Department of Toxic Substances Control

Deborah O. Raphael, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

March 10, 2014

Mr. Frederick Ganster
Exide Technologies
3000 Montrose Avenue
Reading, Pennsylvania 19605

DTSC REVIEW OF FEBRUARY 18, 2014 OFF-SITE SOIL SAMPLING REPORT AND ORDER, EXIDE TECHNOLOGIES, VERNON, CA (STIPULATION AND ORDER, DOCKET HWCA P3-12/13-010, OAH NO. 2013050540, AND CORRECTIVE ACTION CONSENT ORDER, DOCKET NO.:P3-01/02-010)

Dear Mr. Ganster:

The Department of Toxic Substances Control (DTSC) has reviewed the "Off-Site Soil Sampling Report" (Report), dated February 18, 2014, which was prepared by Advanced GeoServices on behalf of Exide Technologies (Exide) in connection with corrective action activities for Exide's facility in Vernon, California. Based on this review and as set forth below, DTSC hereby directs Exide to conduct additional sampling to more fully delineate concentrations of lead and to take interim measures to mitigate potential threats to public health.

The Report presents the results of soil sampling performed within two residential areas and two school locations that have been previously determined to represent locations where impacts from Exide's operations would be most likely to have occurred. The Report also presents sampling results from a background study area, which was determined to represent an area unaffected by Exide's current or previous on-site activities.

The purpose of the soil sampling was to determine whether off-site residential soils have concentrations of selected constituents that are greater than background or residential screening values. The Report states that nineteen (19) properties were sampled in the "Background Area", nineteen (19) properties were sampled in the "Northern Assessment Area", and twenty (20) properties were sampled in the "Southern Assessment Area". In addition, the Report states that samples were collected at San Antonio Elementary School and at Volunteers of America Salazar Park Head Start (Salazar Park School) located to the south and north of the Exide facility, respectively. The Report further states that composite samples were collected from five locations at each property; three five-part field composited soil samples (per property) were generated from soils within the depths ranging from 0" to 1", 1" to 3", and 3" to 6".

Printed on Recycled Paper

The Report generally concludes the following:

- Average concentrations of lead in soils in the Northern and Southern Assessment Areas exceed the average concentration of lead found in the Background Area soils, and exceed the Office of Environmental Health Hazard Assessment (OEHHA) health screening level of 80 milligrams per kilogram (mg/kg) cited in Table 1 of the Report.

- The average concentration of arsenic in soils in the Northern and Southern Assessment Areas was less that the average concentration of arsenic in Background Area soils.

- Lead and arsenic were not found in soils at San Antonio Elementary School above the average Background Area concentrations.

- Arsenic was not found in soils at Salazar Park School above the average Background Area concentration.

- Lead was not found in soils above background concentrations at Salazar Park School, except for one composite soil sample collected at the depth interval of 1" to 3". The concentration of lead at this depth was higher than the health screening level of 80 mg/kg for lead in soils at residential properties.

The Report recommends that a decision to conduct further residential soil sampling on a property by property basis be deferred until the dust step-out investigation and risk assessment calculations are completed. DTSC does not agree with that recommendation and directs Exide to take the measures set forth below.

In the *Work Plan for Off-Site Soil Sampling* (Work Plan), dated November 15, 2013, Exide stated on page 8-1, that *"If the results of the data evaluation show residential soils above background and the RSL, consistent with emissions from the Exide facility, then an amendment to this Work Plan will be prepared for further sampling to determine the lateral extent of such aerial deposition*". In addition, as stated in the section 5.28 of the Stipulation and Order, Docket HWCA: P3-12/13-010, OAH No.: 2013050540, dated November 4, 2013 (Stipulation and Order), Exide is responsible for delineating lead in soils at residential/sensitive receptor areas until 80 mg/kg of lead in soils, or background, whichever is higher, is reached. Additionally, pursuant to Section 5.4 of the Corrective Action Consent Order, Docket No.:P3-01/02-010 issued on February 25, 2002 (CACO), Exide is responsible for submitting an Interim Measures Work Plan "if DTSC identifies a potential threat to human health and/or the environment".

Based on the above, DTSC is hereby ordering Exide to submit work plans by March 21, 2014, that address each of the following (Items 1 and 2 may be combined into one work plan):

1) Delineate concentrations of lead above 80 mg/kg both vertically and horizontally within the Northern and Southern Assessment Areas, and at Salazar Park

School. A work plan for this effort should include, but not be limited to, discrete sampling at each residence where composite sampling above 80 mg/kg of lead was detected to define the lateral and vertical area of impact. In the likely event that owners of other properties within the Northern and Southern Assessment Areas will request an investigation of their property as well, the work plan shall also include sampling soils at these properties upon request of the property owner.

2) Delineate concentrations of lead above 80 mg/kg both vertically and horizontally in areas outward to at least double the sample areas of the Northern and Southern Assessment Areas. A work plan for this effort should include, but not be limited to discrete sampling at a representative number of residences.

3) Interim Measures under the 2002 Corrective Action Consent Order to mitigate the potential threat from exposure to lead at those properties in the Northern and Southern Assessment Areas with lead concentrations exceeding 80 mg/kg where children and/or pregnant women are occupants. This work plan also should address those additional properties in the Northern and Southern Assessment Areas where the concentrations of lead found in soils may represent a potential threat to human health or the environment.

DTSC's Geological Services Unit and Human Health and Ecological Risk Office have reviewed the Report. Each has provided memoranda, which are enclosed. DTSC additionally requires Exide to respond to the comments and recommendations in the enclosed memoranda by March 21, 2014.

Should you have any questions regarding this letter, please contact me at 916-255-3630 or Peter.Ruttan@dtsc.ca.gov.

Sincerely,

Peter Ruttan, P.G.
Project Manager
Office of Permitting

Enclosures (2)

cc: Next page

cc:(via e-mail)

Mr. Bud DeSart, Exide
Mr. John Hogarth, Exide
Mr. Ed Mopas, Exide
Mr. Paul Stratman, AGS
Mr. Ed Pupka, SCAQMD
Mr. Jerrick Torres, City of Vernon
Dr. Cyrus Rangan, LACPHD
Mr. Rizgar Ghazi, DTSC
Ms. Nancy Bothwell, DTSC

Matthew Rodriquez
Secretary for
Environmental Protection

Department of Toxic Substances Control

Deborah O. Raphael, Director
9211 Oakdale Avenue
Chatsworth, California 91311

Edmund G. Brown Jr.
Governor

MEMORANDUM

TO: Peter Ruttan, P.G.
Engineering Geologist
Engineering and Special Projects

FROM: Todd Wallbom, P.G. ___
Engineering Geologist
Chatsworth Geological Services Unit

CONCUR: Craig Christmann, P.G. ___
Senior Engineering Geologist
Chatsworth Geological Services Unit

DATE: March 6, 2014

SUBJECT: Technical Review of Off-Site Soil Sampling Report
Exide Technologies, Inc. Site
2700 South Indiana Street
Vernon, California 90058
Prepared by Advanced GeoServices Corp. (AGC)

PCA: 22120 Site Code: 300214 Phase: 48 Log No: 20022573

As requested, Geological Services Unit (GSU) staff has performed a technical review of the *Off-Site Soil Sampling Report* (Report), dated February 18, 2014, for the purposes of Corrective Action (CA) activities. The Report was submitted by AGC on behalf of the Exide Technologies Corporation (Exide) facility (Site), located at the address listed above.

The Exide facility in the City of Vernon is an actively operating battery recycling facility. Prior to 1922, a portion of the property was occupied by a meat rendering plant while other areas were quarried for gravel. Since 1922, lead smelting and metals processing operations have occurred onsite.

Printed on Recycled Paper

Contaminants-of-concern (COCs) at the Site include volatile organic compounds (VOCs); primarily trichloroethene (TCE), and inorganics; primarily antimony, lead, arsenic, cadmium, and zinc. Elevated sulfate, inorganics, VOCs, and low pH (acidic) conditions also continue to occur in groundwater.

GSU staff reviewed Exide's *Work Plan for Off-Site Soil* (Work Plan), dated November 13, 2013, and recommended that the Work Plan be revised. In response to DTSC's comments, the Work Plan was revised and resubmitted to DSTC on November 15, 2013, and approved by DTSC on November 18, 2013.

The objective for this effort was to determine if soils at residential properties and two school sites within the Northern and Southern Assessment Areas, selected based on air dispersion modeling conducted by Environ International Corporation (Environ) to estimate the locations of the Maximum Exposed Individual Resident (MEIRs), contain metals and other COCs and constituents-of-potential-concern (COPCs) that exceed background concentrations and/or Residential Soil Screening Levels (SLs). As part of the implementation of the Work Plan, a background study was performed for metals in an area selected by Exide and approved by DTSC.

Based on our review of the Report, GSU recommends that Exide perform the following action items:

1. Since most of the composited samples reported lead above the SLs, discrete lateral and vertical soil sampling should occur at each residence to determine the area of impact. To limit the number of discrete samples needed to characterize each affected area, archived discrete soil samples could be analyzed for lead provided that sufficient volume remains, and holding times (typically six months from the collection date for metals) are not exceeded.
2. In partial fulfillment of the project data quality objectives (DQOs) for off-site characterization of lead exceeding the SL in soil, Exide should expand the sample areas outward to at least double the sample areas of the MEIRs. Composite soil sampling is acceptable, provided that Exide understands that discrete soil sampling may become necessary later on.
3. A concentration of lead above the hazardous-waste level (1,000 mg/kg) was initially detected in a composite sample at one residence during the study. While Exide re-analyzed this sample and re-reported this sample at a much lower concentration, albeit still above SLs, Exide has failed to adequately rationalize why the

initial sampling effort is not representative. Exide must immediately re-assess this property and perform interim measures to mitigate this threat to the residence.

We also recommend that the Report be revised in accordance with the comments provided in this memorandum and resubmitted. Our comments on the Report are as follows:

GENERAL COMMENTS:

1. Exide's Report seems to attribute much of the lead detected in the residential areas to lead-based-paint (LBP) and to a lesser degree on lead from leaded gasoline. In fact, very little discussion focuses on stack emissions from the Facility, or what contributions to lead in residential soil have occurred from Exide. Given the overall nature of the urban environment for the Greater Los Angeles (GLA) area, the GSU never expected Exide to be the only source of lead to the Northern and Southern Assessment Areas (or, for the purposes of this memorandum; MEIRs). However, the results of our evaluation of their data do suggest that Exide is a major contributor. Our opinion is based on the following factors:

    - The sampling protocol appeared to have been consistently followed between the Background Area (BA) and the two MEIRs.
    - The sampling protocol was specifically designed to be sensitive to avoiding soils that could be tainted by LBP (i.e., five-feet away from housing drip-lines, entry-ways, and paved surfaces to the extent practicable).
    - In general, lead concentrations are significantly greater in the two MEIRs than in the BA.
    - In nearly all instances, lead detections exceeded the soil screening level for lead (80 mg/kg) at the two MEIRs. In one residence in the Northern MEIR, lead was detected at a maximum concentration of 2,030 mg/kg. Note: as stated above, Exide re-analyzed this sample and re-reported this sample at a much lower concentration. However, Exide has failed to adequately rationalize in the Report why the initial sampling effort is not representative.
    - For the MEIRs, the average lead concentration was 187 mg/kg for soil samples that were sieved. For unsieved samples, the average lead concentration was lower at 168 mg/kg. By comparison, the average lead concentration in the BA was 82 mg/kg for sieved samples, and slightly lower at 80 mg/kg for unsieved samples.

- Leaded gasoline (tetraethyl lead or TEL) was banned in early 1996 by the U.S.EPA. The use of TEL was being steadily phased out well before then and was already banned for sale in California by January 1, 1994 by the California Air Resources Board. Therefore, it is highly unlikely that lead impacts from TEL, particularly in surface and near-surface soil, would still show significant impacts after more than two decades. Regardless, we would consider any residual TEL to already be part of the urban lead footprint or background lead.

The Relative Percent Differences (RPD) for the average lead value between the BA and the MEIRs is also significant for samples that were sieved. The RPD for the BA was calculated at 2.5 while the RPD for the MEIRs was 10.7. The higher RPD at the MEIRs suggests that a larger proportion of lead occurs in the finer fraction (i.e., the fraction that passes through a No. 60 sieve) in soil samples collected from the MEIRs than in the BA.

Furthermore, comparing the sieved to the unsieved samples using linear regression analysis and adding a 'best-fit' line to data points plotted on an x,y graph, the r-squared value for the slope-intercept line was 0.54 for the MEIR samples verses an r-squared of 0.98 for the BA samples. The difference in r-squared results show a poor correlation between the MEIR sieved verses unsieved lead results while the BA results clearly show excellent correlation between the two data sets. This provides another line of evidence that the MEIRs are significantly more contaminated by fine lead than in the BA.

The data also seems to suggest that a greater proportion of fine lead dust occurs in the upper inch of soil. This can be seen at composite soil sample 'SS-MEIR-N-04-1' where the sieved lead result was 338 mg/kg and the unsieved result was only 164 mg/kg. The %RPD between these two values is 69 percent. In contrast, the next lower sample interval (1-3 inches) reported a higher lead result in the unsieved sample (330 mg/kg) than in the sieved sample (243 mg/kg) with a %RPD of 30 percent.

The data also shows greater differences between the Northern MEIR sieved verses unsieved lead results and the Southern MEIR. In the Southern MEIR, the highest %RPD is 24 ('SS-MEIR-S-13-3') whereas, as already mentioned above, the highest %RPD for the Northern MEIR (and for the study in general) was 69 percent ('SS-MEIR-N-04-1'). This suggests that a greater proportion of lead dust occurs to the north of the Facility than to the south. This is not unexpected since the predominant wind direction for most of the GLA area is from the southwest (SW) to the northeast (NE). The data also suggests that a

significant contribution of fine lead dust being deposited on the MEIR soil is relatively recent and likely ongoing. However, these are preliminary findings only and additional data will be needed before a more definitive assessment can be made. Exide is free to utilize various lead-fingerprinting techniques to help determine if the lead came from sources other than stack emissions (e.g., LBP, TEL). Without this kind of level of effort, we cannot agree that the lead is not coming from Exide.

2. In their Report, Exide appears to discount the background data by attributing much of the lead detected in the soil in the MEIRs to LBP. Exide selected the Background Area (BA) on the basis of, as described in Section 2.4 ('Define the Study Boundaries') of the approved Work Plan, "proximity to major freeways, a historically industrial area absent the Exide Facility or other secondary lead smelter, and a sizable rail yard with intermodal facility and switching yard. The housing stock is similar in age, size and density to the assessment areas and was constructed on areas that were previously farmland".

   Despite following the same sampling protocol for both the BA and the MEIRs, (i.e., staying away from drip-lines, downspouts, entry-ways, paved surfaces, etc.), Exide states that the LBP content in the soil is likely higher in the MEIRs than it is for the BA due to the difference in the median age of the houses. We believe that this evaluation should be made on a case-by-case (i.e., house-by-house) basis, and not by using the median age. Our reasons for this are as follows:

   - Not all the houses in the BA were built after World War II (WWII). In fact, the oldest residence in the BA was built in 1929, and the highest lead detected there was only 64 mg/kg ('SS-BG-06-6'). In contrast, the most recent house in the two MEIRs is dated 1991 (Northern MEIR), or more than a decade after the U.S. Consumer Product Safety Commission (USCPSC) banned the use of LBP for residences (1978). The highest lead detected there was 109 mg/kg ('SS-MEIR-N-15-6'). Given the remote possibility that LBP was used at this property, we believe that most of the lead detected here came from lead dust particulate.

   - Unfortunately, neither of the above-mentioned samples was sieved to determine the concentration of the fine lead fraction. However, composite sample 'SS-MEIR-N-09-1' was collected from a post-WWII residence (built in 1951) and sieved. The sieve lead result was 202 mg/kg and the unsieved result was 163 mg/kg, with a %RPD of 21 percent. For the BA, 'SS-BG-08-1' was collected from a residence built in 1938 and this sample was also sieved. The sieved lead result was 136 mg/kg and the unsieved lead result was

132 mg/kg. The RPD between these two results is approximately 3 percent. These results suggest that there's very little difference between the lead concentrations in the sieved sample verses the unsieved at this background location with a pre-WWII-constructed house.

The data also shows that the MEIR sample has a significantly greater amount of fine lead particulate, which, given the sample depth (0-1 inch), was probably recently deposited, and is more likely related to fallout from stack emissions from Exide than it is from LBP or TEL.

- The highest detection of lead in the BA was 195 mg/kg ('SS-BG-08-3') at a residence with a house built in 1929. In contrast, the highest lead detected in the two MEIRs was 2,030 mg/kg ('SS-MEIR-N-14-6') at a residence with a house that was built in 1922, or not much older than the background house with the highest lead result.

In conclusion, comparing the sieved to unsieved sample results seem to lend further credence that the area selected to represent background for Exide was appropriate. It also suggests that there is little evidence in this case to support Exide's argument regarding using the median age of the housing as a basis for attributing the presence of lead detected in soil in the MEIRs to LBP.

3. According to Section 2.2, '*Identify the Decision*' in Exide's Work Plan, "If the comparison shows that detected COPCs in soil exceed background and the applicable RSL or LAUSD arsenic soil screening level, and are consistent with emissions from the Exide Vernon facility, then the next phase of sampling will be conducted as defined in an amendment to this Work Plan to determine the lateral extent of impact. If the comparison shows that the constituents in the soil are below background or the applicable RSL or LAUSD arsenic soil screening level, then no further sampling is required". Since the data clearly shows lead above the 80 mg/kg background/SL, and, as discussed in the above comment, appears to be generally consistent with stack emissions from the Facility, then it stands to reason that the next step would be for Exide to proceed with the next phase of sampling. Therefore, we request that Exide submit a Work Plan amendment to the department that addresses this next phase.

4. In addition to the individual property sketches (already included in Appendix B), Exide should include, for each MEIR and the BA, new figures that more clearly show the sampled areas. These figures should show, at a minimum, the major streets, the sample locations,

the sample location identifications, and boxes presenting the analytical results (presenting lead concentrations only is acceptable) detected in the soil samples for each sample depth interval.

5. The Report is missing a section that discusses quality analysis/quality control (QA/QC) procedures that were followed. The Report only states (Section 5.0, '*Sampling Results and Data Evaluation*') that they performed a Level I review and data validation, but did not provide any detail on the data review. Report is also missing a discussion on how the project DQOs listed in the Work Plan were met.

6. The Report should also discuss any deviations from the Work Plan. For instance, Figure 5 in the Work Plan, titled '*Northern School Sample Locations*', shows six proposed sample locations while the Report shows only four. Figure 6 in the Work Plan, titled '*Southern School Sample Locations*', shows a different distribution of proposed soil sample locations on the property than is shown in the Report. The Work Plan also states that five subsamples will be collected at each school (Section 3.0, '*Sample Location and Frequency*', page 3-1) when only four samples were composited at the Northern School ('Volunteers of America, Salazar Park Head Start Pre-School'). We request that Exide provide supporting documentation indicating prior concurrence from DTSC for these apparent deviations from the Work Plan in the revised Report.

SPECIFIC COMMENTS:

1. Section 1, Introduction, Page 1: The date for the approved Work Plan appears to be a typographical error. The actual date of the approved plan is November 15, 2013, not November 13.

2. Section 5.2.1, Inorganic Constituents, Page 5-5: Exide states only that, for hexavalent chromium, all results "were below the detection limit". The SL for hexavalent chromium is 0.29 mg/kg. To be clear, Exide should identify the laboratory detection limit in the text and/or table or state in the text that all hexavalent chromium results were below the 0.29 mg/kg SL in the revised Report.

3. Section 6.0, Conclusions, Pages 6-1 to 6-5: We have several comments on this section of the Report. These are as follows:

    - Item No 3, Page 6-1: Exide states that no lead in the top one-inch exceeded the California Department of Public Health (CDPH) "hazard level for bare soils where children play of 400 mg/kg". As a result, Exide states, there is "no need for immediate action based on the observed results". GSU defers to the project toxicologist as

far as the cleanup level, and if immediate action, are warranted. However, we still recommend that additional investigations occur to determine the lateral and vertical extent of lead in soil above the SL.

- Item No. 5, Page 6-2: We disagree with Exide's rejection of the 2,030 mg/kg lead result, which they refer to as 'anomalous'. An outlier, certainly, but Exide provides no reason why this result is not representative of 3-6 inch depth soil conditions at this property. There were no issues reported by the analytical laboratory with this sample result. In our experience, it is not uncommon, given the general heterogeneous nature of inorganics in soil, to produce widely-varied results from the same sample interval. Therefore, we recommend that this result be included in the data evaluation. As stated earlier in this memorandum, we also recommend that lead in soil at the residence where this detection occurred be immediately mitigated so it no longer poses a human-health hazard.

- Item No 6, Pages 6-2 to 6-3: As previously noted, GSU disagrees with Exide's use of median home age as an indicator of the source of lead in soils. In addition, Exide's statement that the Northern MEIR has "more heavily trafficked secondary roads" is confusing since they do not state what areas are being comparing to the Northern MEIR. This also appears to be purely speculative since they do not support this statement with data.

- Item No. 7, Page 6-3 (1st and 2nd Bullets): As previously noted in the above comment (please see General Comment No. 2, above), when comparing the BA sample data to the MEIRs, lead does appear to accumulate in the finer fraction or the fraction that passes through a No. 60 sieve. The data also suggests that fine lead particles are more prevalent in the surface (0-1 inch) than at deeper sample intervals. We recommend that Item No. 7 be revised as a result.

- Item No. 7, Page 6-3 (3rd Bullet): We disagree with Exide's conclusion that there is no discernable pattern to the data. Instead, our evaluation of the data shows that lead concentrations do decrease with distance from the Facility. As presented on Figure 6 ('*Relationship between Surface Soil Lead and Distance from the Facility*') in the Report, the Northern MEIR, located between 3,500 and 4,000 feet north of the Exide Facility, reported several detections of surficial lead significantly greater (up to 342 mg/kg) than reported for the Southern MEIR (no detections greater than 174 mg/kg), located between 3,500 and 4,500 feet to the south. The Northern MEIR reported a median lead concentration of 162

mg/kg. The Northern School, located approximately 6,400 feet to the north, reported lead less than 100 mg/kg. The Southern MEIR reported median lead level at 134 mg/kg. The Southern School, San Antonio Elementary School, located 9,500 feet south-southwest, reported lead less than 80 mg/kg.

Taking into account the spread in distances of the four sample areas relative to the Facility, the prevailing wind direction (SW-NE), and the soil sample results for lead collected during the prior off-site dust and soil investigation (ongoing) from several sample points strung out between the Facility and the MEIRs, the data does show decreasing concentrations overall with distance from Exide.

To conclude, we disagree with Exide's request to postpone addition residential soil sampling until the step-out sampling and risk assessment calculations are completed. Exide's statement that there is no "clear relationship between the observed soil concentrations and the facility" is unsupported by the data. The residential areas north and south of the Facility have not been adequately characterized for lead above the SL. Therefore, the current data set is insufficient and does not satisfy the project DQOs. Until additional sampling occurs, GSU considers the completion of a risk assessment to be premature. Instead, we believe that Exide should proceed with the next step; which, as shown on Exide's '*Decision Tree for Evaluation of MEIR Data*' (Figure 4 of the Work Plan), is to prepare an amendment to the Work Plan for additional work.

4. Table 10, Sieved and Unsieved Samples Soil Lead Results: Rather than lumping data sets from the BA study with the MEIRs into one table and the calculating one set of average and median concentrations for lead, GSU recommends separating these two data sets and determining individual averages and median values for the BA and the two MEIRs. Likewise, Figure 4 of the Report, '*Sieved vs. Unsieved Sample Lead Concentrations*', should probably be split into two figures showing the distribution of each individual data set.

Questions regarding the memorandum should be directed to Todd Wallbom at (818) 717-6622.

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Deborah O. Raphael, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

TO: Peter Ruttan, P.G.
Project Manager
Brownfields and Environmental Restoration Program
Sacramento, California

FROM: Shukla Roy-Semmen, Ph.D.
Staff Toxicologist
Human and Ecological Risk Office
Cypress, California

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 leadspread (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:

William Bosan, Ph.D.
Senior Toxicologist
Human and Ecological Risk Office