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**Explanation of Significant Differences
for Metals Discharge Limits at the
Lawrence Livermore National Laboratory
Livermore Site**

Technical Editors

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*Weiss Associates, Emeryville, California



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1. Introduction

On August 5, 1992, the Record of Decision (ROD) (Department of Energy [DOE], 1992) was signed, documenting the final cleanup plan for the Lawrence Livermore National Laboratory (LLNL) Livermore Site in Livermore, California. As required under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA), and pursuant to 40 Code of Federal Regulations (CFR) Section 300.435 (c)(2)(i) (Fed. Reg. Vol. 55, No. 46 [March 8, 1990]), this Explanation of Significant Differences (ESD) describes a change from the National Pollutant Discharge Elimination System (NPDES) Permit No. CA0029289 (Regional Board Waste Discharge Requirements Order No. 91-091) described in the ROD. This ESD describes changes to metals discharge limits approved by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in a letter dated August 15, 1996. With the exception of Treatment Facility A, which will continue to comply with RWQCB Waste Discharge Requirements Order No. 88-075, all ground water treatment facilities, portable treatment units (PTUs), and the Drainage Retention Basin will conform to these new standards when discharging ground water to ditches that lead to the arroyos.

An ESD is required when significant, but not fundamental, changes are made to the final remedial action plan described in the ROD. This ESD was prepared according to EPA guidance (EPA, 1991; 1992).

The lead regulatory agency for this ESD is the U.S. Environmental Protection Agency (EPA). In addition to the EPA, the RWQCB and the California Department of Toxic Substances Control (DTSC) oversee the LLNL Livermore Site cleanup and have commented on this ESD. All regulatory agency comments and DOE/LLNL responses are presented in Section 3.

Pursuant to 40 CFR Section 300.435(c)(2)(i), a public comment period is not required for an ESD, and all regulatory agencies overseeing the Livermore Site cleanup agreed that a public comment period was not necessary for this ESD. A notice will be published in local newspapers (*The Independent*, *Tri-Valley Herald*, and *Valley Times*) that briefly summarizes this ESD.

This ESD will be placed in the LLNL repositories for interested members of the public to review. One repository is located at the Livermore Public Library, 1000 South Livermore Avenue. Library hours are Monday through Thursday, 10:00 a.m. to 9:00 p.m.; Friday, 10:00 a.m. to 6:00 p.m., Saturday, 10:00 a.m. to 5:00 p.m.; and Sunday 1:00 to 5:00 p.m. The second repository is at the LLNL Visitors Center on Greenville Road. Visitor Center hours are Monday through Friday, 1:00 p.m. to 4:00 p.m. The Visitors Center also contains the Administrative Record, which contains all documents that form the basis for the Livermore Site cleanup plan.

The site description and history are described in the Livermore Site Remedial Investigation Report (Thorpe et al., 1990), the Feasibility Study (Isherwood et al., 1990), the ROD (DOE, 1992), and the Remedial Action Implementation Plan (Dresen et al., 1993).

2. Description of the Significant Differences and the Basis for the Differences

In March 1996, DOE/LLNL sent a letter to the RWQCB indicating that they did not plan to renew NPDES permit No. CA0029289 when it expired on June 18, 1996. In this letter DOE/LLNL proposed new discharge effluent limits for metals to meet the substantive requirements of the NPDES permit. The proposed discharge limits were discussed with the RWQCB and an agreement was reached to ensure that the new discharge limits are protective of beneficial uses during the wet and dry seasons. It was recognized that during the dry season, the discharge infiltrates near the discharge point and poses minimal threat to aquatic life. However, because the discharged water can infiltrate and recharge a potential drinking water aquifer, Maximum Contaminant Levels (MCLs) were chosen as the dry season discharge limits. During the wet season, the effluent flows downstream and may impact aquatic life. Thus, discharge limits set forth in the RWQCB Order No. 94-087 for NPDES permits for treated ground water are chosen for the wet season. As referenced in the LLNL Annual Environmental Reports, the dry season is April 1 through November 30, and the wet season is December 1 through March 31.

Table 1 presents the significant differences between the original and revised metals discharge limits.

3. Support Agency Comments

The following responses address EPA comments dated February 20, 1997, DTSC comments dated February 25, 1997, and RWQCB comments dated February 28, 1997 on the Draft ESD, as presented in separate letters to DOE.

3.1. EPA Comments and DOE/LLNL Responses

Comment No. 1: *Page 1, para 1. The text states: "This ESD describes changes to new metals discharge limits..." The word "new" seems duplicative in this context. We suggest it be removed, since it seems that the word "changes" sufficiently describes the issue.*

The word "new" has been deleted.

Comment No. 2: *Page 1, paragraph 1, last sentence. "...discharging ground water to ground." Please clarify this sentence. Does "ground" refer to the arroyo or percolation into soil?*

The word "ground" refers to all ditches that lead to either Arroyo Los Positas or Arroyo Seco. This word has been replaced with: "...to ditches that lead to the arroyos."

Comment No. 3: *Table 1. Please clarify what "Not Applicable" means. Does it mean that the discharge limit is zero? Are there no limits for these constituents listed in Order No. 94-087?*

In the Dry Season column of Table 1, the "not applicable" footnote denotes that no MCL

is established for the individual metal. The “not applicable” footnote in the Wet Season column denotes that no limit has been established for aquatic life protection. Although DOE/LLNL have no discharge standard for some metals in the Wet or Dry Seasons, quarterly bioassay analyses will indicate harmful metal concentrations. The footnote for the Wet Season (footnote “a”) now reads: “No limit is established for aquatic life protection; however, aquatic life is protected by quarterly bioassay analyses.” The footnote for the Dry Season has been changed to footnote “b”, which now reads: “No MCL is established for this metal.”

3.2. DTSC Comments and DOE/LLNL Responses

Comment No. 1: *Section 2 and Table 1 of the ESD seem to imply that MCL standards apply to ground water, but do not apply to surface water. Table 1 is to [sic] modified such that the discharge standards for hexavalent chromium, nickel and zinc are to be the same for the wet and the dry season.*

The discharge standards are protective of beneficial uses. As directed by the RWQCB, MCLs constitute the discharge standard during the dry season because the water recharges to the ground water. Aquatic life protection is the basis for the wet season because the water discharges to the bay. These discharge standards are consistent with the RWQCB NPDES General Waste Discharge Requirements for all San Francisco Bay Region sites remediating ground water containing VOCs.

Comment No. 2: *The wet season discharge limit for mercury is to [sic] changed to an enforceable, measurable unit (i.e. µg/l). Besides being unenforceable, the use of the 1 gram/day requirement would allow LLNL/DOE to discharge mercury in levels which are neither protective of the human health nor protective of aquatic life. (For example, in January 1996, TFD discharged 160,000 gallons of water. Given the 1 gram/day discharge standard, this water could have been discharged at 51 µg/l mercury).*

DOE/LLNL and the RWQCB agree to change the mercury discharge limit to the 2 micrograms per liter MCL, which is more conservative than the 1 gram per day limit in Order No. 94-087.

3.3. RWQCB Comments and DOE/LLNL Responses

Comment No. 1: *The Explanation of Significant Differences (ESD) should contain the complete listing of all analysis similar to the NPDES permit. Please include the following items in the ESD: the complete listing of the original and revised analysis and sampling points; the original and revised sampling schedule; and the original and revised discharge limits; and finally, include the verification sampling procedure in the event of violations of the discharge limits.*

The original and revised analysis, sampling points, and original and revised sampling schedule were not a component of the ROD, and thus do not constitute a significant difference. The following presents where this information has been documented. The complete listing of the original and revised analysis, and the original and revised sampling schedule, are documented in your letter to DOE dated August 15, 1996 (Bessette Rochette, 1996). Sampling points are presented in each self-monitoring report since February 1995, with the exception of the fourth quarter 1996 self-monitoring report because we agreed to only present the sampling points in the 1996 annual report and all future annual reports.

The original and revised metals discharge limits are presented in Table 1 of the ESD.

The verification sampling procedure in the event of discharge limit violations is included in Table 1 of the ESD.

4. Affirmation of the Statutory Determinations

Considering the new information and the changes that will be made to the proposed remedy, the EPA and DOE believe that the remedy remains protective of human health and the environment, complies with Federal and State requirements identified in the ROD as applicable or relevant and appropriate to this remedial action, and is cost effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practical for this site.

Daniel Opalski
Chief, Federal Facilities Cleanup Branch
U.S. Environmental Protection Agency
Region IX

Date

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

Date

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- U.S. Environmental Protection Agency (EPA) (1991), *Guide to Addressing Pre-ROD and Post-ROD Changes*, Office of Solid Waste and Emergency Response, Publication 9355.3-02, April 1991.
- U.S. Environmental Protection Agency (EPA) (1992), *Preliminary Draft Guidance on Preparing Superfund Decision Documents*, Office of Solid Waste and Emergency Response, Directive 9355.3-02, January 1992.

Table 1. Differences between original and revised metals discharge limits.

	Discharge limit ($\mu\text{g/L}$)		
	Original	Revised: Dry season (MCLs) (April 1 - November 30)	Revised: Wet season (Order No. 94-087) (December 1 - March 31)
Antimony	1,460	6	NA ^a
Arsenic	20	50	10
Beryllium	0.7	4	NA ^a
Boron	7,000	NA ^b	NA ^a
Cadmium	5	5	2.2
Chromium (hexavalent)	11	NA ^b	22
Chromium (total)	50	50	NA ^a
Copper	20	1,300	23.6
Iron	3,000	NA ^b	NA ^a
Lead	5.6	15	6.4
Manganese	500	NA ^b	NA ^a
Mercury	1	2	2 ^c
Nickel	7.1	100	320
Selenium	100	50	10
Silver	2.3	100	8.2
Thallium	130	2	NA ^a
Zinc	58	NA ^b	220

Notes:

LLNL will notify the Regional Board within 24 hours from initial analytical results indicating that concentrations exceed the discharge limits. If effluent discharge limits are exceeded, a second effluent sample and receiving water sample will be collected. If the second sample meets effluent limits, a third sample will be collected to verify that the second sample is valid. If the second effluent sample exceeds the discharge limits, the treatment system will be shut down to determine the cause of the violation.

$\mu\text{g/L}$ = Micrograms per liter.

MCLs = Maximum Contaminant Levels.

NA = Not applicable.

^a No limit is established for aquatic life protection; however, aquatic life is protected by quarterly bioassay analyses.

^b No MCL is established for this metal.

^c The mercury MCL of 2 $\mu\text{g/L}$ is more conservative than the 1 gram per day limit in Order No. 94-087.