



Environmental Restoration Project

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Dal

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**EC PLAN OVERVIEW
 FIELD UNIT 5
 SWMU 22-015(c)**

June 21, 1995

1.0 SWMU Description

Location: TA-22

Type: Outfall with Surface and Near-Surface Soil Contamination

Waste Disposed: Floor drains under plating baths and a rinse tank for a printed circuit etching operation overflowed directly to this outfall.

Contaminants of Concern: Heavy Metals and Radionuclides

2.0 Site Investigations:

Pre-RFI **RFI Phase I (X)** **RFI Phase II** **(Check applicable spaces)**

Analytical Results Available:

Metals: Primary Contaminants: Arsenic (227 ppm), Cadmium (79.6 ppm), Chromium (1700 ppm), Copper (16,100 ppm), Silver (266 ppm), Nickel (1630 ppm), Lead (672 ppm).

Organics: Primary Contaminants: NA

Rad: Primary Contaminants: Sr-90 (7.22 pCi/g), Cs-137 (1.8 pCi/g)

Other: Primary Contaminants: NA

3.0 Waste Types to be Generated by Cleanup:

WASTE TYPE	HAZ	RID	NON-HAZ	VOLUME	METHOD OF TREATMENT	METHOD OF DISPOSAL	
						LANL	OFF-SITE
PPE			X	8 ft ³			X
Dacon Liquid	X			1,000 gal.	WWTR	X	
Bulk Soil			X	350 yds ³			X
Bulk Soil				60 yds ³		X	

4.0 Scope of Work for Expedited Cleanup

Rationale for Performing EC: Extensive RFI sampling was conducted within the visibly stained area which runs from TA-22-52 into a low area, then down a wagon road to several channels and into Parajito Canyon. Analytical results indicate that concentration levels for several metals and radionuclides exceed SALs. RFI results have also defined the extent of contamination. Removal of the contaminated soils at this site will eliminate current and future risks associated with worker exposure and potential ecological transport mechanisms.

Description of EC: Analytical results from soil samples collected from the most contaminated portions of this site indicate that the soil does not even approach TCLP limits. Soils exceeding calculated cleanup levels will be excavated and disposed as non-hazardous waste at an off-site industrial waste landfill. Field laboratory analyses will be used to determine whether additional soil requires excavation. Verification sampling will comprise a statistically valid plan and samples will be submitted to a fixed analytical laboratory. The site will be fully restored.

Proposed Cleanup Standards or Methodologies: The derivation of human health risk-based cleanup levels for this EC is based on an occupational exposure scenario (continued Laboratory operations) using the standard EPA default exposure parameters for the generic worker as presented in *RAGS Part B, Development of Risk-Based Preliminary Remediation Goals (US EPA, 1991)*. These default exposure parameters assume an exposure frequency and duration of 250 days per year for 25 years. Exposure pathways considered include ingestion and inhalation of contaminated soil. This approach is considered very conservative in that few to no workers are expected to come into contact with remediated soils in this outfall area.

Cleanup levels calculated for this EC effort are presented in the table below. Typically, the Laboratory derives cleanup levels assuming an acceptable level of risk of 1E-06 for carcinogens, and a hazard index of 0.1 for noncarcinogens. This conservative approach is adopted to account for the presence of multiple constituents. With this approach, the residual risk remaining at the site following remediation will be within the EPA acceptable risk range of 1E-04 to 1E-06 for carcinogens, and less than a hazard index of 1 for noncarcinogens. The table below indicates that the cleanup effort at this SWMU will be driven by the 25 mg/kg cleanup level for arsenic and cadmium (due to its toxicity). It should be noted that the arsenic cleanup level is based on an acceptable risk level of 1E-05 due to the fact that a risk level of 1E-06 results in a cleanup level for this contaminant lower than background (the background UTL for arsenic is 12 mg/kg). The equations and assumptions used for the calculation of cleanup levels in this plan are provided in Annex 6.12 of the EC Plan.

CLEANUP LEVELS FOR SWMU 22-015(c)

Chemical	Cleanup Level (mg/kg)	Rationale
Arsenic	25	Carcinogen. Based on a risk level of 10^{-6} , a risk level of 10^{-6} creates a cleanup level lower than background.
Cadmium	25	Carcinogen - 10^{-6} risk level.
Chromium III	204 400	Noncarcinogenic. Based on a hazard index of 0.1.
Chromium VI	38	Carcinogenic Chromium VI. Based on a risk level of 10^{-6} , a risk level of 10^{-6} creates a cleanup level lower than background.
Lead	3,000	California Department of Toxic Substances Control (DTSC 19920 algorithm for adults.
Copper	7,500	Noncarcinogenic. Based on a hazard index of 0.1.
Nickel	4,100	Noncarcinogenic. Based on a hazard index of 0.1.
Silver	1,000	Noncarcinogenic. Based on a hazard index of 0.1.

Results from the RFI and additional biased samples submitted for TCLP analysis indicate that leaching of metals from soils and sediments at this SWMU did not contribute concentrations of metals on the hillside below the outfall that would pose an unacceptable human health or ecological risk. In addition, the possibility that the total chromium present is in the form of Cr VI (the most toxic and mobile state of CR) is also highly unlikely for several reasons: (1) chromium was barely detectable following the TCLP procedure for soil containing the highest concentrations observed at this site; and (2) the presence of high levels of iron in the soils may have caused any Cr VI to be reduced to Cr III.

Therefore, to ensure that contaminated soils left in place on the hillside do not pose an unacceptable health and/or ecological risk, a minimum of five additional biased samples will be collected from sediment traps located in the two main drainages flowing down the hillside. These samples will be collected and analyzed for the metals of concern (including Cr VI) prior to initiation of this EC. Results from this additional sampling will be compared to SALs and ecological screening thresholds (currently under development) to determine if further action is required. If assessment results indicate that leaving these soils in place may pose an unacceptable human health or ecological risk, they will be excavated and disposed during the EC. Results of this assessment will be provided in the final report for this EC. It should be noted

that human health and ecological risk assessment of the canyon bottom will be addressed in future Canyons Phase I RFIs. The future land use of this site will continue to be for industrial purposes. Cleanup levels for this site will be calculated using a risk-based methodology for the occupational exposure scenario beginning with an acceptable risk of 10^{-4} . The cleanup level may be adjusted upward (not to exceed 10^{-4} risk) due to the extensive soil contamination present at this site. Cleanup level calculations and backup documentation will be provided in the draft EC Plan for this SWMU. Additionally, all treatability and TCLP results for the proposed soil treatment will also be provided.

5.0 Cost and Schedule

Estimated cost of:

LANL Staff	\$ 28,300
Subcontractors	\$ 20,500
Sample Analysis	\$ 13,000
Waste Treatment Storage, Disposal	\$ 19,000
Site Prep/Restoration	\$ <u>12,500</u>

Total \$93,300

Planned Start Date 8/1/95

Planned Field Completion Date 8/31/95

Verification Report Date 9/30/95