13 October 1998

COMMENTS ON THE DRAFT ENGINEERING EVALUATION/COST ANALYSIS (EE/CA) NON-TIME-CRITICAL REMOVAL ACTION FOR IRP SITE 14, POI 29 FORMER SMALL ARMS RANGE NO. 2, FORMER NAVAL TRAINING CENTER, SAN DIEGO CTO-0174

Comments from Charles B. Bishop

Written on 13 October 1998
Charles B. Bishop
RAB Member

GENERAL COMMENTS

Comment 1: Subject document reviewed this date and following comments submitted for your consideration: Section 2.5.1 – How do we get from concentrations of lead in the soil to "blood level concentrations" in humans? Could someone explain the CAL-EPA pharmacokinetic model at the next RAB meeting?	**Response 1**: As discussed at the 27 October RAB meeting and discussed in detail at the 10 November RAB subcommittee meeting, lead is one of the most widely studied hazardous materials and its effects on humans have been well documented. California Department of Toxic Substances Control (DTSC) has developed a pharmacokinetic[a] model for lead using a national database of actual lead exposure data from children and adults. The pharmacokinetic model is used to estimate blood-lead concentrations resulting from the following five exposure pathways: diet, drinking water, soil and dust ingestion, inhalation, and dermal contact (OSA 1992, copy attached). Blood-lead concentration is a commonly used human-health indicator of exposure to lead. Blood lead concentration is an integrated measure of internal dose, reflecting total exposure from site-related and background sources. The benchmark for blood-lead levels is 10 micrograms per deciliter (μg/dL) and was established because levels above this have been shown to cause toxic effects, particularly neurological ones in children. The California Environmental Protection Agency (Cal-EPA) preliminary remediation goal for lead is 130 milligrams per kilogram (mg/kg) in soils and correlates to this blood-lead concentration of 10 μg/dL.
The tables in this section appear to be based on a maximum Pb concentration of 11,900 mg/kg at the site, whereas the highest level obtained at any of the borings was 1,094 mg/kg (Sect. 2.2.2.3). I could find no explanation of this apparent discrepancy in the text.	The maximum reported concentration of lead in soils at the site was 11,900 mg/kg, as shown on Figure 2-6. The text has been revised as follows to clarify this fact: "Figure 2-6 shows the soil sample results and locations at the three trenches. Lead concentrations varied widely between trenches. In P29-T1, where the highest lead concentration of 11,900 mg/kg was reported at 0.9 feet bgs, a deeper sample collected at 3 feet bgs in the center of the trench had a much lower reported lead concentration (1.8 mg/kg)."

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Section 3.5 – What is the cost of raising the safety factor from 100 mg/kg to 130 mg/kg?	The cost of raising the factor from 100 mg/kg to 130 mg/kg would be insignificant. Based on results from previous investigations (Figures 2-6 and 2-7) only 4 out of 115 soil samples collected from the site contain reported concentrations of lead between 100 mg/kg and 130 mg/kg. Therefore, the amount of soil that would be excluded from the removal action, based on the estimated volume from these data, would be minimal. The area of actual excavation will be determined using confirmation sampling during the removal action. Details of the sampling to be performed during the removal action will be included in the Removal Action Work Plan.
How were the cost figures for "RCRA disposal" vs. "CAL-EPA non-RCRA disposal" obtained?	Based on costs quoted from Chemical Waste Management, landfill costs for disposal of RCRA waste (only lead-contaminated soil without bullet fragments) requiring stabilization ranges from \$110.00 to \$160.00 per ton (approximately \$88.00 to \$128.00 per cubic yard [yd^3]). Waste classified as Cal-EPA non-RCRA waste ranges from \$25.00 to \$35.00 per ton (approximately \$20.00 to \$28.00 per yd^3). Also, since bullet fragments cannot be stabilized, additional soil screening to remove the bullet fragments may be necessary. Table 4-1, the cost for Alternative 1, excavation, has been revised to include the actual landfill disposal cost per cubic yard of soil used in the cost estimating process (RCRA waste – \$60.00 per yd^3 and Cal-EPA non-RCRA waste – \$30.00 per yd^3). The landfill disposal cost in the Table 4-1 also includes transportation cost, cost for cleaning the trucks, etc. Wastes are classified (RCRA hazardous, Cal-EPA non-RCRA hazardous, nonhazardous, or inert waste) based on laboratory testing (i.e., toxicity characteristic leaching procedure and California waste extraction test). Federal and state agencies have developed criteria outlined in *Code of Federal Regulations* Title 22, which define the classification of these wastes.
Comment 2: The cost estimate of almost one million dollars to dispose of the soil containing an unknown quantity of spent small arms ammunition is staggering. Isn't there some way to assess the probability of serious effects on human health being caused by the existence of this material in the soil? It appears that you have taken the highest level measured at any point source as the level to be mitigated throughout the area; used the highest sensitivity level of possible human contact, namely small children; and then added a thirty percent safety factor over the required safe level, which must certainly already contain a safety factor.	**Response 2:** Per U.S. EPA guidance (U.S. EPA 1989), the maximum detected concentration should be used as the exposure concentration where a screening level risk assessment is performed. Hence, the risk assessment was conducted using the highest concentration of lead (11,900 mg/kg) in soil reported at the site. It should be noted that the risk would be unacceptable for levels above 130 mg/kg. As evident in Figures 2-6 and 2-7, the site contains reported concentrations of lead exceeding 130 mg/kg in 23 of the 115 soil samples collected from the site during previous investigations.

	As mentioned in Response 1, lead is one of the most studied toxic chemicals and its effects have been well documented. Based on the requirements of DTSC, pharmacokinetic modeling is performed to evaluate the risk of exposure to human receptors. The pica child (a syndrome in which a child consumes abnormally large quantities of soil) is considered the most sensitive of possible human contact; however, this could be regarded as too conservative an estimate. Hence, the residential child scenario was used for IRP Site 14 for a more realistic exposure scenario. Also, children are considered instead of adults because of the following reasons (U.S. EPA 1998): • They have a high level of hand-to-mouth activity, which increases the potential for ingesting lead-contaminated soil. • They have a rapidly developing central nervous system, making it highly susceptible to the effects of lead. • They have a peaking of synaptic density of the frontal cortex of the brain; synaptic development can be disrupted or delayed as a result of lead exposure. The cleanup goal for lead at IRP Site 14 was set at 100 mg/kg. This cleanup goal was selected to prevent site lead levels from causing blood levels of more than 10 µg/dL under a residential exposure scenario. The exposure pathways considered included ingestion of soil, dermal exposure to soil, and inhalation of particulates from the soil. Using these exposure pathways, a threshold of 130 mg/kg lead would bound the blood lead level of 10 µg/dL. An additional safety margin of 30 mg/kg was added for potential measurement variability.
Comment 3: Is it true that during the destruction of the building on that site that the contents of the sand pits were dug up and distributed over the entire area?	**Response 3:** It is unknown what actually occurred during demolition of Building 192. As stated in the last paragraph of Section 2.2.2.1, although the soil underlying the bullet trap was recommended for excavation and removal, no documentation exists for removal of the sand trap material. Therefore, based on the results of elevated levels of lead in soil at the site in subsequent investigations, it is assumed that during the demolition of Building 192, the sand trap material was dispersed throughout the site during regrading activities.

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Was there no attempt to recover the spent ammunition?	Based on the investigation conducted by LeRoy Crandall in 1991, screening was periodically performed on the sand trap to remove spent ammunition. However, the condition of the sand trap prior to demolition of Building 192 is unknown.
Comment 4: I understand the motivation to lean over backwards to defend against possible future challenges from environmental groups, but our responsibilities to the taxpayer must also be considered, and if the probability of serious harm being caused in the future is low, then the expenditure of such a large sum of tax dollars does not seem to be wise. Recommend we have a subcommittee meeting on this one.	**Response 4:** At the request of the RAB, a subcommittee meeting was held on 10 November 1998 to discuss RAB members' concerns on the Draft EE/CA.

Note:
[a] Pharmacokinetic – the study of the bodily absorption, distribution, metabolism, and excretion of drugs.

References:

OSA. *See* The Office of Scientific Affairs.

The Office of Scientific Affairs. 1996. Supplemental Guidance for Human-Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities, State of California Environmental Protection Agency, Department of Toxic Substances Control. August.

United States Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund, Volume I, Human-Health Evaluation Manual (Part A). EPA/540/1-89/002. Office of Emergency and Remedial Response. December.

———. 1998. Risk Analysis to Support Standards for Lead in Paint, Dust, and Soil. Office of Pollution Prevention and Toxics. (EPA 747-R-98-006). June.

U.S. EPA. *See* United States Environmental Protection Agency.