



U.S. Department of Energy
Oakland Operations Office, Oakland, California 94612

Lawrence Livermore National Laboratory



University of California, Livermore, California 94551

UCRL-AR-130229

**Action Memorandum for the Building 815
Operable Unit Removal Action at
Lawrence Livermore National Laboratory
Site 300**

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August 1998

*Weiss Associates, Emeryville, California



Environmental Protection Department
Environmental Restoration Program and Division

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Table of Contents

1. Purpose.....	1
2. Site Conditions and Background	2
2.1. Site Description	2
2.1.1. Physical Location	2
2.1.2. Site Characteristics	3
2.1.3. Removal Site Evaluation.....	3
2.1.4. Release or Threatened Release of Hazardous Substances, Pollutants, or Contaminants.....	3
2.1.5. National Priorities List Status	4
2.1.6. Maps, Pictures, and Other Graphic Representations	4
2.2. Other Actions to Date	4
2.2.1. Previous Actions	4
2.2.2. Current Actions	5
2.2.3. Administrative Record	5
2.3. State and Local Authorities' Roles	6
2.3.1. State and Local Actions to Date	6
2.3.2. Potential for Continued State/Local Response.....	6
3. Threats to Public Health or Welfare or the Environment	6
3.1. Threats to Public Health or Welfare.....	7
3.2. Threats to the Environment.....	8
4. Endangerment Determination.....	8
5. Removal Action Description and Estimated Costs.....	9
5.1. Description of Action	9
5.1.1. Removal Action Components.....	9
5.1.2. Contribution to Remedial Performance.....	10
5.1.3. Description of Alternative Technologies	10
5.1.4. Engineering Evaluation/Cost Analysis.....	11
5.1.5. Applicable or Relevant and Appropriate Requirements	11
5.1.6. Project Schedule	11
5.2. Estimated Cost	11

6. Expected Change in the Situation Should Action be Delayed or not Taken..... 11

7. Outstanding Policy Issues 12

8. Enforcement..... 12

9. Recommendation and Approval 13

10. References 14

List of Figures

- Figure 1. Locations of the Site 300 study areas and the Building 815 OU.
- Figure 2. TCE isoconcentration contour map for the Tnbs₂ aquifer, second quarter 1996.
- Figure 3. Locations of offsite compliance wells and the proposed treatment system for the Building 815 OU removal action.
- Figure 4. Proposed ground water monitoring network for the Building 815 OU showing locations of offsite compliance wells, TCE and nitrate MCL contours, and RDX PRG contour.

Appendix

Appendix A. Responsiveness Summary..... A-1

Acronyms and Abbreviations

DOE F 1325.8
(8-89)

United States Government

Department of Energy

memorandum

Date: July 9, 1998
Subject: Removal Action at the Building 815 Operable Unit LLNL Site 300
From: Elisabeth Reber-Cox, ERD
To: James T. Davis, AMEM
Via: Roger Liddle, ERD
Andrea Blohm, GLO

1. Purpose

The purpose of this Action Memorandum is to document the approval of the selected removal action in the Building 815 Operable Unit (OU) at Lawrence Livermore National Laboratory (LLNL), Site 300, located in the Altamont Hills near Tracy, California. Site 300 is owned by the U.S. Department of Energy (DOE) and operated by the Regents of the University of California (The Regents). Removal action alternatives were evaluated in the *Engineering Evaluation/Cost Analysis (EE/CA) for the Building 815 Operable Unit* (Madrid and Jakub, 1997).

This removal action consists of extracting and treating trichloroethylene (TCE)-contaminated ground water at the leading edge of the plume near the southern boundary of the site and continued ground water monitoring of all plumes in the Building 815 OU. Ground water will be extracted at the leading edge of the plume to control offsite migration of TCE. By intercepting the plume at this location, public health risk from potential future offsite residential use of ground water will decrease. The selected removal action, as described in the EE/CA, has been modified in response to stakeholder concern that this removal action could accelerate RDX plume migration. The major modification to this removal action was to postpone installation of a second treatment facility pending further evaluation of remedial technologies for treating RDX, nitrate and other constituents of concern (COCs). Contingencies for addressing RDX and nitrate, should they affect the performance of this removal action, will be addressed in the Removal Action Design Workplan (RADW).

The selected removal action is not intended as the final remedy for the Building 815 OU. Cleanup of the RDX and nitrate plumes will be addressed in the Site 300 Site-Wide Feasibility Study (FS). The Site-Wide Record of Decision (ROD) will establish cleanup standards for all COCs, including TCE.

This removal action will be executed by DOE in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). In November 1996, the Remedial Project Managers from DOE, the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the Central Valley Regional Water Quality Control Board (RWQCB) concurred that a removal action is an appropriate response for stabilizing the environmental releases at this OU (confirmed in a letter from the DTSC to DOE dated November 26, 1996). This removal action will be conducted under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as prescribed in 40 Code of Federal Regulations (CFR), Section 300.415, and performed under the authority of Executive Order 12580. Because the selected removal action will be funded by DOE and not the EPA, it is not subject to the fund-financed duration and cost limitations of 12 months and \$2 million prescribed in 40 CFR Section 300.415(b)(5). This document follows the EPA guidance *Superfund Removal Procedures Action Memorandum Guidance* (EPA, 1990).

This removal action is based on information documented in the Administrative Record for Site 300 and presented at a public workshop on March 9, 1998. The EPA, DTSC, and RWQCB concur with the selected action. This Action Memorandum also includes a Responsiveness Summary (Appendix A), that addresses public comments on this removal action that were collected either at the public workshop or were sent by mail during the comment period from February 5 to March 30, 1998.

2. Site Conditions and Background

This section describes the site, remedial actions completed to date, and state and local authorities' roles in the project.

2.1. Site Description

The physical location, site characteristics, and contaminant releases in the Building 815 OU are briefly described below.

2.1.1. Physical Location

Site 300 is located in the eastern Altamont Hills about 17 miles southeast of Livermore, California and 8.5 miles southwest of Tracy, California. The High Explosives (HE) Process Area occupies approximately 934 acres in the southeastern part of Site 300. The Building 815 OU is located in the southeastern part of the HE Process Area, north of Corral Hollow Road (Fig. 1).

As shown in Figure 2, several former and currently operational Site 300 water-supply wells are located in the southern part of the Building 815 OU. One of the parcels located south of the Building 815 OU is owned by the Gallo family. The Gallo family operates water-supply well Gallo-1, located about 2,200 feet (ft) south of Building 815. Gallo-1 is used to supply water for livestock.

2.1.2. Site Characteristics

Site 300 is an experimental test facility owned by the DOE and operated by The Regents. The HE Process Area was established in the mid- to late-1950s to chemically formulate and mechanically press and machine HE compounds into detonation devices. Building 815, located in the HE Process Area, was constructed in 1958 to supply steam to nearby facilities involved in the processing and formulation of HE compounds. The steam was supplied to these facilities via buried pipelines. Between 1959 and 1986, steam was generated using a diesel-powered steam boiler, and steam boiler blowdown (condensate) was discharged to a dry well located approximately 50 ft north of Building 815. TCE was used periodically to clean organic scale buildup from the pipelines. The TCE was stored in 55-gallon drums approximately 50 ft southeast of the building. As described in Section 2.2.1 of this Action Memorandum, all activities that could contribute to the migration of the TCE plume have been permanently discontinued.

2.1.3. Removal Site Evaluation

Since 1981, many environmental investigations have been conducted in the HE Process Area to identify sources of soil and ground water contamination. These investigations were triggered by the detection of TCE in an onsite water-supply well (Well-6), located approximately 2,000 ft southeast of Building 815 (Fig. 2). Table 1 in the EE/CA lists the reports documenting these investigations. The investigations focused primarily on chemical releases resulting from discharges of HE process wastewater to unlined rinsewater lagoons and dry wells. As part of these investigations, DOE and LLNL collected and analyzed surface soil; subsurface soil and rock; water from springs, boreholes, and monitor wells; and soil vapor from passive and active vacuum-induced soil vapor surveys. Most of the investigations and monitor well installations were completed between 1984 and 1991 and are summarized in the Site-Wide Remedial Investigation (SWRI) report (Webster-Scholten, 1994). Additional characterization data collected after the SWRI are summarized in Section 1 and Appendix A of the EE/CA.

These investigations identified 16 release sites in the HE Process Area. Of these, only the TCE release and associated ground water contamination in the Building 815 OU are addressed in this Action Memorandum. The other releases will be addressed in the Site-Wide FS.

2.1.4. Release or Threatened Release of Hazardous Substances, Pollutants, or Contaminants

Activities from the mid-1950s until the late 1970s released TCE adjacent to the Building 815 central steam plant. During steam boiler or pipeline cleaning, TCE may have been spilled or leaked to the ground. The steam boiler blowdown that was discharged to the Building 815 dry well created a saturated pathway in the vadose zone for TCE to migrate to the underlying Tnbs₂ aquifer. Concurrent pumping from a former water-supply well (Well 6), accelerated migration of dissolved TCE in the Tnbs₂ aquifer.

The volume of TCE released to the environment in the Building 815 OU has not been determined, but ground water analyses indicate that TCE is present in ground water at concentrations exceeding the Federal Maximum Contaminant Level (MCL) of 5 micrograms per liter (µg/L). Statistical evaluation of ground water monitoring data indicates that the leading

edge of the Building 815 TCE plume is migrating, further degrading ground water. Figure 2 is a TCE isoconcentration map for second quarter 1996 which shows TCE in ground water exceeding the 0.5 µg/L detection limit close to the site boundary.

In addition to TCE, nitrate and the HE compound RDX have been detected at concentrations above the 45 milligrams per liter (mg/L) MCL and 0.6 µg/L Preliminary Remediation Goal (PRG) for tap water, respectively. The RDX PRG is referenced as the health-based standard because no MCL exists for this compound. The source of RDX and nitrate in the subsurface is suspected to be from former unlined HE rinsewater lagoons located in the HE Process Area. Remediation and control of these compounds are not within the scope of this removal action, and they will be addressed in the Site-Wide FS.

TCE, RDX, and nitrate in ground water in the Building 815 OU are classified as hazardous substances, as defined by Section 101(14) of CERCLA, 42 United States Code (U.S.C.) Section 9601(14), and the NCP, 40 CFR Part 300, and are pollutants or contaminants as defined by Section 101(33) of CERCLA, 42 U.S.C. Section 9601(33). The presence of these substances in soils and ground water indicates a release of hazardous substances into the environment, as defined by Section 101(22) of CERCLA, 42 U.S.C. Section 9601(22).

2.1.5. National Priorities List Status

Site 300 was placed on the National Priorities List (NPL) in August 1990. A Federal Facility Agreement (FFA) for Site 300 was signed by DOE, EPA, DTSC, and RWQCB in June 1992. Revisions to the FFA deliverables and schedule were made in November 1995, November 1996, and October 1997. The Building 815 OU is designated as OU 4 in the FFA. Provisions and requirements in the NCP pertaining to non-time-critical removal actions will be followed.

2.1.6. Maps, Pictures, and Other Graphic Representations

The SWRI and EE/CA provide additional background information including figures showing site location, features, and conceptual drawings of this removal action. This Action Memorandum includes figures showing the site location, TCE ground water plume, approximate location of the proposed treatment facility for this removal action and the proposed ground water monitoring network (Figs. 1 through 4, respectively).

2.2. Other Actions to Date

The following sections describe previous and current actions pertaining to the Building 815 TCE plume.

2.2.1. Previous Actions

DOE/LLNL started environmental investigations in the HE Process Area in 1981 under the guidance of the RWQCB. After listing on the NPL, investigations and reporting were conducted in accordance with CERCLA. Table 1 of the Building 815 EE/CA provides a chronological summary of environmental restoration activities in the HE Process Area and the Building 815 OU. Investigations performed until 1991 are also described in Chapter 13 of the SWRI report. Investigations performed between 1991 and 1996 are summarized in the EE/CA.

To date, all activities that led to TCE releases and enhanced ground water plume migration in the Building 815 OU have been discontinued, including:

- Removing the steam boilers and the TCE hardstand from Building 815 and discontinuing TCE use.
- Sealing and abandoning water-supply wells 4 and 6, because pumping from these wells increased the migration of TCE-contaminated ground water.
- Closing the Building 815 dry well.
- Rerouting any liquid discharges from Building 815 to an engineered percolation pit.

2.2.2. Current Actions

In compliance with the FFA for Site 300, the following actions have been completed or started:

- Ground water monitoring in the Building 815 OU and offsite, including the Gallo well, is ongoing to continually assess plume migration.
- Installing offsite compliance wells (completed).
- Hydraulic testing and numerical modeling (started).
- Investigating treatment technologies for remediation of RDX, nitrate and other COCs (started).
- Developing the RADW (started).

2.2.3. Administrative Record

An Administrative Record has been established and is available for public review according to the requirements in the NCP. Information repositories for Site 300 are established at the following locations:

LLNL Visitors Center

Environmental Information Repository
Greenville Road
Livermore, CA 94550

Tracy Branch Library

20 East Eaton Avenue
Tracy, CA 95376

Summaries of key documents are also maintained at:

Central Branch Library

605 North El Dorado Street
Stockton, CA 95292

Information about public access to the Administrative Record can be obtained from:

Bert Heffner

LLNL Environmental Community Relations

P.O. Box 808 L-404

Livermore, CA 94550

Tel. (510) 424-4026, e-mail: heffner1@llnl.gov

A fact sheet was issued in March 1998 describing the selected removal action and announcing a public comment period and workshop. The public comment period started February 5, 1998 and ended March 30, 1998. The public workshop was held March 9, 1998. Public comments concerning this removal action have been considered and used, as appropriate, to prepare this Action Memorandum. Public comments are addressed in the Responsiveness Summary (Appendix A).

2.3. State and Local Authorities' Roles

2.3.1. State and Local Actions to Date

No removal actions have been performed by the state or local authorities at the site. EPA, in conjunction with the DTSC and the Central Valley RWQCB, oversee investigations and cleanup activities performed by the University of California in accordance with Section 120 of CERCLA, as amended by SARA Title III.

2.3.2. Potential for Continued State/Local Response

No state or local response actions are anticipated other than continued oversight of site cleanup activities under CERCLA. DOE will provide the necessary funding and support for this removal action, future monitoring, operations and maintenance, and any required future contingency actions related to ground water contaminants in the Building 815 OU.

3. Threats to Public Health or Welfare or the Environment

In accordance with the NCP (40 CFR, Section 300.415), the following criteria must be considered to determine the appropriateness of a non-time-critical removal action in addressing threats to public health or welfare or the environment:

- (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.
- (ii)* Actual or potential contamination of drinking water supplies or sensitive ecosystems.
- (iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

- (iv) High levels of hazardous substances or pollutants or contaminants in soils, largely at or near the surface, that may migrate.
- (v)* Weather conditions that may cause hazardous substances, pollutants or contaminants to migrate or be released.
- (vi) Threat of fire or explosion.
- (vii) The availability of other appropriate Federal or State response mechanisms to respond to the release.
- (viii) Other situations or factors that may pose threats to public health or welfare or the environment.

Criteria indicated with an asterisk (*) are relevant in determining the appropriateness of the removal action at the Building 815 OU to protect public health and welfare and the environment and are discussed in Sections 3.1 and 3.2. All other criteria do not apply due to the nature, physical state and location of the contaminants. Because the TCE is in ground water at low concentrations, well beneath the ground surface, there is no threat from such hazards as fire or explosion (criterion vi), containers that pose a threat of release (criterion iii), or contaminants close to the surface that would pose a threat to any population (criteria i and iv).

EPA, with the support of the State, agrees that implementing a non-time-critical removal action is appropriate for the Building 815 OU.

3.1. Threats to Public Health or Welfare

The EPA (EPA, 1991) indicates that where the cumulative carcinogenic risk to an individual, based on reasonable maximum exposure for both current and future land use is less than 10^{-4} , and the Hazard Index is < 1 , remedial action is generally not warranted unless there are adverse environmental impacts. If MCLs or non-zero MCL goals are exceeded, action generally is warranted. The 10^{-4} to 10^{-6} risk range is a target within which risks should be managed as part of a cleanup action. Once a decision has been made to undertake a cleanup, the preference is to achieve the more protective end of the range (i.e., 10^{-6}). Records of Decision (and ostensibly Action Memoranda) for cleanup actions taken at sites posing risks within the 10^{-4} to 10^{-6} risk range must document why the cleanup is warranted. For the TCE in ground water in the Building 815 OU, action is being undertaken because of the continued degradation and loss of beneficial use of ground water associated with uncontrolled plume migration.

Threats to public health or welfare or the environment are discussed below with respect to the criteria considered in determining the appropriateness of the selected removal action.

Criterion (ii):

TCE concentrations in ground water have been increasing at the leading edge of the plume and near the site boundary. Ground water modeling indicates that the plume could migrate offsite at a concentration of 6 $\mu\text{g/L}$ within ten years (Webster-Scholten, 1994). If the plume is allowed to migrate unchecked, there is a potential for residential exposure to TCE in ground water. The SWRI baseline human health risk assessment for the HE Process Area was based on conservative estimates of additional lifetime cancer risk associated with residential use of ground

water containing TCE from the Tnbs₂ aquifer at a hypothetical water-supply well located at the site boundary. The estimated incremental cancer risk from volatile organic compounds (VOCs) in ground water is 1.0×10^{-5} (3.0×10^{-6} for TCE) as presented in Chapter 6 and Table P-27-5 in Appendix P of the SWRI.

Criterion (v):

Weather conditions may cause hazardous substances or contaminants to migrate or be released. These are:

- Periods of rain that allow water to infiltrate and recharge the Tnbs₂ aquifer, increasing mobilization of contaminants. At the same time, introduction of more water causes contaminant concentrations in the aquifer to become more dilute.
- Contaminants sorbed to soil in the shallower Tps unit could be released during infiltration of water, increasing the potential for their downward migration. Analysis of TCE migration from the Tps water-bearing zone indicates that this source has been depleted and does not present a further potential for release. This analysis was presented as Appendix E in the EE/CA.

3.2. Threats to the Environment

A detailed discussion of the Building 815 OU baseline ecological assessment can be found in Chapter 6 of the SWRI. The baseline ecological assessment, conducted to evaluate the potential for adverse impact to plants and animals from long-term exposure to contaminants in the Building 815 OU, determined that VOCs did not pose ecological risk. This determination was based on estimates of hazard from exposure to contaminants that were calculated for mammal species that could potentially inhabit this area, as well as biological surveys conducted to determine which species actually inhabit or migrate through the Building 815 OU.

4. Endangerment Determination

Actual or threatened releases of hazardous substances/pollutants and contaminants from this site, if not addressed by implementing this removal action may present an imminent and substantial endangerment to public health, or welfare, or the environment.

5. Removal Action Description and Estimated Costs

5.1. Description of Action

The following section describes the components of the selected removal action, contribution to remedial performance, and describes the alternatives considered. The EE/CA identified the following Removal Action Objectives (RAOs) at the Building 815 OU:

- Migration control—hydraulically control migration of the leading edge of the TCE plume, preventing further degradation of ground water.
- Risk mitigation—mitigate any public health risk associated with future offsite residential use of contaminated ground water from this plume.
- Mass removal—remove TCE mass from the Tnbs₂ aquifer, without accelerating migration of the RDX plume.

The removal action consists of extracting and treating ground water containing TCE, and continued ground water monitoring of all plumes in the Building 815 OU. Ground water will be extracted at the leading edge of the plume to control offsite migration of TCE. Additionally, by intercepting the plume at this location, public health risk from potential future offsite residential use of ground water will decrease.

Whereas extraction of ground water at the leading edge of the plume will meet the RAO of removing TCE mass from the Tnbs₂ aquifer, mass removal could be increased by extracting ground water from areas of the TCE plume with higher concentrations. However, extraction from the TCE plume interior may accelerate RDX plume migration. Therefore, this removal action includes additional aquifer testing and ground water modeling to determine how TCE mass removal from the Tnbs₂ aquifer will influence the RDX plume. Any influence on the RDX plume as a result of this removal action will be addressed in the RADW. Cleanup standards for all COCs, including TCE, will be specified in the Site-Wide ROD.

5.1.1. Removal Action Components

This removal action is described as Alternative 2 in the Preface to the EE/CA and as the preferred removal action in the EE/CA, and has been modified in response to stakeholder concern that the removal action could accelerate RDX plume migration. The primary components of the removal action are:

- Install two offsite compliance well clusters (five wells) to monitor the downgradient extent of the TCE plume (Fig. 3).
- Perform aquifer tests on proposed extraction wells to support design of the treatment system.
- Extract and treat ground water using aqueous-phase granular activated carbon to remove TCE and monitor effluent for COCs (Fig. 3).

- Evaluate how additional ground water extraction will influence the RDX plume.
- Evaluate remediation technologies for RDX, nitrate, and other COCs.
- Develop a contingency plan for other COCs as discussed in Section 3.5 of the EE/CA.
- Develop a method for discharge of treated ground water in compliance with RWQCB Applicable or Relevant and Appropriate Requirements (ARARs).
- Evaluate removal action performance through ground water modeling and continued ground water monitoring for all COCs. Figure 4 shows the monitoring network.

Operations and maintenance will be performed for the treatment facility and ground water monitor wells.

5.1.2. Contribution to Remedial Performance

This removal action is intended to prevent TCE from migrating offsite and to begin removal of TCE mass. It is not intended to be the final remedy for the Building 815 OU. The RDX and nitrate plumes will be addressed in the Site-Wide FS. The Site-Wide ROD will contain cleanup standards and remedies for all COCs, including TCE.

Offsite compliance wells will be installed to determine whether this removal action is preventing offsite migration of TCE. Conducting aquifer tests and ground water modeling will aid in determining the optimal treatment system design.

Figure 4 shows the location of ground water monitoring wells in the Building 815 OU and identifies wells to be used as downgradient compliance wells for TCE. Monitoring will enable us to identify any changes in plume size or concentration.

5.1.3. Description of Alternative Technologies

In Appendix B of the Building 815 EE/CA, we evaluated alternative technologies for the treatment of the TCE plume. Several alternative technologies, such as installing a grout curtain and in-situ remediation, were screened out in the EE/CA report, based on effectiveness, implementability, and cost. After screening the available technologies, the following alternatives were developed and evaluated in the EE/CA:

- Monitoring of ground water contaminants and preparing a contingency plan to implement ground water extraction and treatment, if necessary, to prevent offsite migration of TCE at concentrations exceeding health-based standards.
- Ground water extraction and treatment to hydraulically control the leading edge of the TCE plume with additional hydraulic testing and modeling to evaluate TCE mass removal.
- Ground water extraction and treatment with the objective of restoring all contaminated ground water to concentrations not exceeding background levels.

Alternative 2 was presented as the preferred removal action in the EE/CA and was modified due to stakeholder concern that the removal action could accelerate RDX plume migration. Alternative 1 was not selected because VOCs would be allowed to migrate offsite before

contingencies were triggered to control plume migration. Alternative 3 was not selected because currently there are no available conventional treatment technologies for remediating such low concentrations of RDX in ground water.

5.1.4. Engineering Evaluation/Cost Analysis

In December 1997, DOE/LLNL submitted the Building 815 EE/CA to the regulators and the public for comment. This document is available in the Administrative Record repositories. As mentioned in Section 2.2.3 of this Action Memorandum, the removal action was presented to the public in a fact sheet and as a public workshop for questions and comment in March 1998.

5.1.5. Applicable or Relevant and Appropriate Requirements

An analysis of Federal and State ARARs was performed and presented in Section 2.2 and Table 3 of the EE/CA to develop chemical-, location-, and action-specific ARARs. Discharge of treated water will not occur until the RWQCB issues Substantive Requirements or Waste Discharge Requirements.

5.1.6. Project Schedule

The project schedule for the Building 815 OU removal action as agreed upon in the FFA includes:

- Installing offsite compliance monitoring wells (completed).
- Modeling and hydraulic testing of the Tnbs₂ aquifer (ongoing).
- Completing a RADW by November 17, 1998.
- Installing a treatment facility beginning in January 1999.

5.2. Estimated Cost

The total 1997 present-worth cost for this removal action for 20 years is \$5.8 million. Because project funding will occur incrementally (annually) as the project proceeds, rather than as a lump-sum investment at the beginning of the project, we also present the total cost of this removal action with no discount rate. The total cost of this removal action over 20 years at 1997 rates is \$7.8 million. The total cost for the two-year period between implementing the removal action and when the Site-Wide ROD supersedes the Action Memorandum is \$1.6 million. A detailed cost estimate for the removal action was presented in Table F-1 of the EE/CA.

6. Expected Change in the Situation Should Action be Delayed or not Taken

If the removal action is delayed or not taken, the TCE plume may migrate offsite at levels exceeding the MCL within ten years. Well Gallo-1, downgradient of the plume, may be affected.

7. Outstanding Policy Issues

This removal action is not intended to be the final remedy for the Building 815 OU. The final remedy for the Building 815 OU will be presented in the Site-Wide ROD, which will include final cleanup standards and remedies.

8. Enforcement

DOE is committed to performing the removal action in its entirety. The removal action will be undertaken in compliance with CERCLA, and the FFA deliverables and schedule below:

Final Action Memorandum	August 17, 1998
Removal Action Design Workplan	November 17, 1998
Begin treatment facility installation	January 1999
Begin treatability testing	Spring-Summer 2000

The signatories to the FFA are DOE, EPA, DTSC, and RWQCB.

9. Recommendation and Approval

This decision document represents the selected removal action for the Building 815 OU (OU 4) at LLNL Site 300, Tracy, California, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. Conditions at the site meet the NCP, 40 CFR Section 300.415(b)(2) criteria for a removal action. This decision is based on the Administrative Record for the site. The estimated cost for the removal action, including 20 years of operation and maintenance is \$7.8 million, which will be funded by DOE.

The selected removal action is protective of human health and the environment, complies with Federal, State, and local requirements that are legally applicable or relevant and appropriate to the removal action, and are cost effective. While the final remedy for this OU will be determined in the Site-Wide ROD, the selected removal action utilizes permanent solutions to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

The undersigned approves implementation of the selected removal action for the Building 815 OU.



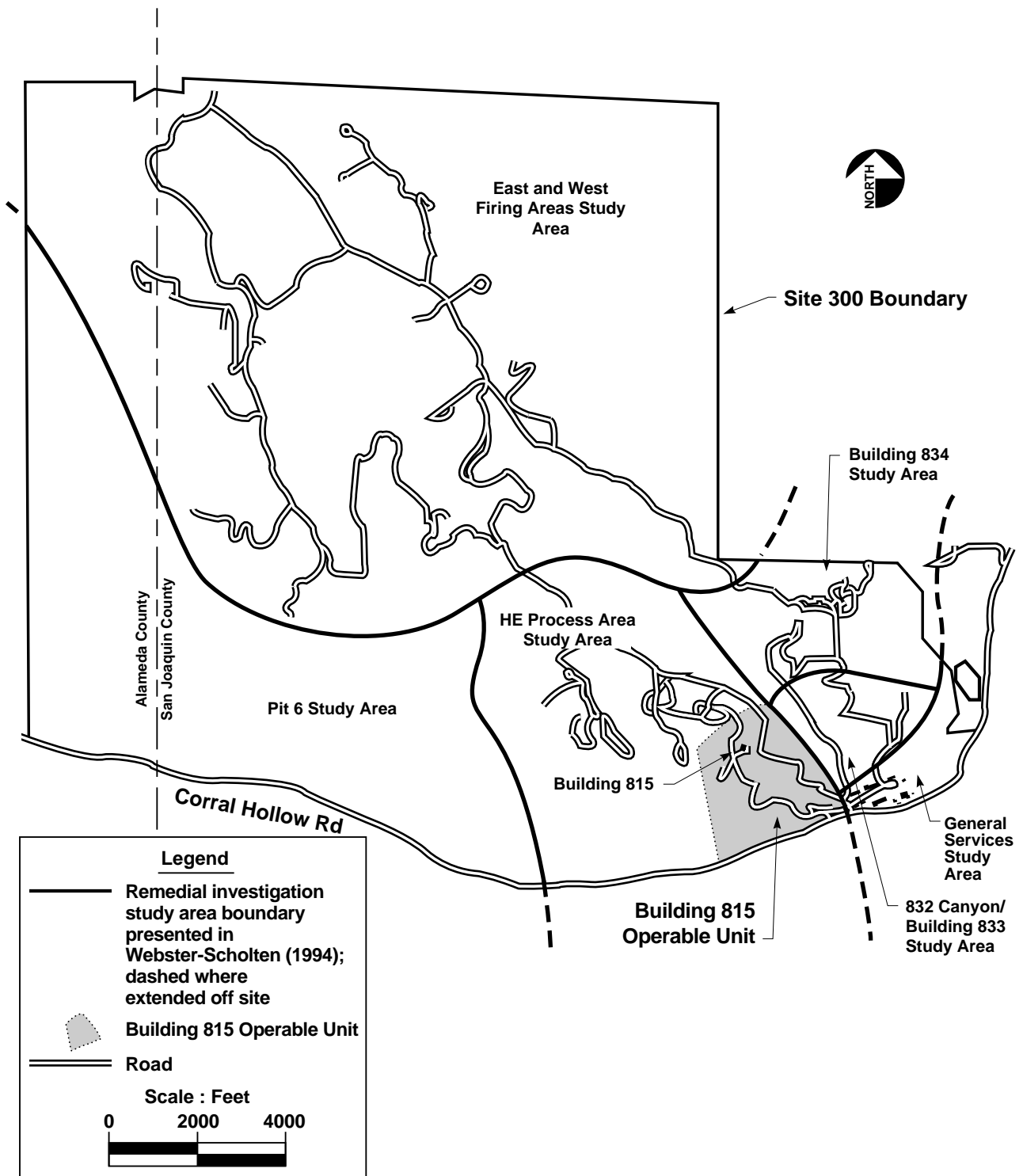
James T. Davis
Associate Manager for Environmental Management
Oakland Operations Office
U.S. Department of Energy

AUG 18, 1998
Date

10. References

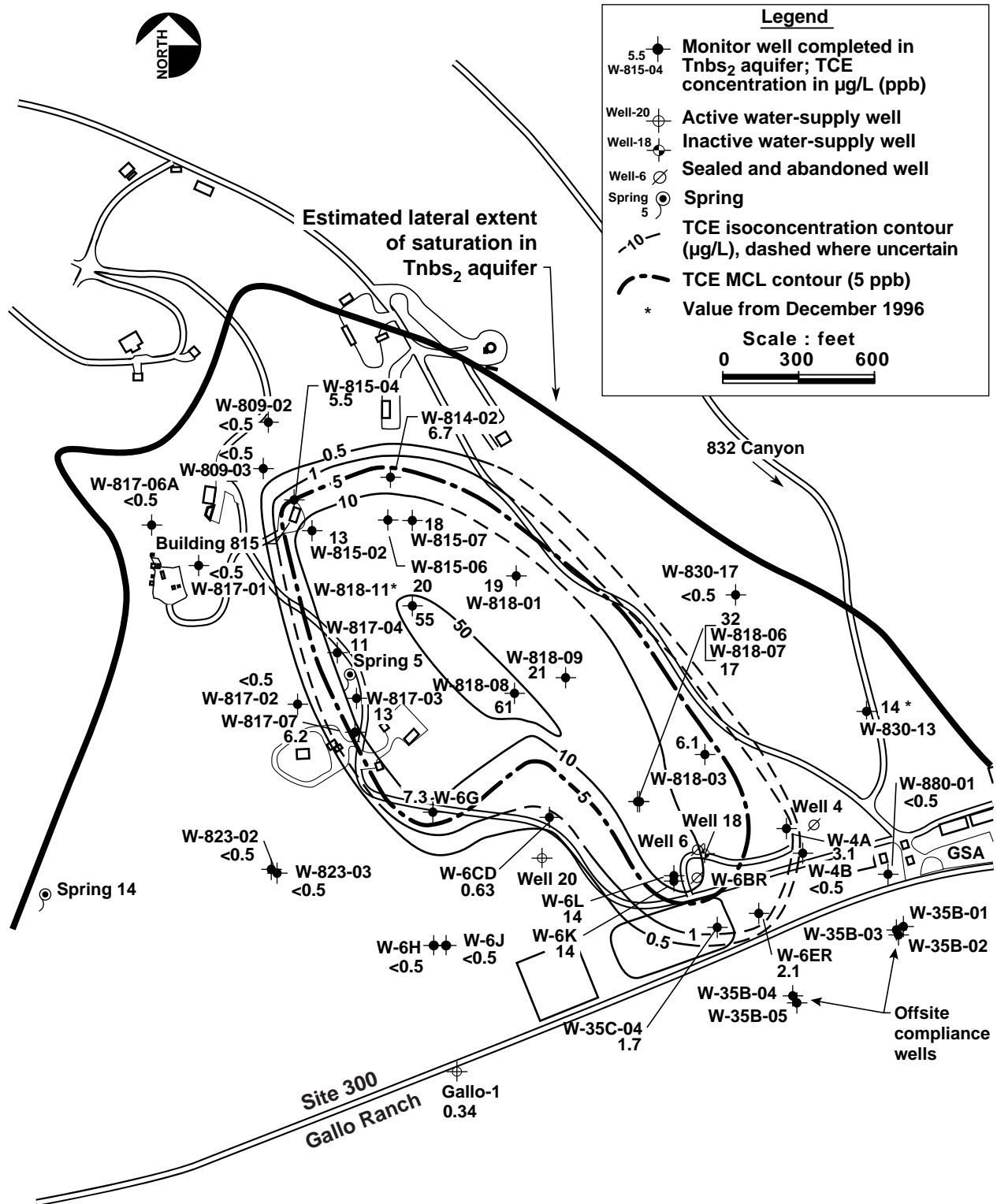
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Figures



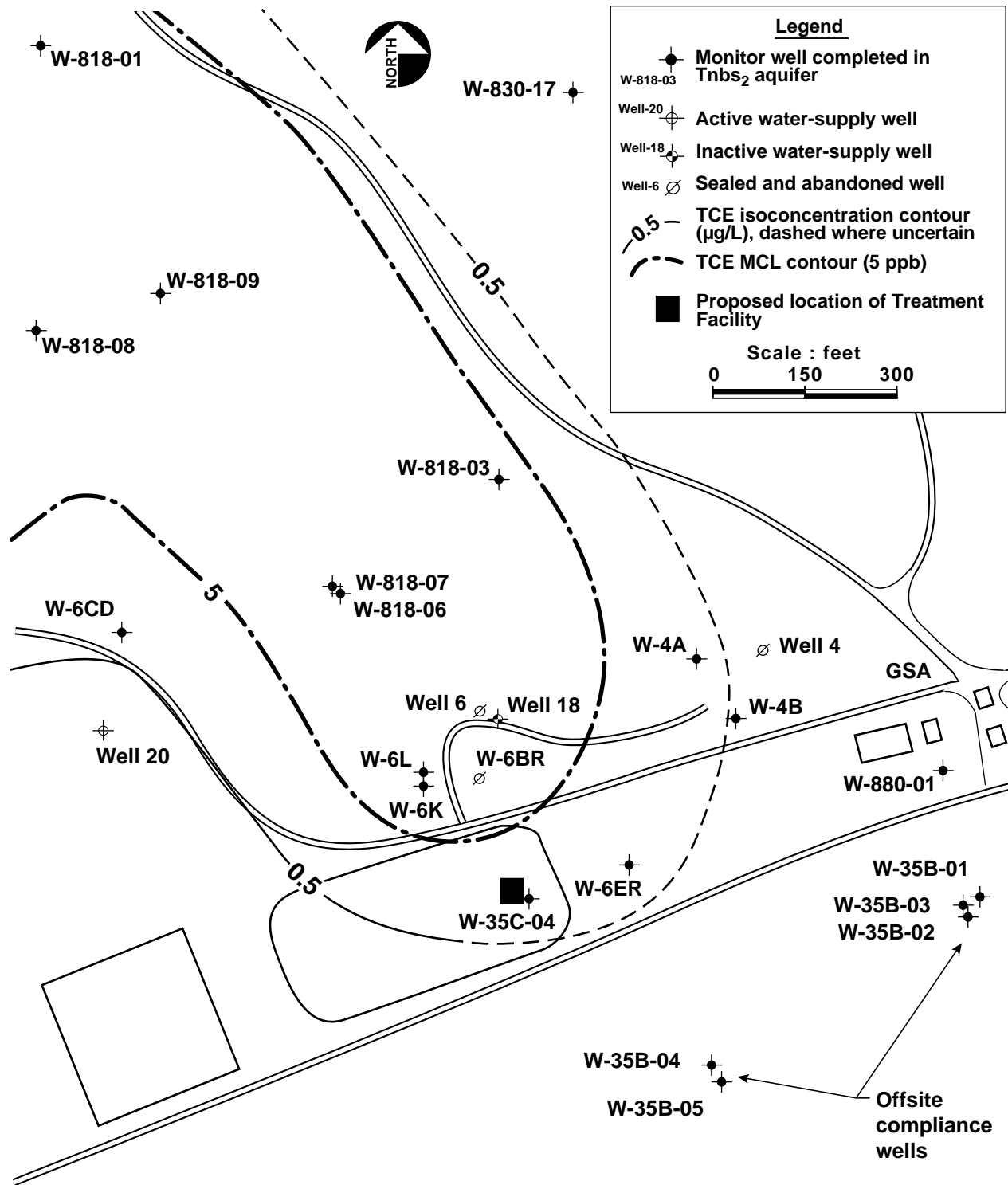
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Figure 1. Locations of the Site 300 study areas and the Building 815 OU.



ERD-S3R-98-0030

Figure 2. TCE isoconcentration contour map for the Tnbs₂ aquifer, second quarter 1996.



ERD-S3R-98-0031

Figure 3. Locations of offsite compliance wells and the proposed treatment system for the Building 815 OU removal action.

Appendix A

Responsiveness Summary

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Responsiveness Summary

This Appendix responds to public comments directed to DOE, LLNL, EPA, and the State of California regarding the selected removal action for the Building 815 OU. As appropriate, community comments and concerns have been incorporated into the selected removal action. Cleanup standards for TCE, RDX and nitrate will be addressed in the forthcoming Site-Wide ROD, which is scheduled for submittal in July 2000.

The public comment period for the selected removal action began February 5, 1998, and ended March 30, 1998. On March 9, 1998, DOE/LLNL and the regulatory agencies held a public workshop at the Tracy Public Library in Tracy, California to present the selected removal action, answer questions from the public, and allow the public to provide comments. A representative from LLNL summarized the background, environmental concerns, and technical approach for the Building 815 OU and associated ground water plume. The public presented comments on the selected removal action after an informal question and answer period. Comments were presented verbally and are paraphrased in Section A-1. Comments from the regulatory agencies at the Public Workshop are also included. Written comments submitted during the comment period are addressed in Section A-2.

A-1. Verbal Comments and DOE/LLNL Responses

Comment 1, from Barbara Dyskant

Barbara Dyskant, a representative of Tri-Valley Citizens Against a Radioactive Environment (CAREs), wanted to emphasize that other contaminants (RDX and nitrate) and other strata (Tps) should be addressed in this removal action “and to make sure that nothing is inadvertently worsened...during this process.” She also wanted to know when they could start commenting and working on the RDX and nitrate issues and other contaminated strata.

Response to Comment 1

Cleanup standards and treatment technologies for RDX and nitrate and other strata will be addressed in the Site-Wide FS. RDX and nitrate cleanup were not addressed in the Building 815 EE/CA because the selected removal action is intended to mitigate the threat posed by offsite migration of TCE-contaminated ground water. We will continue to evaluate removal action performance through ground water monitoring and modeling to evaluate the influence of the selected removal action on the migration of other contaminants.

The Draft Proposed Plan for the Site-Wide ROD is scheduled for the year 2000. There will be a formal comment period prior to approval of the Site-Wide ROD.

Comment 2, from Eric Dyskant

The speaker was concerned about the possibility of expanding the RDX plume. He wanted to know if there was a way to cleanup the RDX concurrent with TCE treatment.

Response to Comment 2

There currently is no conventional treatment technology for RDX. As stated above, this removal action is not intended to be the final remedy for the Building 815 OU. The first stage of the cleanup is to prevent offsite migration of TCE. We will evaluate innovative treatment technologies for RDX and nitrate for the Site-Wide FS. We are currently investigating methods to treat RDX, nitrate and other contaminants of concern. Methods being investigated for treating RDX include a biological treatment method. This method is described in more detail in Appendix C of the EE/CA.

Comment 3, from Bob Sarvy

Bob Sarvy asked whether there were any representatives from the City of Tracy in attendance. He said "I'm glad to see an outstanding show of support. Next time I would recommend you tell these folks that you're lowering the property values by about 50%. I'm sure you'll get a great turnout." The speaker then stated that "Any pollution is too much pollution. We'd like to see you clean up the water to the standards that they were before you started [polluting], anything less than that is unacceptable." The speaker also expressed concern that this cleanup was "cutting corners" and that "advanced notice wasn't too good."

Response to Comment 3

Comment noted. It may be technically and/or economically impracticable to cleanup ground water to background levels. However, cleanup standards for each contaminant and stratum will be determined in the Site-Wide ROD. It is unclear what "cutting corners" meant. All contaminants and aquifers will be addressed in the Site-Wide FS.

CERCLA requirements were met for advanced notice of the Public Workshop. The notice was published in the Tri-Valley Herald, Stockton Record, and Tracy Press at the beginning of the public comment period.

Comment 4, from Steven Kelly

The speaker stated that DOE/LLNL were spending a lot of money on projects "specifically... the National Ignition Facility" instead of putting money into cleanup.

The speaker noted that he drove two hours to reach this Public Workshop because "what happens here affects the entire Bay Area. We're taking a lot of money and investing it in new pollution problems, specifically, one example, the National Ignition Facility. I feel like our priorities are really askew and we could use some critical thinking that we are trying to teach high school students. But to increase pollution without cleaning it up and putting more money into further pollution is really not logical. A stronger word for it would be insanity. If we, as a species, want to continue living on this planet we want to reverse our priorities, and cleanup is an essential for long, long, long-term pollutants."

Response to Comment 4

Comment noted.

Comment 5, from Peter Strauss

Peter Strauss, the technical advisor to Tri-Valley CAREs, expressed concern that the EE/CA process was not going to save money. He also stated that “all contaminants and strata must fall into a ROD,” and was concerned that “the small removal actions will fall through the cracks.” He was pleased to hear that LLNL had changed the strategy for the removal action based on concerns he expressed to LLNL at the time of the draft final EE/CA, which was to contain the plume but not to start source removal. He also questioned “whether it was appropriate to have a remedial strategy to cleanup water to acceptable standards when it goes offsite but not onsite.”

Response to Comment 5

The removal action is intended to prevent offsite TCE migration and potential exposure to TCE-contaminated ground water while a treatment solution is developed for RDX and nitrate. Implementation of this removal action may save money because it will prevent further migration of TCE and thus prevent the effort necessary to remediate a larger area. The onsite and offsite cleanup standards will be addressed in the Site-Wide ROD. Once the ROD is finalized, all contaminants and strata will be subject to cleanup standards in the ROD.

Comment 6, from Susan Timm

Susan Timm from the RWQCB commented that she was “disturbed” that LLNL had not presented the source control portion of the removal action at the Public Workshop.

Response to Comment 6

DOE/LLNL modified the removal action after Tri-Valley CAREs expressed concern that the RDX plume would be spread during pumping at the TCE plume interior. A long-term cleanup strategy for the Building 815 OU, including an innovative treatment technology for RDX and nitrate, will be evaluated in the Site-Wide FS.

Comment 7, from Kathy Setian

Kathy Setian from U.S. EPA asked if the Administrative Record contained the comments from the regulators so the public could review the regulators’ and Tri-Valley CAREs’ comments during the public comment period.

Response to Comment 7

Regulatory and Tri-Valley CAREs’ comments are in the repositories for review. Regulatory comments were addressed in the draft final EE/CA and Tri-Valley CAREs’ comments were addressed in a letter from DOE to Tri-Valley CAREs dated March 3, 1998.

Comment 8, from Eric Dyskant

“You guys are constantly making more messes ten times faster than you’re cleaning them up. The National Ignition Facility is a good example. If you spend the same amount of money you’d have a way to cleanup RDX.”

Response to Comment 8

Comment noted.

Comment 9, from Barbara Dyskant

“I just want to underscore what my son said and I totally agree with him. I was totally appalled, myself, when the gentleman said there was no known treatment for RDX and I cannot help insisting that, yes, we need to look at the best technical means to clean this thing up. We have to clean it up. Until or unless something is devised to remediate ground water we have no business creating any other pollutants at the lab.”

Response to Comment 9

DOE/LLNL are currently investigating the best methods for remediation of RDX and nitrate. Cleanup standards and treatment technologies will be specified in the Site-Wide FS.

A-2. Written Comments and Responses**Letter #1, from Michael Harburg**

Thank you for this opportunity to express myself on the important issue of the cleanup of Site 300. I am not an expert, but I know that it’s best to do the job right the first time, even if it means more time and cost. And I think this applies to the plan to clean up Site 300, which site, I have been told is extremely contaminated with all kinds of toxic metals and chemicals and elements. I am especially concerned about all these getting into the water supply, via the aquifer. Please do not leave any toxic chemicals, such as RDX, in the area. They will continue to create disease and sickness for who knows how many generations.

Thank you for listening.

Response to Letter #1 from Michael Harburg

Thank you for your comments regarding the Building 815 OU EE/CA report. I hope the following response addresses your concerns regarding the cleanup of Site 300.

The main objective of the action proposed in the EE/CA report is to protect public health by stopping TCE contamination in ground water from moving in the direction of private property near the Site 300 boundary. This will be done by pumping and treating ground water from wells located at the front of the TCE contamination. Ground water monitoring wells have been installed in the area to demonstrate that the proposed action prevents TCE from moving toward private wells. In addition, numerous operational changes have been made to eliminate any future contaminant releases.

Although the proposed action is designed to prevent TCE from moving toward private wells, it is not the final remedy for the contamination at Site 300. Final cleanup of TCE, RDX, and other contaminants will be covered under the upcoming Site-Wide ROD. Cleanup standards will be established for these contaminants and future actions will be taken to reduce levels to regulatory standards, thereby protecting the health of future generations. In the case of RDX, we are currently investigating several remediation alternatives (such as granular activated carbon) and are still looking for other innovative clean up technologies that may be applicable to our site. In addition, we have been talking with various DOD facilities who have experience in cleaning up RDX to see what treatment course of action they recommend.

Letter #2, from Helen Bruner

I am very concerned about Site 300. I hope you are also. Contaminants here will affect our children and grandchildren.

Is there any way to monitor a very careful and thorough cleanup including RDX wells and preventing the release of further toxins?

Is there anything I can do to support you in this? We must not cut corners here.

Response to Letter #2 from Helen Bruner

Thank you for your comments regarding the Building 815 OU EE/CA report. I hope the following response addresses your concerns regarding Site 300.

I share your concerns regarding contamination at Site 300. The action proposed in the EE/CA report is designed to protect public health by stopping TCE contamination in ground water from moving offsite toward private wells. Ground water monitoring will be used to evaluate the performance of the proposed action and demonstrate that contaminants are not moving in the direction of private wells.

We are already actively monitoring the ground water for contaminants both onsite and offsite. In the case of RDX, we are investigating several remediation alternatives (such as granular activated carbon) and are still looking for other innovative clean up technologies that may be applicable to our site. In addition, we have been talking with various DOD facilities who have experience in cleaning up RDX to see what treatment course of action they recommend. Although the proposed action is designed to prevent TCE from moving toward private wells, it is not the final remedy for the contamination at Site 300. Final cleanup of TCE, RDX, and other contaminants will be covered under the upcoming Site-Wide ROD. Cleanup standards will be established for these contaminants and future actions will be taken to reduce levels to regulatory standards, thereby protecting the health of future generations.

All of our cleanup efforts will be coordinated with the regulatory agencies and the public. The best way to support this effort is to remain informed regarding environmental issues and Site 300 environmental cleanup activities. You are welcome to participate in any future public workshops by submitting written or verbal comments during the public comment period.

Letter #3, from Julie Machado

This letter is to support a full and thorough clean up of Site 300 between Livermore and Tracy.

I do not think the limited clean up proposal by the Department of Energy will be sufficient, as it does not address the high-explosives compound RDX, or nitrate resulting from the breakdown of explosives. I am concerned that the DOE approach is vague, and may produce additional toxics. And finally, there is not even a procedure planned for monitoring the other contaminants involved.

Please do whatever you can to improve the extent of the clean up on Site 300. The people of the San Francisco Bay area deserve more than this. Thank you.

Response to Letter #3 from Julie Machado

Thank you for your comments regarding the Building 815 OU EE/CA report. I hope the following response addresses your concerns regarding the cleanup of Site 300.

The main objective of the action proposed in the EE/CA report is to protect public health by stopping trichloroethylene (TCE) contamination in ground water from moving in the direction of private property near the Site 300 boundary. This will be done by pumping and treating ground water from wells located at the front of the TCE contamination. Ground water monitoring wells have been installed in the area to demonstrate that the proposed action prevents TCE from moving toward private wells. Although the proposed action is designed to prevent TCE from moving offsite, it is not the final remedy for the contamination at Site 300. Final cleanup of TCE, RDX, nitrate, and other contaminants will be covered under the upcoming Site-Wide ROD. Cleanup standards will be established for these contaminants and future actions will be taken to reduce levels to regulatory standards, thereby protecting the health of future generations. I do not anticipate that the proposed action or future cleanup activities will produce any additional toxic chemicals. In addition, numerous operational changes have been made to eliminate any future contaminant releases.

We have been actively monitoring the ground water for TCE, RDX, nitrate, and other contaminants at the Bldg. 815 OU for over 12 years. This includes monitoring the ground water both onsite and offsite. We are currently investigating several remediation alternatives for RDX (such as granular activated carbon) and nitrate (such as ion exchange, biological treatment, etc.) and are still looking for other innovative clean up technologies that may be applicable to our site. In addition, we have been talking with various DOD facilities who have experience in cleaning up RDX and nitrate to see what treatment course of action they recommend.

I agree that the people of the San Francisco Bay Area deserve to be protected from any unacceptable risks due to contamination at Site 300. All of our cleanup efforts will be coordinated with the regulatory agencies and the public. You are welcome to participate in any future public workshops by submitting written or verbal comments during the public comment period.

Letter #4, from Jack W. Fleming

Although my information is incomplete, my understanding is that plans to cleanup on Site 300 are themselves incomplete, not fully adequate. I also understand that the substances involved are complex, some of them possibly volatile, such that formulating a plan is not a simple, straightforward matter.

My concern is that, for whatever reasons, the cleanup may be less than complete, and/or be conducted in a manner that exacerbates the fundamental problem of toxic pollution.

Response to Letter #4 from Jack W. Fleming

Thank you for your comments regarding the Building 815 OU EE/CA report. I hope the following response addresses your concerns regarding plans to cleanup Site 300.

The main objective of the action proposed in the EE/CA report is to protect public health by stopping trichloroethylene (TCE) contamination in ground water from moving in the direction of private property near the Site 300 boundary. This will be done by pumping and treating ground water from wells located at the front of the TCE contamination. Ground water monitoring wells have been installed in the area to demonstrate that the proposed action prevents TCE from moving toward private wells. Although the proposed action is designed to prevent TCE from moving offsite, it is not the final remedy for the contamination at Site 300. Final cleanup of TCE, RDX, nitrate, and other contaminants will be covered under the upcoming Site-Wide ROD. Cleanup standards will be established for these contaminants and future actions will be taken to reduce levels to regulatory standards, thereby protecting the health of future generations. I do not anticipate that the proposed action or future cleanup activities will produce any additional toxic chemicals. In addition, numerous operational changes have been made to eliminate any future contaminant releases.

All of our cleanup efforts will be coordinated with the regulatory agencies and the public to ensure that the cleanup is adequate, complete, and does not generate any additional environmental contamination. We welcome public input and participation in this process. You are welcome to participate in any future public workshops by submitting written or verbal comments during the public comment period.

Letter #5, from Kathryn Sawyer

The toxics people are being exposed to around Site 300 is appalling. Please either ensure it's cleaned up and better monitored or close it down.

Thank you for your help.

Response to Letter #5 from Kathryn Sawyer

Thank you for your comments regarding the Building 815 OU EE/CA report. I hope the following response addresses your concerns regarding toxic chemicals at Site 300.

The main objective of the action proposed in the EE/CA report is to protect public health by stopping TCE contamination in ground water from moving in the direction of private property near the Site 300 boundary. This will be done by pumping and treating ground water from wells

located at the front of the TCE contamination. Ground water monitoring wells have been installed in the area to demonstrate that the proposed action prevents TCE from moving toward private wells, thereby eliminating public exposure to ground water contamination. Although the proposed action is designed to prevent TCE from moving offsite, it is not the final remedy for the contamination at Site 300. Final cleanup of TCE, RDX, nitrate, and other contaminants will be covered under the upcoming Site-Wide ROD. We are currently investigating several remediation alternatives for RDX and nitrate and are still looking for other innovative clean up technologies that may be applicable to our site. Cleanup standards will be established for these contaminants and future actions will be taken to reduce levels to regulatory standards, thereby protecting the health of future generations. I do not anticipate that the proposed action or future cleanup activities will produce any additional toxic chemicals. In addition, numerous operational changes have been made to eliminate any future contaminant releases.

We have been actively monitoring the ground water and soil for all known chemicals and releases for over 12 years. This includes monitoring the ground water both onsite and offsite. In the SWRI prepared for Site 300 in April 1994, the estimated lifetime cancer risk to the public living outside the site boundaries was found to be one in 100,000. This figure was calculated using the assumption that a person drank 2 liters of water per day for 70 years from a well at the site boundary with no ground water cleanup. The estimated lifetime cancer risk is the number of additional cases of cancer that could occur as a result of contact with the contaminants at Site 300. These cases would be in addition to the number of cancer cases caused by day to day living (known as the background rate). The estimated lifetime cancer risks calculated for the Building 815 OU boundary are three in a million for TCE and two in a million for RDX. By reducing TCE contamination levels down to background or below, the estimated lifetime cancer risk drops to one in 10 million.

All of our cleanup efforts will be coordinated with the regulatory agencies and the public to ensure that the cleanup is adequate, complete, and does not generate any additional environmental contamination. We welcome public input and participation in this process. You are welcome to participate in any future public workshops by submitting written or verbal comments during the public comment period.

Acronyms and Abbreviations

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ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund
CFR	Code of Federal Regulations
CCR	California Code of Regulations
COC	Constituent of Concern
DOE	U.S. Department of Energy
DTSC	California Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	Feet, foot
GAC	Granulated activated carbon
GLD	General Law Division
HE	High explosive
LLNL	Lawrence Livermore National Laboratory
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NPL	National priority list
OU	Operable Unit
ppb	Parts per billion
PRG	Preliminary Remediation Goal
RADW	Remedial Action Design Workplan
RAO	Removal action objective
RDX	A high explosive
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SWRI	Site-Wide Remedial Investigation
TCE	Trichloroethylene
The Regents	University of California
Tnbs ₂	Miocene Neroly Formation upper blue sandstone

Tps	Pliocene nonmarine unit, consisting of silts and clays with some gravel units
U.S.C.	United States Code
VOC	Volatile organic compound
µg/L	Micrograms per liter