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DATE: March 6, 2014

SUBJECT: Review of an Off-Site Soil Sampling Report for the Exide Facility at
Vernon, California.

PCA: 25040

Site Code: 300214-33

Background

Exide Technologies, Inc (Exide) is a secondary lead recovery facility where lead batteries and other lead bearing materials are recycled. It is located on 15 acres of land, in the City of Vernon, California. It is bounded by East 26th Street to the north, Bandini Boulevard to the south, Indiana Street to the East and Union Pacific Storage Yard to the West. A drainage channel bisects the plant in a north-south direction, and flows into the Los Angeles river, located 500 feet south of the site. A large railroad yard runs along the northern border of the facility. Other properties surrounding Exide include the Command Packing building, Rehrig Pacific Company, the former Honeywell facility, and Baker rendering plant. The nearest residences are located 0.4 to 0.6 miles north and south of the site.

At the request of DTSC, Exide collected soil samples from two residential areas located north and south of the facility, two schools (San Antonio Elementary School and Salazar Head Start Program), and an area identified as background (located 14 miles away in Long Beach). One of the residential areas was identified as the location of the maximum exposed individual resident (MEIR) in the January 2013 AB 2588 HRA, required by South Coast Air Quality Management District (SCAQMD). Soil samples were collected from 19 residential properties in the northern area (Boyle Heights and East Los Angeles) and 20 residential properties from the southern residential area (Maywood). In

each of the residential properties and schools, soils were collected from five distinct locations at depths of 0"-1", 1"-3" and 3"-6", and combined to form a composite sample for each of the three individual depths. The samples were analyzed for arsenic, lead, antimony, cadmium, chromium, polychlorinated biphenyls, dioxins/furans and polycyclic aromatic hydrocarbons. Results of soil analyses were compared to screening levels and site-specific background data set.

Document Reviewed

The Human and Ecological Risk Office (HERO) reviewed a report titled "Off-Site Soil Sampling Report, Exide Technologies, Vernon, California". The report was prepared by Advanced Geoservices, for Exide Technologies, Vernon, California, and is dated February 18, 2014. Comments on the report are provided below.

Scope of Review

HERO reviewed this document with emphasis on those aspects that affect the risk to human health. We defer to other DTSC personnel for evaluation of environmental media. Any future changes or additions to the document should be clearly identified in order for efficient review by DTSC.

General Comments

The soils data collected from the two residential neighborhoods, and background area indicate that lead is present at levels above California Human Health Screening Levels (CHHSL) and the "background" area. None of the other contaminants that were sampled in soils appear to be of concern. Following are comments on the report.

- 1) Comparison of soil lead concentrations to screening levels:** We do not concur with the approach used to evaluate soil lead concentrations found on the residential properties. The report states that the 80 mg/kg value (derived by California EPA's Office of Environmental Hazard Health Assessment (OEHHA) is strictly a screening number for lead in soils and went on to compare lead levels found on the sampled residential properties to California Department of Public Health (CDPH) hazard levels of 400 mg/kg for play areas and 1000 mg/kg for non-play areas, to determine if people on these properties are being exposed to unacceptable levels of lead. The two screening values (80 mg/kg vs. 400 mg/kg) for lead were derived using different end points. The 400 mg/kg value is USEPA's residential screening level for lead and is based on a "threshold" predicted blood level of 10 ug/dl, where it is assumed that when children are exposed to this level of lead in the environment, there is a less than 5% probability that the blood lead levels of those children will exceed 10 ug/dl.

USEPA used the Integrated Exposure Uptake Biokinetic (IEUBK) model to derive their screening value. This is based on observations that children may experience adverse neurological effects (decreased cognitive ability), when blood lead levels exceed 10 ug/dl . On the other hand, the 80 mg/kg level was developed (by OEHHA) using leadsread (a biokinetic model similar to IEUBK) where a "benchmark change" in blood lead level of 1 ug/dl is expected to occur when children are exposed to this level of lead in soils/dust in a residential setting. In 2009, OEHHA published this value based on more recent studies showing that children are affected by exposures to lead at lower levels than were previously believed. The Center for Disease Control and Prevention has recently revised the blood lead level that would require notification (to parents, doctors, public health officials), from 10 ug/dl to 5 ug/dl.

- 2) **Maximum Exposed Individual Resident:** The January 2013 AB2588 HRA report approved by SCAQMD mentions only one MEIR area, which is clearly shown in Figure ES-1. That report does not mention one MEIR to the north of the facility and another MEIR located to the south of the facility, as described in the current report. MEIR, by definition, can only be in one location. Communications with SCAQMD's Pierre Sycip indicated that the AB2588 HRA was performed to determine the cumulative risks and hazard for all contaminants emitted from the facility, where arsenic was the risk driver. Separate air dispersion modeling was not performed for arsenic and lead. Furthermore, Mr. Sycip commented that "it does not make sense" that maximum concentrations of arsenic and lead would be in opposite directions. DTSC requested sampling of the closest residential areas located north and south of the facility, to determine if emissions from the facilities have impacted these communities. The report should be modified to remove verbiage on the southern MEIR area. Alternatively, include a letter from SCAQMD approving basis for the southern MEIR area.
- 3) **Surface soils:** USEPA recognizes soils located at 0 to 6 inches below ground surface, as surface soils. The report is differentiating between results of soil samples collected from 0-1 inches and those collected from deeper depths. The purpose of collecting surface soil samples in three different increments is to determine if contaminants have been leaching to deeper depths and to what extent. It can also be potentially used to evaluate differential lead deposition from past activities and legacy lead contamination.
- 4) **Exposure unit:** We recommend that each residential property be evaluated separately, since each house represents a separate exposure unit. The composite soil samples taken from each property provides an estimate of the average concentration of lead in soils and can be used to evaluate effects to people residing in those houses. The report calculated median values for each of the two residential areas and compared these median values to the screening levels. Area-wide statistical comparisons are not appropriate for evaluating effects of contaminated soils to residents on the individual properties.

- 5) Source of lead in soils at residential properties:** According to Exide, other sources of lead such as the historic use of leaded paint and gasoline are contributing factors to lead found in soils on the residential lots. While it is true that there are other sources of lead in the environment, various precautions were taken to minimize interference from these sources. For example, following USEPA's recommendations, soil samples were taken at least two feet away from roads and five feet away from structures, so as to avoid potentially sampling for lead from roadways (remnants of leaded gasoline) and lead-based paint on the structures. A "background" area, which is located in an urban area with a similar housing stock, proximity to freeways, railways and industrial area, was specifically chosen to address these anthropogenic sources of lead. A review of the lead data indicates that a majority of the houses in the "background" area have concentrations of lead below 80 mg/kg (with the exception of five houses). In contrast, only one house in each of the assessment areas (northern and southern) had lead concentration below 80 mg/kg. The average concentration of lead in the background area for the 0-1 inch depth is 63 mg/kg vs. 175 mg/kg (Northern assessment area) and 131 mg/kg (Southern Assessment Area).

The fact that (a) lead concentrations in the two residential areas in the vicinity of Exide are on average 2 to 3 times higher than lead concentrations in the "background" residential area, (b) the Exide facility is the only major secondary smelter in the neighborhood, and (c) concentrations of lead in soils and dust (collected up to 4,500 ft) from the facility is roughly inversely related to distance from the facility, suggests that facility may be a contributor to lead contamination in soils on these properties.

- 6) Vertical extent of lead contamination:** The fact that the uppermost surface soils data (0-1 inch bgs) have similar concentrations of lead as the deeper surface soil samples (1 to 3 inches bgs; and 3 to 6 inches bgs) indicates that historic releases of lead (the facility has been operating as a smelter since 1922) have affected the surrounding areas, and that the contamination has traveled to depths just below the surface, either through mixing of soils over the decades, through leaching of the contaminants from the surface and/or through differential deposition of lead over the decades. According to Exide, soils collected from the topmost layer should have significantly higher concentrations of lead than the deeper surface soils.
- 7) Contamination in Northern vs. Southern assessment areas:** The results of the AB2588 HRA (the MEIR area located to the north of Exide) was used as a guide to identify areas that may be more heavily impacted by Exide's emissions, and to keep preliminary investigations to a manageable level. Emissions data collected from Exide in 2010 and 2012 were used to conduct dispersion modeling and estimate risks/hazards to the surrounding community. It did not account for historic releases or impacts from the facility. Therefore, the results of the dispersion modeling and risk assessment of the most recent AB2588 HRA should not be used to evaluate the results of the soils/dust data, since those

most likely reflect the fall out of contaminants (primarily lead) from facility, which has been operating as such for many decades. In the report, Exide states that "The air modeling would indicate that the lead concentrations in the Northern and Southern Assessment Areas would also be about the same which is not observed in the data."

- 8) Age of housing:** The concentration of lead detected on the properties does not always correlate well with the age of the house. Many of the older homes in the background and assessment areas had concentrations of lead at or below 80 mg/kg. For example, SS-BG-06-1 (1929), SS-BG-09-1 (1940), SS-BG-17-1 (1947), SS-MEIR-N-02-1 (1920) had lead concentration of 54.8 mg/kg, 81.1 mg/kg, 51.1 mg/kg, and 81.8 mg/kg. According to the report, the concentrations of lead in soils is related to the median age of the houses in the residential areas that were sampled, and therefore, leaded paint is the most likely source of higher concentrations in the Northern assessment area (median house age is 1923), followed by the Southern residential areas (median house age is 1937), compared to the background area (median house age is 1950).
- 9) Lateral extent of contamination:** A review of the soil and dust data collected around the facility (going 4,500 feet out, radially) indicates that the concentrations of lead are highest in areas closest to the facility (concentrations of lead are in the thousands of milligrams per kilogram of dust) and lower at distances further away from the facility (Step-out dust and soil sampling report, November 2013). The data does not support the statement that "There is no spatial relationship or pattern to the results that would tie them to the facility such as higher concentrations in samples closer to the facility."
- 10) Lead in fine fraction of soils:** The lead levels in the sieved fractions are generally higher, than in the unsieved fractions (Table 10). However, it should be noted that the lead deposited onto surfaces many years ago may become tightly bound to soils and not necessarily be available for analysis in the finer fractions. In this situation, lead may not be concentrated at significantly higher level in the finer fractions of soils. The report states that "Lead did not concentrate significantly in the fine fraction passing the #60 sieve. This also is not typical of impacts from airborne emissions, which are comprised of very small particles".
- 11) Arsenic vs. lead concentrations:** We do not concur with the statements that arsenic and lead should be present in similar amounts in soils. Dust and soil samples collected from areas immediately around Exide demonstrate that concentrations of lead are much higher (in the thousands of milligrams per kilogram of soil/dust), while arsenic concentrations are well below 100 mg/kg. For example, concentration of lead and arsenic in dust samples collected at SWK-08 are 2,700 mg/kg and 47 mg/kg, respectively. Concentrations of lead and arsenic in soil samples collected at 500 NE-5 (0-1 inch bgs) are 3,100 mg/kg and 19 mg/kg, respectively. Communications with SCAQMD reveal that arsenic is a relatively recent addition to the smelting process at the facility. As discussed

above, the AB2588 HRA only evaluated emissions data collected from the facility in 2010 and 2012. It does not account for historic emissions of lead (from the facility), that have been occurring for decades.

12)Additional investigations: Based on data presented in this report, we recommend that Exide perform step-out sampling, both vertically and laterally, to delineate the extent of lead contamination in the neighborhoods. Soils data collected from the Northern and Southern assessment areas indicate that lead exceeds the CHHSL value of 80 mg/kg in all but two of the properties that were sampled. Discrete step-out samples should be collected on these properties, to determine if there is heterogeneity in the concentrations of lead on each of the properties.

Recommendations and Conclusions

Overall, the results of the soil sampling report indicate that concentrations of lead in the Northern and Southern Assessment areas are on average, two to three times higher than the background area and residential CHHSL (80 mg/kg). Lateral and vertical step-out sampling will be necessary to delineate the nature and extent of the lead contamination. Each residential unit should be evaluated separately in a risk assessment based on people living in those houses and the intended future use of the properties. The results of the AB2588 HRA should not be used to evaluate the soil data collected at the residential properties, as it did not account for historical emissions from the facility.

HERO notes that the decisions made in this document are site specific and should not be construed as a policy decision applicable to other sites. If you have additional questions please feel free to contact me at (714) 484-5448 or Sroysemm@dtsc.ca.gov.

Reviewed by:



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