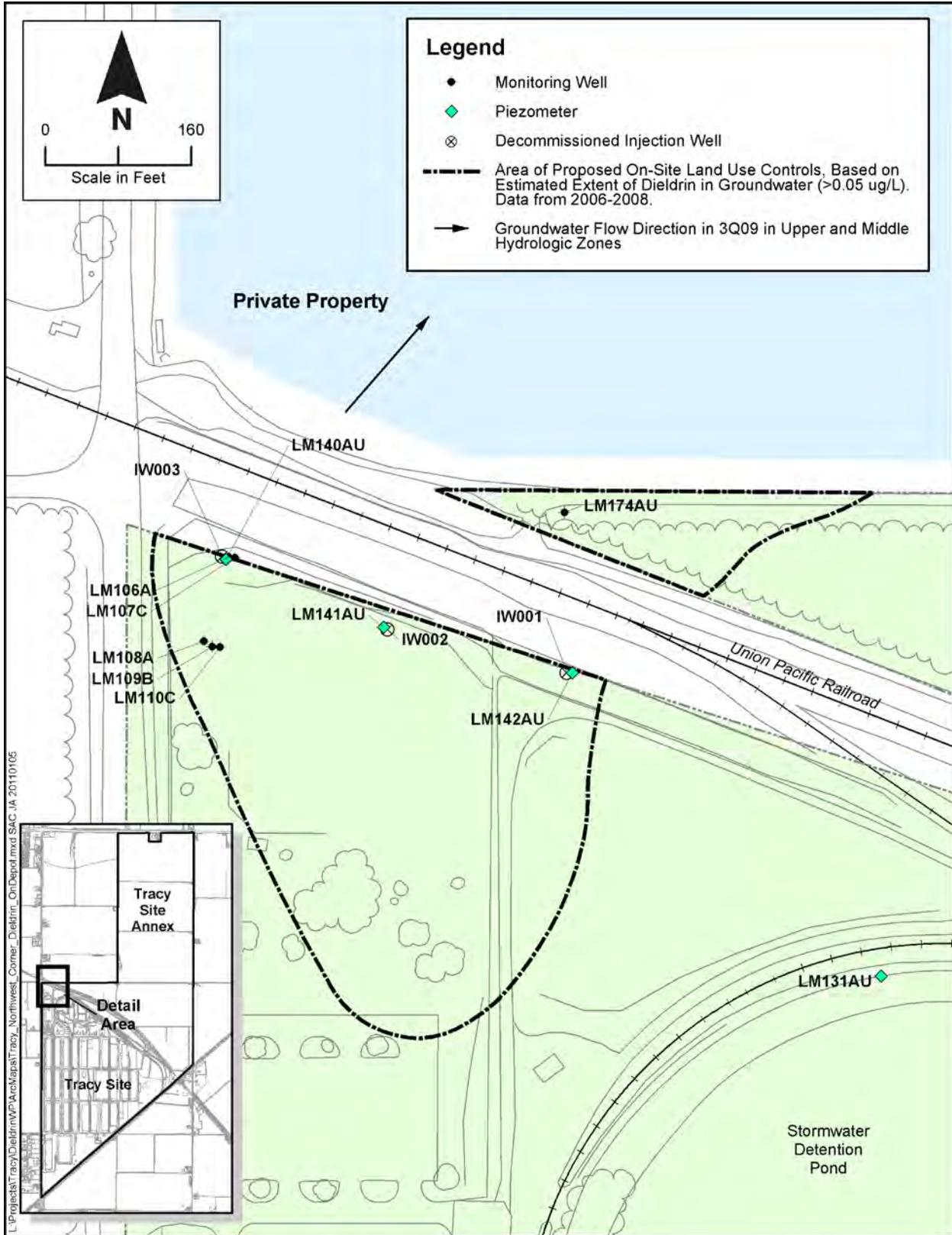


Figure 12-1. On-Site Portions of the NWC Dieldrin Plume Requiring Land Use Controls, Tracy Site

- DLA will maintain administrative controls (e.g., review of proposed construction projects) while the land use controls are in place. Land use controls will be maintained until concentrations of hazardous substances in groundwater are at such levels to allow for unlimited use and unrestricted exposure. The potential for unlimited use and unrestricted exposure for the NWC Groundwater OU will be evaluated by assessing the residual risk at the site. An initial risk assessment was completed for the NWC FS. That risk assessment, including any additional sampling data obtained during the three years of active pumping, will be used to determine if the site is suitable for unlimited use and unrestricted exposure. If it is determined the site is suitable for unlimited use and unrestricted exposure, the land use controls will no longer be needed, and a memorandum to the site file will be prepared to terminate the land use controls. DLA will not modify or terminate the land use controls without approval from EPA, DTSC, and CVRWQCB. DLA will seek prior concurrence before any anticipated action that may disrupt the effectiveness of the land use controls or any action that may alter or negate the need for the land use controls.
- Inspections of the environmental use restrictions and controls will be conducted annually by DLA. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to EPA, DTSC, and CVRWQCB. The annual monitoring reports will be used in preparation of the five-year reviews to evaluate the effectiveness of the remedy. The annual monitoring report, submitted to the regulatory agencies by DLA, will evaluate the status of the land use controls and how any land use control deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed to such restrictions and controls.
- DLA will notify EPA, DTSC, and CVRWQCB at least six months prior to any transfer or sale of any property subject to the land use controls so that the agencies can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective land use controls. If it is not possible for DLA to notify the agencies at least six months prior to any transfer or sale, then DLA will notify the agencies as soon as possible but no later than 60 days prior to transfer or sale of any property subject to land use controls. In addition to these land transfer notice and discussion provisions, DLA will provide the agencies with similar notice, within the same timeframes, for federal-to-federal transfers of property. DLA will provide a copy of the executed deed or transfer assembly to the agencies.

DLA is responsible for implementing, monitoring, maintaining, reporting on, and enforcing the identified land use controls. Although DLA may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, DLA will retain ultimate responsibility for remedy integrity. If DLA determines that it cannot meet specific land use control requirements, it is understood that the remedy may be reconsidered and that additional measures may be required to ensure the protection of human health and the environment.

Any future land use change for property associated with the on-site portions of the NWC dieldrin plume requires site characterization (prior data may be used) and, at a minimum, an environmental assessment of the property in accordance with the applicable U.S. Department of Defense (DoD) and EPA regulations in place at the time of the change. Many decisions documented in this ROD are based on current land use (industrial). In general, a change in land use must be evaluated to ensure that contamination left in place will not pose an unacceptable risk to human health or the environment under the new exposure scenario.

Nonclosure transfers of DoD property are guided by community input on land use, as provided for by the local government land use planning agency. In the event that no community land use plan is available at the time of property transfer, DoD will consider a range of reasonably anticipated future land uses in the transfer process. These assumptions allow the DoD (in conjunction with regulatory agencies) to determine the need for the land use controls. Environmental process requirements and restrictions (including land use controls) at installations subject to transfer are described in Title 42 United States Code §9620(h) (CERCLA §120(h)). This statute establishes hazardous substance notification and deed content requirements. Title 40 CFR §373 et seq. establishes the regulatory notification and reporting requirements. DoD policy, as set forth in the *Base Redevelopment and Realignment Manual* (DoD, 2006), currently requires documenting the environmental condition of the property and a finding of suitability to transfer prior to the transfer of properties subject to the NCP. In accordance with Title 22 CCR §67391.1(e)(1), DTSC cannot consider property owned by the federal government to be suitable for transfer to nonfederal entities where hazardous wastes/constituents/substances remain at levels that are not suitable for unrestricted land use unless appropriate land use covenants have been executed and recorded with the county of record.

If the depot is closed, DLA will implement the appropriate regulatory process and actions (e.g., legally enforceable restrictions) to ensure continued protection of human health and the environment. In addition, notification of appropriate regulatory agencies will occur at the initiation of the process.

12.3 Cost Estimate for the Selected Remedy

The cost estimate for the selected alternative is based on present worth estimates of the following:

- Capital costs, including both direct and indirect costs
- Annual operation and maintenance costs
- Periodic costs, including preparation of five-year reviews
- Removal of pipelines and decommissioning of wells

Direct costs include the purchase of equipment, labor, and materials necessary to construct the selected remedy. Indirect costs include those for engineering, financial, and other services. Annual operation and maintenance costs for the selected remedy include maintenance materials, labor, and auxiliary materials, as well as operating costs.

As described in EPA's *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, the common approach for a feasibility study is to assign a contingency percentage based on engineering judgment. The contingency percentage is based on a qualitative assessment of cost risk. EPA's guidance states that the two main types of capital cost contingency are scope and bid (construction). Scope and bid contingencies may be added together and applied to the total of construction or operation and maintenance activity costs. Scope plus bid contingency typically ranges from 20 to 45 percent. A low contingency percentage indicates an opinion that the project scope will undergo minimal change during design and/or after the construction contract is awarded. A high percentage indicates an opinion that the project scope may change considerably between the feasibility study and construction completion.

The present worth cost represents the amount of money that, if invested in the initial year of the remedial action at a given rate, would provide the funds required to make future payments to cover all costs associated with the remedial action over its planned life. The present worth costs are projected for 30 years using a 2.7 percent discount rate. EPA's *A Guide to Developing and Documenting Cost*

Estimates During the Feasibility Study states that it is appropriate to apply the real discount rates found in Appendix C of the Office of Management and Budget (OMB) Circular A-94 for Federal Facility Sites being cleaned up using Superfund authority. In Appendix C of OMB Circular A-94, revised in December 2009, the real discount rate (nominal interest rate minus inflation rate) for 30-year projects is 2.7 percent. Real discount rates are rates from which the inflation premium has been removed and are based on the economic assumptions from the 2011 Budget. The feasibility study used a 5 percent discount rate, which was updated with the current 2.7 percent rate used in this ROD.

Capital, operation and maintenance, and periodic costs for the selected remedy are summarized in Table 12-1. The 30-year present value analysis is presented in Table 12-2. The present worth cost for the selected alternative is \$2,390,000. This estimate was developed using the best available information regarding the anticipated scope of the remedy. This is a feasibility-level engineering cost estimate expected to be within -30 percent to +50 percent of the actual project cost. Changes in the cost elements are likely to occur as a result of new information and data collected during engineering design.

Table 12-1. Cost Estimate Summary for the Selected Remedy

Description		Cost				
Capital Costs						
1.	Site Mobilization and Site Survey		\$19,000			
2.	Extraction Well Installation		\$244,000			
3.	Conveyance Piping/Communication Conduit Install		\$284,500			
4.	Liquid-Phase Granular Activated Carbon Installation		\$94,000			
5.	Upgrades to Groundwater Treatment Plant		\$51,000			
6.	Site Restoration and Post Construction Survey		\$20,000			
	Subtotal		\$712,500			
	Contingency Allowances (30%)		\$213,750			
	Construction Management (8%)		\$57,000			
	Project Management (8%)		\$57,000			
	Remedial Design (10%)		\$71,250			
Total Capital Cost			\$1,111,500			
Annual Operation and Maintenance Costs						
1.	Monthly Sampling and Analysis from Four Extraction Wells		\$35,000			
2.	Quarterly Sampling and Analysis from Eight Monitoring Wells		\$70,000			
3.	Operation and Maintenance		\$75,000			
4.	Carbon Change Out (Annually)		\$7,200			
5.	Reporting (Three Quarterly and One Annual Report)		\$30,000			
6.	Land Use Control Inspections and Reporting		\$2,000			
	Subtotal		\$219,200			
	Contingency Allowances (20%)		\$43,840			
	Project Management (15%)		\$32,880			
Total Annual Operation, Maintenance, and Reporting Cost			\$295,920			
Description	Year	Cost	Contingency Allowances (30%)	Project Management (8%)	Total Periodic Cost	
Periodic Costs						
1.	Start Up/Shakedown	1	\$10,000	\$3,000	\$800	\$13,800
2.	IRACR and Operation and Maintenance Reports	4	\$70,000	\$21,000	\$5,600	\$96,600
3.	Land Use Control Signs	0, 10, 20, 30	\$600	\$180	\$48	\$828
4.	System and Well Decommissioning	4	\$135,350	\$40,605	\$10,828	\$186,783
5.	Five-Year Reviews	5, 10, 15, 20, 25, 30	\$30,000	\$9,000	\$2,400	\$41,400
IRACR = Interim Remedial Action Completion Report						

Table 12-2. Summary of Present Worth Analysis

Year	Capital Cost	Annual O&M Cost	Periodic Cost	Total Cost	Discount Factor (2.7%)	Present Worth
0	\$1,119,500		\$828	\$1,120,128	1.000	\$1,119,328
1		\$295,920	\$13,800	\$309,720	0.974	\$301,577
2		\$295,920		\$295,920	0.948	\$280,565
3		\$295,920		\$295,920	0.923	\$273,189
4			\$283,383	\$283,383	0.899	\$254,737
5			\$41,400	\$41,400	0.875	\$36,237
6					0.852	\$0
7					0.830	\$0
8					0.808	\$0
9					0.787	\$0
10			\$42,228	\$42,228	0.766	\$32,352
11					0.746	\$0
12					0.726	\$0
13					0.707	\$0
14					0.689	\$0
15			\$41,400	\$41,400	0.671	\$27,762
16					0.653	\$0
17					0.636	\$0
18					0.619	\$0
19					0.603	\$0
20			\$42,228	\$42,228	0.587	\$24,785
21					0.572	\$0
22					0.556	\$0
23					0.542	\$0
24					0.528	\$0
25			\$41,400	\$41,400	0.514	\$21,269
26					0.500	\$0
27					0.487	\$0
28					0.474	\$0
29					0.462	\$0
30			\$42,228	\$42,228	0.450	\$18,988
Totals	\$1,119,300	\$887,760	\$362,112	\$2,369,172		\$2,390,760
Total Present Worth Cost (rounded)						\$2,390,000
O&M = operation and maintenance						

12.4 Expected Outcomes of Selected Remedy

This section presents the expected outcomes of the selected remedy in terms of resulting land and groundwater uses and risk reduction achieved as a result of the response action. The remedy uses a combination of institutional controls and groundwater treatment to control exposures and protect human health and the environment over the long term. The remedy will remove dieldrin to the extent technically and economically feasible. Expected outcomes for the selected remedy include the following:

- Land use is not expected to change as a consequence of the remedial action. Land use is expected to remain industrial, recreational, and agricultural.
- Groundwater use will be restricted by land use controls during implementation of the remedy, and these restrictions will remain in effect if dieldrin concentrations remain above those that would allow for unlimited use/unrestricted exposure following remediation. Groundwater use restrictions are

necessary to prevent the use of contaminated groundwater and to minimize migration of contaminated groundwater that could occur due to nearby groundwater withdrawals. The time frame for the extraction and treatment component of the remedial action is three years. If dieldrin concentrations in groundwater following remediation are at levels that would allow for unlimited use and unrestricted exposure, land use restrictions may be removed.

- Site cleanup is expected to have a negligible local socio-economic impact.

The removal of dieldrin mass from groundwater is expected to reduce the toxicity, mobility and volume of dieldrin in the groundwater at the NWC Groundwater OU.

13.0 STATUTORY DETERMINATIONS

Under CERCLA §121 and the NCP, the selected remedy must be protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected remedy compares to these statutory requirements.

13.1 Protection of Human Health and the Environment

Human receptor exposure to groundwater contaminated with dieldrin will only occur if groundwater is pumped to the surface and consumed or used in a residential or industrial setting. Groundwater from the NWC is not used for any domestic, agricultural, or industrial use, and there currently are no known plans for this to change in the future. No completed exposure pathways exist in the area of the NWC dieldrin plume. The selected remedy will protect human health and the environment in the long term by implementing land use controls, as appropriate, that will consist of prohibiting installation of a water supply well in the NWC Groundwater OU or adjoining government-owned land. Prohibiting the installation of water supply wells that could influence horizontal or vertical groundwater gradients within the affected area will also limit further degradation of the aquifer by maintaining plume stability.

The selected remedy will also reduce health risks by removing dieldrin from the groundwater. Implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts.

13.2 Compliance with ARARs

Remedial actions selected under CERCLA must comply with ARARs under federal environmental laws or, where more stringent than the federal requirements, state environmental or facility siting laws, unless ARARs are waived. The selected remedy complies with ARARs. No ARAR waivers are being sought for the NWC Groundwater OU remedial action.

13.2.1 Chemical-Specific ARARs

Chemical-specific ARARs are health- or risk-based numerical values that, when applied to site-specific conditions, establish acceptable concentrations of a chemical that may be found in, or discharged to, the ambient environment. If a chemical has more than one cleanup level, the most stringent level is identified as an ARAR for this remedial action. With respect to the dieldrin contamination in the NWC

Groundwater OU, there are no federal MCLs listed in the Safe Drinking Water Act or state primary MCLs in Title 22 CCR.

The preferred alternative was established through the dispute resolution process, which was memorialized in an agreement between DLA, USEPA, DTSC, and the CVRWQCB. The CVRWQCB, in its comments on the draft ROD, requested that several State plans and resolutions be included as ARARS, specifically the Water Quality Control Plan (Basin Plan), the State Anti-degradation Policy, Resolution 92-49, and Resolution 88-63, which classifies all groundwater in the state as a potential source of drinking water (if the water meets certain quality criteria).

DLA's position is that all remedial actions under CERCLA must, as a threshold matter, be determined by the lead agency to be necessary to protect human health and/or the environment from unacceptable risk, and further be appropriate and relevant to the circumstances of a site release (42 U.S.C. Section 9621(a)(1) and (d)(1)). Both CERCLA and the NCP focus on cleaning up contaminated groundwater, where practicable and achievable within a reasonable timeframe, to a level that will restore the designated uses of the groundwater, not to the lowest level achievable regardless of risk (42 U.S.C. Section 9621(d)(2)(B)(i) and 40 CFR Section 300.430(a)(1)(iii)(F)). Accordingly, California anti-degradation provisions (to include State Water Resources Control Board Resolution 92-49 and the Basin Plan) based on achieving background or the lowest cleanup level that is technically and economically achievable are not risk-based, necessary, appropriate or relevant to returning contaminated groundwater to a drinking water level of service; and, therefore, they are not eligible for consideration as potential ARARS.

Regarding applicability, the California anti-degradation provisions are not applicable as they are directed towards state agencies who in turn are directing cleanup under state law, whereas this is a federal CERCLA cleanup action where the state is a support agency; or apply to current discharges as opposed to historic releases or further migration of such releases; or apply to specific, discrete regulated units that received hazardous waste after 26 July 1982, neither of which apply here.

State anti-degradation provisions are not relevant and appropriate requirements (RARs) because: MCL goals that are set at zero are categorically not relevant and appropriate (40 CFR Section 300.430(e)(2)(i)(C)) and as background for the hazardous substances in issue at the Northwest Corner Groundwater OU would be zero, such background provisions in California anti-degradation provisions are similarly not relevant and appropriate; 40 CFR Section 300.430(e)(2)(i)(C) and 40 CFR Section 300.400(g)(2)(viii) together require that a potential RAR for groundwater reasonably relate, that is be relevant and appropriate, to the beneficial use of the groundwater being addressed and as discussed above, California anti-degradation provisions requiring cleanup levels be set at zero or the lowest level technically and economically feasible, are not reasonably related to any actual or potential use of the water or risks to users thereof; and the CCR revisions are designed for specific and discrete units that manage hazardous waste, such as landfills, surface impoundments, and other similar transfer, treatment, storage or disposal units, thus they are not reasonably related to the NWC Groundwater OU.

Although the parties do not agree whether the plans and resolutions requested by CVRWQCB identified below should be included in the ROD as State ARARS, the parties do agree that the preferred alternative, which is outlined in the 14 April 2010 agreement of the parties and is incorporated as the remedy selected in this ROD, substantively complies with all State ARARS.

- State Water Board Resolution 92-49, Article III.G.
- Title 27, CCR, Section 20415 – Title 23, CCR, Section 2550.7 (general monitoring requirements).

- Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan, Chapter III, Water Quality Objectives for Ground Waters (providing that ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.) Basin Plan, page III-10.00.

13.2.2 Location- and Action-Specific ARARs and TBCs

Location- and action-specific ARARs and TBCs identified for the selected remedy are presented in Table 13-1.

13.3 Cost Effectiveness

The selected remedy is cost effective and represents a reasonable value for the money required to implement the remedy. In making this determination, the following definition was used: A remedy shall be cost effective if its costs are proportional to its overall effectiveness (NCP §300.430(f)(1)(ii)(D)). The determination was made by evaluating the overall effectiveness of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost effectiveness. The relationship of the overall effectiveness of the selected remedy was determined to be proportional to its costs; hence the selected remedy represents a reasonable value for the money to be invested in its implementation.

The estimated present worth cost of the selected remedy is \$2,390,000. Although Alternative 2 is less expensive by \$1,310,000, reduction in toxicity, mobility, and volume through treatment is not addressed by that alternative, making the selected remedy more cost effective. The selected remedy's additional cost for the reduction in toxicity, mobility, and volume provides a significant increase in protection of human health and the environment and is cost effective. The selected remedy will provide an overall level of protection comparable to Alternative 3 at a lower cost.

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy maximizes use of permanent solutions and treatment technologies in a practicable manner. Of those alternatives that are protective of human health and the environment and comply with ARARs, the selected remedy provides an acceptable balance of trade-offs in terms of the five balancing criteria. It also considers the statutory preference for treatment as a principal element with a bias against off-site treatment and disposal. The selected remedy has been accepted by the State, and there was no comment on the proposed plan by the community.

The selected remedy satisfies the criteria for long-term effectiveness by removing dieldrin mass from groundwater and implementing land use controls. The residual treatment waste (granular activated carbon) will be regenerated off site. The selected remedy does not present short-term risks different from the other treatment alternative. There are no special implementability issues that set the selected remedy apart from any of the other alternatives evaluated. The selected remedy is cost effective with a mid-level cost in comparison to the other treatment alternative, Alternative 3.

Table 13-1. ARARs and TBCs for the NWC Groundwater Operable Unit, Tracy Site

Authority	Legal Authority	Status	Synopsis of Requirement	Actions to be Taken to Attain Requirement
Chemical-Specific ARARs				
None				
Location-Specific ARARs or TBCs				
Federal and State Regulatory Authority	Federal Endangered Species Act 16 USC 1531, et seq.); 50 CFR Part 402 California Endangered Species Act Fish and Game Code Sections 2050 et seq.; 2080 Native Plant Protection Act Fish and Game Code Section 1908	TBC	Requires action to conserve endangered species or threatened species by ensuring that actions authorized, funded, or carried out by federal agencies are not likely to jeopardize endangered or threatened species.	A burrowing owl (a species of special concern in California) colony has been identified on the Tracy Site Annex, and the depot is located within the historic range of five sensitive species: the San Joaquin kit fox (endangered), the giant garter snake (threatened), the Swainson's hawk (threatened), the western yellow-billed cuckoo (threatened), and the valley elderberry longhorn beetle (threatened). Consultations with the United States Fish and Wildlife Service and the California Fish and Game are required for all actions that may impact an identified sensitive species.
Action-Specific ARARs				
State Regulatory Authority	Waste Discharge Requirements Order No. 98-053	ARAR	The discharge of treated groundwater at the Tracy Site is currently permitted under Order No. 98-053. The current Order does not specifically include the dieldrin area in the NWC as a source area.	Approval from the Executive Officer and/or revision of the existing permit is necessary.

Table 13-1. (Continued)

Authority	Legal Authority	Status	Synopsis of Requirement	Actions to be Taken to Attain Requirement
Action-Specific ARARs (continued)				
State Regulatory Authority	Requirement for Land Use Covenants California Civil Code Section 1471 (a&e); 22 CCR 67390.2 - 67391.1	Possible ARAR	Where hazardous substances levels remain that do not allow for unlimited use and unrestricted exposure, ICs must be included in decision documents. If the site is transferred to a non-federal entity, California will not find the site suitable for transfer unless a land use covenant is filed with the county recorder. For federal-to-federal transfers, other methods must be in place to ensure that IC/LUC language be maintained.	At the time of site transfer, a land use covenant or equivalent shall be applied, if necessary.
Federal and State Regulatory Authority	Hazardous Waste Regulations Identification and Listing of Hazardous Waste 40 CFR 261.11 through 261.24; 22 CCR 66261.11 and 22 CCR 66261.20 through 66261.24	ARAR	A generator must determine if the waste is classified as a hazardous waste in accordance with the criteria provided in these requirements.	The selected remedy will comply with the waste classification requirements to determine proper disposal of waste (e.g., drill cuttings and spent granular activated carbon). All hazardous wastes generated will be handled in accordance with hazardous waste requirements.
ARAR = applicable or relevant and appropriate requirement CCR = California Code of Regulations CFR = Code of Federal Regulations IC = institutional control LUC = land use control No. = number NWC = northwestern corner TBC = to be considered USC = United States Code				

13.5 Preference for Treatment as a Principal Element

By incorporating ex-situ treatment as a component of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

13.6 Five-Year Review Requirements

This remedy may result in dieldrin concentrations remaining above those that allow for unlimited use and unrestricted exposure following remediation. If dieldrin concentrations remain above those concentrations, a statutory review will be conducted within five years after initiation of the remedial action in conjunction with OU 1 and soil site reviews to evaluate whether the remedy is protective of human health and the environment.

REFERENCES

City of Tracy, 2010. *City of Tracy General Plan*. July.

Defense Logistics Agency, 2010. Letter from Phillip Dawson to Keith Takata, EPA, describing final agreement to resolve the formal dispute of the Northwestern Corner Dieldrin Feasibility Study for the Tracy Site. Attachment to letter is titled "FINAL Agreement between the DLA, USEPA and State to resolve the October 3, 2009 formal dispute under the Tracy, California Federal Facility Agreement with respect to the Draft Final Northwest Corner Dieldrin Plume Feasibility Study, DDJC Tracy." 14 April.

Department of Toxic Substances Control, 1994 (Second printing:1999). *Preliminary Endangerment Assessment Guidance Manual*. State of California: Environmental Protection Agency, Department of Toxic Substances Control. January.

ENSOTECH, 1991. Geologic Well Logs for Interim Groundwater Remediation at Tracy Defense Depot. Draft. February.

Montgomery Watson, 1994. *Final Comprehensive Site Wide RI/FS – Phase 1 Characterization Report, DDRW-Tracy, California*. October.

Montgomery Watson, 1995a. DDRW-Tracy Monitoring Program 1994 Annual Report.

Montgomery Watson, 1995b. *Preliminary Design Data Report, DDRW-Tracy, California*. February.

Montgomery Watson, 1995c. *3-D Groundwater Model Technical Evaluation*. August.

Montgomery Watson, 1996a. *DDRW-Tracy Comprehensive Remedial Investigation/Feasibility Study*. Final. November.

Montgomery Watson, 1996b. *Final Explanation of Significant Differences, DDRW-Tracy, California*. January.

Radian Corporation, 1986. *Geohydrological Investigations, Final Engineering Report, DDRW-Tracy California*.

Radian Corporation, 1996–2001. DDJC-Tracy Well Monitoring Program, 1995 to 2000 Annual Reports.

- Radian International, 1998a. *DDJC-Tracy Site-Wide Comprehensive Record of Decision*. Final. April.
- Radian International, 1998b. *DDJC-Tracy Remedial Design Work Plan*. Final. January.
- R&K Engineering, 2009. *Defense Distribution Depot San Joaquin Real Property Master Plan Digest*. May.
- Rust, 1999. *Technical Memorandum: Summary of Dieldrin Data and Recommendations for the Northwest Corner of Defense Distribution Depot San Joaquin, Tracy Site*. May.
- U.S. Department of Defense, 2006. *Base Redevelopment and Realignment Manual*. March.
- U.S. Environmental Protection Agency (EPA), 1989. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*. Interim Final. Office of Emergency and Remedial Response. EPA/540/1-89/002. December.
- EPA, 1996. *Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites*. Final Guidance. EPA 540/R-96/023. October.
- EPA, 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents*. Solid Waste and Emergency Response. EPA/540/R-98/031. July.
- EPA, 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. EPA 540-R-00-002, OSWER 9355.0-75. July.
- EPA, 2006. Sample Federal Facility Land Use Control ROD Checklist with Suggested Language. October. <http://www.epa.gov/fedfac/documents/icchecklist.pdf> (last accessed December 2010).
- EPA, 2010. Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites. RSL Table update. May 17, 2010. <http://www.epa.gov/region9/superfund/prg/>
- URS, 2000. *OU 1 Pesticides Extraction and Treatment System Remedial Design (30%)*. November.
- URS, 2002–2009. DDJC-Tracy Well Monitoring Program, 2001 to 2008 Annual Reports.
- URS, 2002. *OU 1 Pesticides Extraction and Treatment System Remedial Design (100%)*. Final. May.
- URS, 2003. *Recommendation Relative to Dieldrin Concentrations in Groundwater, Northwestern DDJC-Tracy Site*. June.
- URS, 2004. *DDJC-Tracy 2004 Explanation of Significant Differences to the Sitewide Comprehensive Record of Decision*. September.
- URS, 2005. *Recommendation Relative to Dieldrin Concentrations in Groundwater, Northwestern DDJC-Tracy*. May.
- URS, 2007. *Dieldrin Natural Attenuation Investigation Results*. Final. April.
- URS, 2010. *Northwestern Corner Dieldrin Plume Feasibility Study Report*. Final. July.
- USATHAMA, 1980. *U.S. Army Toxic and Hazardous Materials Agency Installation Assessment of Defense Depot, Tracy, California, Report No. 181*. October.

Woodward-Clyde Consultants, 1993. *Operable Unit No. 1 Record of Decision, DDRW-Tracy, California*.
Final August.

Woodward-Clyde Consultants, 1996. *Final Comprehensive Remedial Investigation/Feasibility Study*.
Vols. I and II. November.

PART 3: RESPONSIVENESS SUMMARY

1.0 OVERVIEW

The public comment period for the proposed plan to clean up dieldrin-contaminated groundwater in the northwestern corner (NWC) of the Tracy Site began on 19 October and ended 18 November 2010. Prior to the start of the public comment period, the Defense Logistics Agency (DLA), the U.S. Environmental Protection Agency, and the California Environmental Agency identified an Agreed Upon Alternative for remediation of dieldrin in the NWC Groundwater Operable Unit (OU). All of the stakeholder agencies agreed that this alternative, extraction with four wells and treatment with activated carbon for three years, can reasonably be expected to achieve the remedial action objectives. The proposed plan described the Agreed Upon Alternative and other alternatives considered in the *Northwestern Corner Dieldrin Plume Feasibility Study Report*.

During the public comment period, no written comments were submitted via mail or in person to the DLA, Office of Command Affairs. The proposed plan was presented orally in a public meeting on 3 November 2010. Although some members of the public attended the meeting, no oral or written comments were submitted during the meeting. Therefore, DLA has not identified any public concerns regarding the preferred alternative for the NWC Groundwater OU.

2.0 BACKGROUND OF COMMUNITY INVOLVEMENT

The Environmental Services Branch DLA Installation Support at San Joaquin has maintained an active community involvement program since the 1980s. DLA has provided general information updates to the community through the distribution of the depot's *Environmental Update* fact sheets to a community mailing list that includes interested parties (approximately 200 addresses) and all mailing addresses within the postal zones surrounding the depot (more than 3,000 addresses). DLA has also notified the community of program milestones and provided opportunities for public review and comment through public notices placed in local newspapers, as required under the Comprehensive Environmental Response, Compensation, and Liability Act, and it has held public meetings to present milestone documents and solicit public review and comment, as required under CERCLA, such as the public meeting on the NWC Groundwater OU proposed plan. The submittal of public comments and concerns has been actively solicited, and yet, there has been no response on the proposed plan and most other information provided. Therefore, DLA concludes that the public in the Tracy Site area has no concerns regarding the remedy proposed for the NWC Groundwater OU.

3.0 SUMMARY OF PUBLIC COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

No comments were received from the public in written or oral form during the public comment period for the proposed plan.

4.0 REMAINING CONCERNS

DLA is not aware of any public concerns regarding groundwater in the NWC Groundwater OU.

ATTACHMENT A

Final Dispute Resolution Letter, 14 April 2010



IN REPLY
REFER TO DES-E

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
8725 JOHN J. KINGMAN ROAD
FORT BELVOIR, VIRGINIA 22060-6221

APR 14 2010

Keith Takata
Director, Superfund Division
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105

Dear Mr. Takata:

The Defense Logistics Agency (DLA) received your letter dated March 26, 2010, transmitting the Final Agreement signed by the U.S. Environmental Protection Agency (USEPA) and the State of California (Toxic Substances Control Division and the Regional Water Quality Control Board) to resolve the formal dispute of the Northwest Corner (NWC) Dieldrin Feasibility Study for the Defense Dept, San Joaquin – Tracy (DDJC). The Agreement, as signed by DLA at the attachment, solidifies the concurrence of all parties on the requirements for implementation of a pump and treat (P&T) groundwater remedy at the NWC site. As always, DLA will follow all applicable laws, regulations, and guidance to achieve proper site closure.

In my letter dated February 25, 2010, I stated that in order to expedite the implementation of the remedy and at the direction of the Office of the Deputy Under Secretary of Defense (Installations & Environment) Environmental Management office (DUSD (I&E)/EM), DLA could possibly use currently programmed FY10 dollars for the NWC remedy. Contrary to what was implied in the third paragraph of your letter, we have secured FY10 funding for the DDJC groundwater cleanup compliance activities and plan to fully obligate these funds by April 30, 2010. Additionally, in early February, DLA had indeed informed DUSD (I&E)/EM of the potential need for additional funds upon resolution of the DDJC dieldrin dispute. Now that we have a Final Agreement, DLA has formally requested additional FY10 funds for the NWC remedy. DUSD (I&E) has agreed to fund the dieldrin resolution costs. DLA is expecting to receive funding in the June/July time frame for this resolution.

As requested, I am forwarding the signed Agreement, as well as the estimated schedule of the Federal Facility Agreement (FFA) Installation Restoration Program (IRP) activities at DDJC. The schedule includes submittal dates for the primary documents. The success of this schedule will require timely document review as defined in the FFA.

If you have any questions, please contact me or Ms. Nanette Werner, DES-E, at (703) 767-6236, DSN 427-6236, or email: nanette.werner@dla.mil.

Sincerely,

A handwritten signature in black ink that reads "Phillip R. Dawson". The signature is written in a cursive style with a long horizontal flourish at the end.

Phillip R. Dawson
Staff Director
Environmental Management

Attachments

cc:

Mr. Michael Montgomery, U.S. EPA

FINAL
Agreement between the
Defense Logistics Agency (DLA), the US Environmental Protection Agency, (US
EPA) and the California Department of Toxic Substances Control and Regional
Water Quality Control Board – Central Valley Region (State)
to resolve the October 13, 2009 formal dispute under the Tracy, California
Federal Facility Agreement with respect to the Draft Final Northwest Corner (NWC)
Dieldrin Plume Feasibility Study, Defense Depot San Joaquin (DDJC) Tracy

DLA agrees to implement an action to pump and treat (P&T) groundwater to remove dieldrin to the extent technically and economically feasible in the area of the facility known as the NWC Dieldrin Plume, consistent with this agreement. The State agrees that the proposed action, taken consistent with the following agreement, provides substantive compliance with the State's Applicable or Relevant and Appropriate Requirements in that this unique site consists of a limited plume of non-dissolved phase dieldrin that is subject to partial removal from the groundwater.

All parties (DLA, US EPA, and the State) agree:

- 1) DLA will design, install, and operate a P&T system to remove the dieldrin, to the extent technically and economically feasible, from groundwater at the NWC of DDJC Tracy.
- 2) The P&T system will consist of 4 extraction wells, 3 to be located on the northern edge of the Tracy property boundary and 1 near the former injection locations. The extraction wells will be installed in the permeable channels of the Middle and Upper Hydrogeologic Zones (Draft NWC Dieldrin Plume Feasibility Study Report, June 2009). Extraction well construction will be optimized by location and depth, the latter not exceeding 65 feet below ground surface, for maximum on-site and off-site dieldrin mass removal with a goal to reduce dieldrin concentrations to 0.05 ug/l.
- 3) DLA will operate the P&T system for a period of up to 3 years during which time it will optimize the system, as designed and built, through methods such as altering flow rates at individual extraction wells. Groundwater samples will be collected monthly from the 4 extraction wells and quarterly from the 8 existing monitoring wells already being utilized in support of the Tracy Annual Well Monitoring program.
- 4) DLA will submit sampling results from the 4 extraction and 8 monitoring wells in the Quarterly and Annual Monitoring Reports and will include the amount of dieldrin mass being removed. DLA will also prepare a Preliminary Project Completion Report containing the results at the conclusion of the 3 year pumping period.
- 5) DLA will cease operation of the P&T system after a period of 3 years, beginning after the 4 wells are fully operational and functional, even if the dieldrin removal goal of 0.05 ug/l has not been met.

- 6) At the conclusion of the P&T, no further action by DLA will be required except for institution of on-site land use restrictions as appropriate.
- 7) No containment zone will be needed at the conclusion of the P&T.
- 8) This agreement and the proposed remedy will be set forth in a Proposed Plan for the NWC. A separate NWC Record of Decision will follow.
- 9) DLA agrees to seek funding for construction and operation of a limited P&T system to include the 4 extraction wells.

Keith A. Takata
Keith A. Takata
Director, Superfund Division
U.S EPA Region 9

3/26/10
Date

Frederick S. Moss
Frederick S. Moss
Assistant Executive Officer
California Regional Water Quality Control Board –
Central Valley Region

3/30/10
Date

Stewart W. Black
Stewart W. Black, P.G.
Acting Deputy Director
California Department of Toxic Substances Control

3/28/10
Date

Phil R. Dawson
Phil R. Dawson
Staff Director, Environmental Management
Defense Logistics Agency

4/14/10
Date

APPENDIX A

Addendum to the Real Property Master Plan Digest

ADDENDUM TO THE REAL PROPERTY MASTER PLAN DIGEST

This addendum to the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* (formerly Installation Master Plan) describes land use controls (LUCs) for the Northwestern Corner (NWC) Groundwater Operable Unit (OU) at the Tracy Site to protect human health and ecological receptors from exposure to dieldrin in groundwater. LUCs are necessary to prohibit installation of water supply wells within the on-site portions of the NWC dieldrin plume at the Tracy Site and to protect infrastructure associated with the NWC Groundwater OU remedial system. Figure 1 shows the portions of the NWC dieldrin plume on the depot and annex where groundwater use controls will be implemented (based on data collected through 2008).

PURPOSE OF THIS ADDENDUM

This addendum to the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest* describes the procedures that will be used to prohibit the installation of water supply wells within the on-site portions of the NWC dieldrin plume at the Tracy Site and to protect infrastructure, including signs informing site visitors of the LUCs, associated with the NWC Groundwater OU monitoring, extraction, treatment, and disposal systems. If additional information is needed, please contact the Defense Logistics Agency (DLA) Installation Support at San Joaquin Environmental Program Manager.

IMPLEMENTATION REQUIREMENTS

This addendum will be incorporated into the *Defense Distribution Depot San Joaquin Real Property Master Plan Digest*. In addition, the DLA Environmental Program Manager will review all proposed construction projects, evaluate the proposed project with respect to the land use restriction, and issue a record of environmental consideration with the findings of the evaluation. If any component of a proposed project is inconsistent with the LUC objective, the requester will be required to modify the project plans to be consistent with the LUCs.

DLA will address any activity that is inconsistent with the LUC objective or use restriction, or any other action that may interfere with the effectiveness of the LUCs, as soon as practicable. In no case will the process be initiated later than 10 days after the date DLA becomes aware of the inconsistency.

AGENCY NOTIFICATION REQUIREMENTS

DLA is required to notify the regulatory agencies (United States Environmental Protection Agency [EPA], California Department of Toxic Substances Control [DTSC], and the California Regional Water Quality Control Board—Central Valley Region [CVRWQCB]) regarding discovery of any activity or proposal for a land use change that is inconsistent with the LUCs or transfer or sale of any property subject to the LUCs. Notification requirements include the following:

- DLA will notify EPA, DTSC, and CVRWQCB as soon as practicable, but no later than 10 days after discovery of any activity that is inconsistent with the LUC objective or use restriction, or any other action that may interfere with the effectiveness of the LUCs. Within 10 days of sending the initial notification related to the inconsistency, DLA will provide notification explaining how the inconsistency was or will be addressed.
- DLA will notify EPA, DTSC, and CVRWQCB at least 45 days in advance of any proposed land use change that is inconsistent with the LUC objective, any anticipated action that may disrupt or interfere with the effectiveness of the LUCs, any action that might alter or negate the need for the LUCs, or any anticipated transfer of the property subject to the LUCs.
- DLA will notify EPA, DTSC, and CVRWQCB at least six months prior to any transfer or sale of any property subject to the LUCs so that the agencies can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain

effective LUCs. If it is not possible for DLA to notify the agencies at least six months prior to any transfer or sale, then DLA will notify the agencies as soon as possible but no later than 60 days prior to transfer or sale of any property subject to LUCs. In addition to these land transfer notice and discussion provisions, DLA will provide the agencies with similar notice, within the same timeframes, for federal-to-federal transfers of property. DLA will provide a copy of the executed deed or transfer assembly to the agencies.

LAND USE CONTROL MAINTENANCE REQUIREMENTS

DLA is required to maintain existing administrative controls (e.g., review of proposed construction projects) while the LUCs are in place. LUCs will be maintained until concentrations of hazardous substances in groundwater are at such levels that allow for unlimited use and unrestricted exposure. DLA will not modify or terminate the LUCs without approval from EPA, DTSC, and CVRWQCB. DLA will seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for the LUCs.

LAND USE CONTROL MONITORING AND REPORTING REQUIREMENTS

Monitoring of the environmental use restrictions and controls will be conducted annually by DLA. The monitoring results will be included in a standalone report or as a section of another environmental report, if appropriate, and provided to EPA, DTSC, and CVRWQCB. The annual monitoring reports will be used in preparation of five-year reviews to evaluate the effectiveness of the remedy. The annual monitoring report, submitted to the regulatory agencies by DLA, will evaluate the status of the LUCs and how any LUC deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s) if a parcel including the NWC were sold or transferred, whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and whether use of the property has conformed to such restrictions and controls.

CHANGES IN LAND USE

Any future land use change for property associated with the on-site portions of the NWC dieldrin plume requires site characterization (prior data may be used) and, at a minimum, an environmental assessment of the property in accordance with the applicable U.S. Department of Defense (DoD) and EPA regulations in place at the time of the change. Many decisions documented in the *Record of Decision Remedy for Northwestern Corner Groundwater Operable Unit* are based on current land use (industrial). In general, a change in land use must be evaluated to ensure that contamination left in place will not pose an unacceptable risk to human health or the environment under the new exposure scenario.

Nonclosure transfers of DoD property are guided by community input on land use, as provided for by the local government land use planning agency. In the event that no community land use plan is available at the time of property transfer, DoD will consider a range of reasonably anticipated future land uses in the transfer process. These assumptions allow the DoD (in conjunction with regulatory agencies) to determine the need for the LUCs. Environmental process requirements and restrictions (including LUCs) at installations subject to transfer are described in Title 42 United States Code §9620(h) (Comprehensive Environmental Response, Compensation, and Liability Act §120(h)). This statute establishes hazardous substance notification and deed content requirements. Title 40 Code of Federal Regulations §373 et seq. establishes the regulatory notification and reporting requirements. DoD policy, as set forth in the *Base Redevelopment and Realignment Manual*, currently requires documenting the environmental condition of the property and a finding of suitability to transfer prior to the transfer of properties subject to the National Oil and Hazardous Substances Pollution Contingency Plan. In accordance with Title 22 California Code of Regulations §67391.1(e)(1), DTSC cannot consider property owned by the federal government to be suitable for transfer to nonfederal entities where hazardous wastes/constituents/substances remain at levels that are not suitable for unrestricted land use, unless appropriate land use covenants have been executed and recorded with the county of record.

If the depot is closed, DLA will implement the appropriate regulatory process and actions (e.g., legally enforceable restrictions) to ensure continued protection of human health and the environment. In addition, notification of appropriate regulatory agencies will occur at the initiation of the process.

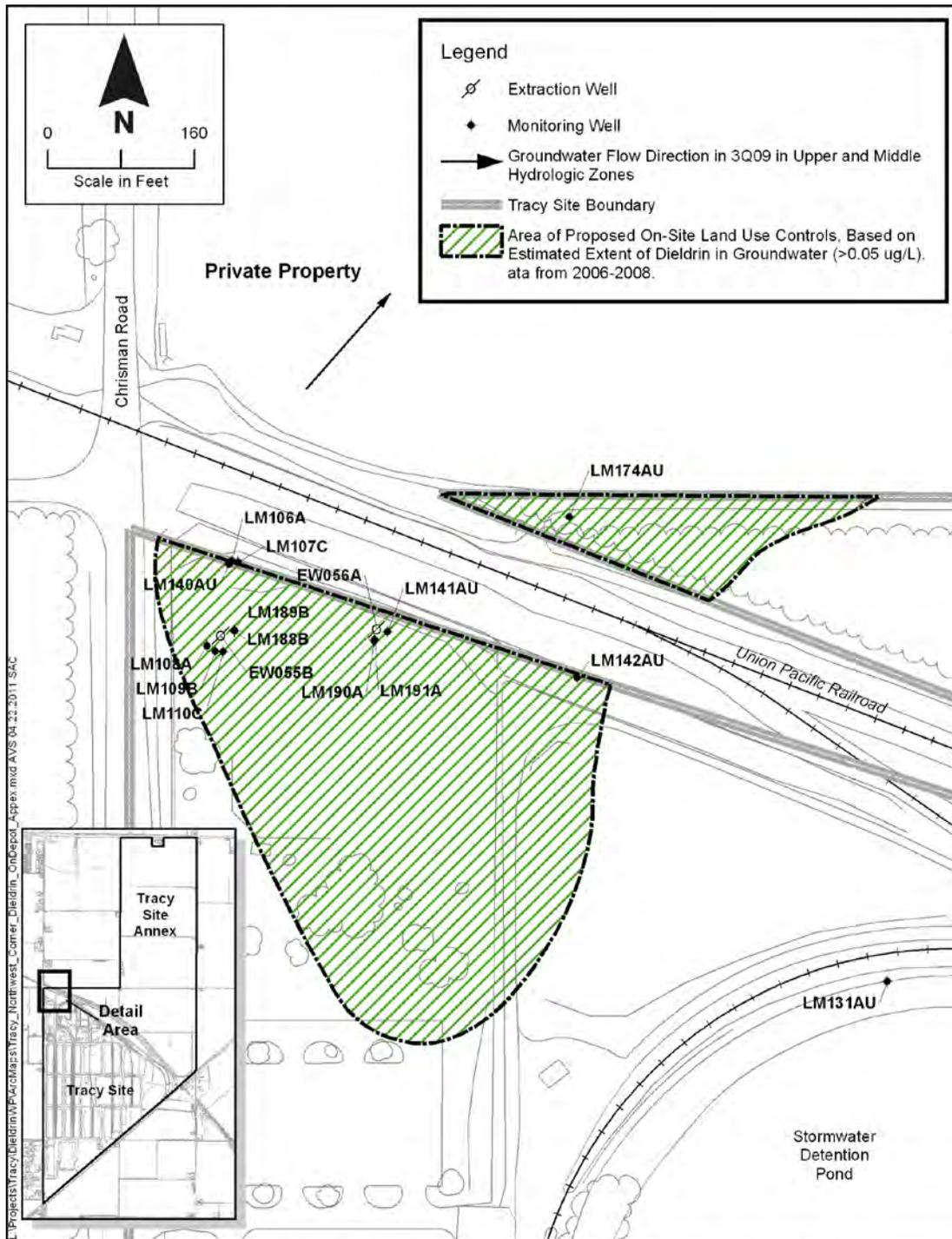


Figure 1. On-Site Portions of the Northwestern Corner Dieldrin Plume Requiring Land Use Controls, Tracy Site

Purpose of Controls:

- Prevent exposure to dieldrin contaminated groundwater.

Land Use Control Requirements:

- Prevent use of contaminated groundwater (untreated) within the contaminant plumes. (Contact Tracy Site Environmental Program Manager for most recent map of plume extent.)
- Protect infrastructure associated with NWC Groundwater OU groundwater monitoring, extraction, treatment, and disposal (any damage to infrastructure must be promptly repaired).
- Post appropriate signage at the NWC Groundwater OU Site indicating restrictions on groundwater use and production well installations.
- Implement notification procedure for construction activities or land use changes.
- Maintain administrative controls (i.e., Real Property Master Plan Digest addendum and notification procedures).
- Perform annual reviews to ensure compliance with instituted controls and to correct any deficiencies in the notification procedure.
- Follow defined procedures in the event of a change in land use.

Actions to Date:

- None.

Contaminants of Concern:

- Dieldrin.

Site Characteristics:**Past Site Activities**

- Previous treated groundwater injection resulted in dieldrin contamination in groundwater beneath the NWC of the Tracy Site.

RI/FS Activities

- The distribution of contaminants in groundwater is assessed each year by the Well Monitoring Program and reported in the Annual Monitoring Report.

Conclusions:

- The selected remedy for NWC Groundwater OU is extraction and treatment with the discharge of treated water to infiltration galleries for up to three years.

References:

URS, 2011. Defense Distribution Depot San Joaquin California - *Tracy Site Record of Decision Remedy for Northwestern Corner Groundwater Operable Unit*. Final. TBD.

APPENDIX B

**Responses to Comments
and
Informal Dispute Documentation**

Responses to Comments

AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT (AFCEE)

DESIGN REVIEW COMMENTS

Project: Draft Record of Decision, Remedy for NWC Groundwater OU, Defense Distribution, Sharpe Site

- | | | | |
|--|--|---|--------------------------------------|
| <input checked="" type="checkbox"/> SITE DEV & GEO | <input type="checkbox"/> MECHANICAL | <input type="checkbox"/> SAFETY | <input type="checkbox"/> SYSTEMS ENG |
| <input type="checkbox"/> ENVIR PROT & UTIL | <input type="checkbox"/> MFG TECHNOLOGY | <input type="checkbox"/> ADV TECH | <input type="checkbox"/> VALUE ENG |
| <input type="checkbox"/> ARCHITECTURAL | <input type="checkbox"/> ELECTRICAL | <input type="checkbox"/> ESTIMATING | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft
 DATE 25 March 2011
 NAME James Brownell, CVWB

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
		<p>California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) staff has reviewed the 18 January 2011 <i>Draft Record of Decision, Remedy for Northwestern Corner Groundwater Operable Unit</i> (Draft ROD), received 19 January 2011. URS Corporation prepared the Draft ROD on behalf of Defense Logistics Agency Enterprise Support San Joaquin, California (DLA) for the Defense Distribution Depot San Joaquin facility located in Tracy, California.</p> <p>The Draft ROD presents the selected remedy to cleanup dieldrin-contaminated groundwater in the northwest corner of the Tracy facility. DLA presented the selection of a groundwater pump and treat remedy in the 9 July 2010 Final Northwestern Corner Dieldrin Plume Feasibility Study Report. The selected remedy is consistent with the 14 April 2010 dispute resolution agreement signed by DLA, Central Valley Water Board, U.S. Environmental Protection Agency (USEPA), and California Department of Toxic Substances Control. DLA has identified the northwest corner groundwater contaminated area as a new operable unit (OU): Northwestern Corner (NWC) Groundwater Operable Unit.\</p> <p>The USEPA has provided DLA with extensive comments on the Draft ROD in their correspondence dated 22 February 2011. Rather than reiterate comments made in that correspondence, Central Valley Water Board staff have focused this review letter on Applicable or Relevant and Appropriate Requirements (ARARs) identified in the Draft ROD. The Draft ROD does not identify State of California ARARs. DLA should consider inclusion of the following State ARARs to the Draft Final ROD:</p>	<p>DLA does not agree the suggested State ARARs should be included in the NWC ROD. DLA responses to each suggested State ARAR are provided below.</p> <p>1. California Water Code Section 13243 is not applicable to DLA or the remedy. It pertains to the CVRWQCB and allows them a role in the cleanup (primarily through waste discharge requirements [WDR]).</p> <p>2. through 8. DLA disagrees that these are ARARs for the NWC Groundwater OU. DLA's position is that all remedial actions under CERCLA must, as a threshold matter, be determined by the lead agency to be necessary to protect human health and/or the environment from unacceptable risk, and further be appropriate and relevant to the circumstances of a site release (42 U.S.C. Section 9621(a)(1) and (d)(1)). Both CERCLA and the NCP focus on cleaning up contaminated groundwater, where practicable and achievable within a reasonable timeframe, to a level that will restore the designated uses of the groundwater, not to the lowest level achievable regardless of risk (42 U.S.C. Section 9621(d)(2)(B)(i) and 40 CFR Section 300.430(a)(1)(iii)(F)). Accordingly, California anti-degradation provisions (to include SWRCB Resolution 92-49 and the Basin Plan) based on achieving background or the lowest cleanup level that is technically and economically achievable are not risk-based, necessary, appropriate or relevant to returning contaminated groundwater to a drinking water level of service; and, therefore, they are not eligible for consideration as potential ARARs.</p> <p style="text-align: right;">(continued)</p>

AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT (AFCEE)

DESIGN REVIEW COMMENTS

Project: Draft Record of Decision, Remedy for NWC Groundwater OU, Defense Distribution, Sharpe Site

- | | | | |
|--|--|---|--------------------------------------|
| <input checked="" type="checkbox"/> SITE DEV & GEO | <input type="checkbox"/> MECHANICAL | <input type="checkbox"/> SAFETY | <input type="checkbox"/> SYSTEMS ENG |
| <input type="checkbox"/> ENVIR PROT & UTIL | <input type="checkbox"/> MFG TECHNOLOGY | <input type="checkbox"/> ADV TECH | <input type="checkbox"/> VALUE ENG |
| <input type="checkbox"/> ARCHITECTURAL | <input type="checkbox"/> ELECTRICAL | <input type="checkbox"/> ESTIMATING | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft
 DATE 25 March 2011
 NAME James Brownell, CVWB

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
			<p>(continued)</p> <p>Regarding applicability, the California anti-degradation provisions are not applicable as they are directed toward state agencies who in turn are directing cleanup under state law, whereas this is a federal CERCLA cleanup action where the state is a support agency; or apply to current discharges as opposed to historic releases or further migration of such releases; or apply to specific, discrete regulated units that received hazardous waste after July 26, 1982, neither of which apply here.</p> <p>State anti-degradation provisions are not relevant and appropriate requirements (RARs) because: MCL goals that are set at zero are categorically not relevant and appropriate (40 CFR Section 300.430(e)(2)(i)(C)) and as background for the hazardous substances in issue at the Northwest Corner Groundwater OU would be zero, such background provisions in California anti-degradation provisions are similarly not relevant and appropriate; 40 CFR Section 300.430(e)(2)(i)(C) and 40 CFR Section 300.400(g)(2)(viii) together require that a potential RAR for groundwater reasonably relate, that is be relevant and appropriate, to the beneficial use of the groundwater being addressed and as discussed above, California anti-degradation provisions requiring cleanup levels be set at zero or the lowest level technically and economically feasible, are not reasonably related to any actual or potential use of the water or risks to users thereof; and the CCR revisions are designed for specific and discrete units that manage hazardous waste, such</p> <p style="text-align: right;">(continued)</p>

AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT (AFCEE)

DESIGN REVIEW COMMENTS

Project: Draft Record of Decision, Remedy for NWC Groundwater OU, Defense Distribution, Sharpe Site

- | | | | |
|--|--|---|--------------------------------------|
| <input checked="" type="checkbox"/> SITE DEV & GEO | <input type="checkbox"/> MECHANICAL | <input type="checkbox"/> SAFETY | <input type="checkbox"/> SYSTEMS ENG |
| <input type="checkbox"/> ENVIR PROT & UTIL | <input type="checkbox"/> MFG TECHNOLOGY | <input type="checkbox"/> ADV TECH | <input type="checkbox"/> VALUE ENG |
| <input type="checkbox"/> ARCHITECTURAL | <input type="checkbox"/> ELECTRICAL | <input type="checkbox"/> ESTIMATING | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft
 DATE 25 March 2011
 NAME James Brownell, CVWB

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
			<p>(continued)</p> <p>as landfills, surface impoundments, and other similar transfer, treatment, storage or disposal units, thus they are not reasonably related to the NWC Groundwater OU site.</p> <p>Although the parties disagree that the plans and resolutions requested by CVRWQCB should be included in the ROD as State ARARS, as described above, the parties do agree, per the Dispute Resolution Agreement, that the preferred alternative, which is outlined in the Agreement, substantively complies with all state ARARS.</p> <p>9. These are not ARARs for the NWC Groundwater OU. Actions taken by public agencies to clean up unauthorized releases are generally exempt from Title 27 and Title 23. The dispute resolution agreement does not specify a cleanup level.</p> <p>10. These are not ARARs for the NWC Groundwater OU. Actions taken by public agencies to clean up unauthorized releases are generally exempt from Title 27 and Title 23. The dispute resolution agreement does not specify monitoring after the shutdown of the extraction system.</p> <p>11. These are not ARARs for the NWC Groundwater OU. Actions taken by public agencies to clean up unauthorized releases are generally exempt from Title 27 and Title 23. Monitoring of groundwater during the three years of extraction and treatment are addressed either in the dispute resolution agreement or in a WDR order that includes the NWC Groundwater OU.</p> <p style="text-align: right;">(continued)</p>

AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT (AFCEE)

DESIGN REVIEW COMMENTS

Project: Draft Record of Decision, Remedy for NWC Groundwater OU, Defense Distribution, Sharpe Site

- | | | | |
|--|--|---|--------------------------------------|
| <input checked="" type="checkbox"/> SITE DEV & GEO | <input type="checkbox"/> MECHANICAL | <input type="checkbox"/> SAFETY | <input type="checkbox"/> SYSTEMS ENG |
| <input type="checkbox"/> ENVIR PROT & UTIL | <input type="checkbox"/> MFG TECHNOLOGY | <input type="checkbox"/> ADV TECH | <input type="checkbox"/> VALUE ENG |
| <input type="checkbox"/> ARCHITECTURAL | <input type="checkbox"/> ELECTRICAL | <input type="checkbox"/> ESTIMATING | <input type="checkbox"/> OTHER |
| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft
 DATE 25 March 2011
 NAME James Brownell, CVWB

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
			(continued) 12. These are not ARARs for the NWC Groundwater OU. Actions taken by public agencies to clean up unauthorized releases are generally exempt from Title 27 and Title 23. The dispute resolution agreement does not specify a cleanup level, and the source of the dieldrin (the SSL plume) is undergoing remediation 13. The Compilation of Water Quality Goals is not a TBC for the NWC Groundwater OU. The water quality goals for dieldrin in the compilation are not promulgated. The NWC Groundwater OU ROD will not have a cleanup level specified and the 0.05 µg/L level for dieldrin is only a goal.

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	Comments
1	Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.)	California Water Code Section 13243	The RWQCB may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted.	Applicable	Applies to groundwater remedial action.
2	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243)	Water Quality Control Plan (Basin Plan) for the RWQCB, CVR.	Establishes water quality objectives, including narrative and numerical standards, that protect the beneficial uses and water quality objectives of surface and ground waters in the region. Describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning.	Applicable, Relevant and Appropriate	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated soils or waters or in-situ treatment or containment of contaminated soils or waters, must not result in actual water quality exceeding water quality objectives.
3	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13304, 13240, 13241, 13242, 13243)	Central Valley Water Board Basin Plan, "Policy for Investigation and Cleanup of Contaminated Sites."	Establishes and describes policy for investigation and remediation of contaminated sites. Also includes implementation actions for setting groundwater and soil cleanup standard.	Applicable	Cleanup standards for water should be equal to background concentrations unless such levels are technically and economically infeasible to achieve. In such cases, cleanup standards should not exceed applicable water quality objectives.
4	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243)	Central Valley Water Board Basin Plan, "Policy for Application of Water Quality Objectives"	This policy defines water quality objectives and explains how the Central Valley Water Board applies numerical and narrative water quality objectives to ensure the reasonable protection of beneficial uses of water and how the Central Valley Water Board applies Resolution No. 68-16 to promote the maintenance of existing high-quality waters.	Applicable	Applies to groundwater remedial actions.

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	Comments
5	Porter-Cologne Water Quality Control Act (California Water Code Sections 13240, 13241, 13242, 13243)	Central Valley Water Board Basin Plan, "Wastewater Reuse Policy"	Requires applicants for waste discharge requirements and discharge permits to evaluate land disposal as an alternative to discharge to surface waters.	Applicable	Applies to groundwater extracted by groundwater treatment system.
6	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13263, 13304)	State Water Resources Control Board (SWRCB) Resolution No. 68-16 ("Anti-degradation Policy").	Requires that high quality surface and ground waters be maintained to the maximum extent possible. Degradation of waters will be allowed (or allowed to remain) only if it is consistent with the maximum benefit to the people of the state, does not unreasonably affect present and anticipated beneficial uses, and does not result in water quality less than that prescribed in Central Valley Water Board and SWRCB policies. If degradation is allowed, the discharge must meet best practicable treatment or control, which must prevent pollution or nuisance and result in the highest water quality consistent with maximum benefit to the people of the state.	Applicable	Applies to discharges of waste to waters, including discharges to soil that may affect surface or ground waters. In-situ cleanup levels for contaminated ground waters must be set at background level, unless allowing continued degradation is consistent with the maximum benefit of the people of the state. If degradation of waters is allowed, or allowed to remain, the discharge must meet best practical treatment or control standards, and result in the highest water quality possible that is consistent with the maximum benefit to the people of the state. In no case may water quality objectives be exceeded.
7	Porter-Cologne Water Quality Control Act(California Water Code Sections13000, 13140, 13240, 13260, 13263, 13267, 13300, 13304, 13307)	State Water Resources Control Board Resolution No. 92-49 (As amended April 21, 1994)	Establishes requirements for investigation and cleanup and abatement of discharges. Among other requirements, dischargers must clean up and abate the effects of discharges in a manner that promotes the attainment of either background water quality, or the best water quality that is reasonable if background water quality cannot be restored. Requires the application of Title 23, CCR, Section 2550.4, requirements to cleanups.	Applicable, Relevant and Appropriate	Applies to groundwater remedial actions.

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	Comments
8	Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240)	SWRCB Resolution No. 88-63 ("Sources of Drinking Water Policy") (as contained in the Central Valley Water Board Water Quality Control Plan)	Specifies that, with certain exceptions, all ground and surface waters must have the beneficial use of municipal or domestic water supply.	Applicable	Applies in determining beneficial uses for waters that may be affected by discharges of waste.
9	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27, CCR, Section 20400 Title 23, CCR, Section 2550.4.	Concentration limits must be established for groundwater, surface water, and the unsaturated zone. Must be based on background, equal to background, or for corrective actions, may be greater than background, not to exceed the lower of the applicable water quality objective or the concentration technologically or economically achievable. Specific factors must be considered in setting cleanup standards above background levels.	Applicable	Applies in setting ground water cleanup levels for all discharges of waste to land.
10	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27, CCR, Section 20410 Title 23, CCR, Section 2550.6	Requires monitoring for compliance with remedial action objectives for three years from the date of achieving cleanup standards.	Applicable	Applies to groundwater remedial actions.
11	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27, CCR, Section 20415 Title 23, CCR, Section 2550.7.	Requires general soil, surface water, and ground water monitoring.	Applicable	Applies to all areas at which waste has been discharged to land.

No.	Source	Standard, Requirement, Criterion, or Limitation	Description	ARARs, or To Be Considered	Comments
12	Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13263, 13267, 13304).	Title 27, CCR, Section 20430 Title 23, CCR Section 2550.10	Requires implementation of corrective action measures that ensure that cleanup levels are achieved throughout the zone affected by the release by removing the waste constituents or treating them in place. Source control may be required. Also requires monitoring to determine the effectiveness of the corrective actions.	Applicable	Applies to groundwater remedial actions.
13	Staff Report of the RWQCB, CVR	A Compilation of Water Quality Goals	Provides guidance on selecting numerical values to implement narrative water quality objectives contained in the Basin Plan.	To Be Considered	Performance Standard. To be considered in selecting appropriate numerical values to implement the Basin Plan for setting cleanup levels and discharge limits. The numerical values contained in the staff report may be ARAR's, or Performance Standards, depending on the source of the values.