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DATE: March 10, 2010

SUBJECT: GROUP 2 RCRA FACILITY INVESTIGATION (RFI) REPORT
SANTA SUSANA FIELD LABORATORY (SSFL)
VENTURA COUNTY, CALIFORNIA.

PCA: 22120 SITE: 300122-48 MPC: 37-HWMP

DOCUMENT REVIEWED

Draft RCRA Facility Investigation Santa Susana Field Laboratory Ventura County, California (3 volumes). Prepared by CH2M HILL. November 2008. (Group 2 Report).

INTRODUCTION

As requested, the GSU of the Department of Toxic Substances Control (DTSC) has reviewed the above referenced report for the Group 2 RFI sites. The report was prepared by CH2M HILL for the National Aeronautics and Space Administration (NASA). The GSU also reviewed selected items from among electronic copies of 1495 historical and reference documents submitted with the Group 2 Report. The historical documents include multiple copies of some documents and documents not directly applicable to Group 2. The Group 2 Report and associated historical documents can be accessed at http://www.dtsc-ssfl.com.

The Group 2 RFI reporting area is comprised of NASA Area I, the northern portion of NASA Area II, the northwestern portion of Boeing Area I, and the eastern portion of the

Boeing “Undeveloped Area” north of the SSFL property (see Group 2 Report Figure 1.1.2.3-1). The Group 2 area includes five RFI sites: the former liquid oxygen (LOX) plant, the Area II landfill, the Expendable Launch Vehicle (ELV) area, the Area II sewage treatment plant (STP), and the former incinerator and ash pile. Due to their close proximity, the Group 2 Report addresses the STP and the incinerator and ash pile sites as a single RFI site. The Group 2 report presents background information, characterization data, risk assessment results, and site action recommendations for the reporting areas.

GSU defers to the DTSC project hydrogeologists and toxicologists from the Human and Ecological Risk Office for all sections within Volumes I, II, and III pertaining to groundwater and human and ecological risk evaluation. Separate memoranda will be provided specific to groundwater, human health risk assessment and ecological risk assessment.

Based on our review, it is the opinion of the GSU that the Group 2 report is significantly deficient and requires extensive revision before detailed review to identify data gaps is performed. General and specific comments and recommendations are presented below. If you have any questions or comments regarding this memorandum, please contact Tom Skaug at (916) 255-6523 or tskaug@dtsc.ca.gov.

GENERAL COMMENTS AND RECOMMENDATIONS

1. The report text is generally incomplete and inadequate in the level of substantive detail provided regarding site background and history, previous and current investigative efforts and results, and validation of data quality. Previous RFI reports, and DTSC comments on those reports, should be reviewed for better understanding of the level of detail expected. Organization consistent with the format established for previous reports would also be helpful.

   The report should provide sufficient detail, either directly or through clear reference to other, readily available documents, to allow independent evaluation of the report findings and conclusions by the reviewer. For example, supporting data for soil vapor sampling results should include: 1) sample chain of custody forms, 2) field sample collection forms, 3) leak detection testing data, 4) laboratory data reports, and 5) chemical validation reports. Due to the volume of analytical testing, copies of laboratory reports should be submitted electronically, using a searchable format.

   The revised Group 2 Report must include chemical data tables organized to clearly communicate: 1) Description of Chemical Use Areas, 2) Chemical Use Investigation Areas, 3) Risk Based Screening Levels (RBSLs), and 4) All Site Characterization Chemistry Data. The report must also include an organized presentation of all relevant investigation data including: 1) soil boring logs, 2) soil removal action reports, 3) tank removal closure reports, 4) RCRA area clean closure reports, 5) utility location and investigation reports (i.e. sanitary sewer, septic systems and

leach fields, reclaimed water system, liquid oxygen tank and piping system, liquid petroleum piping system, and other compressed gas tank and piping systems).

2. GSU reviewed selected historical documents provided as electronic files contained in a portable hard-drive. A number of documents were identified indicating chemical usage or other concerns at different areas within the Group 2 RFI reporting area that are not identified in the report text or figures. Such documents were found in Historical Document Management System (HDMS) folders for Group 2 and folders for other groups. In addition, many documents relevant to other RFI groups, but not Group 2, were identified in the Group 2 folder. It is not DTSC's responsibility to identify all historical chemical use/release areas. That responsibility lies with the responsible parties. DTSC's role is to provide regulatory oversight and review of the scope of work conducted to ensure that the RFI program objectives are attained. Ultimately, GSU's role in report review should be more of detailed spot-checking of the RFI Report and relevant references, rather than conducting a time-intensive review of the historical documents in order to point out deficiencies in the investigation. All historical locations potentially having chemical use and/or releases indicated in any of the submitted historical documents must be addressed and all chemicals identified at each location must be investigated accordingly.

3. The quality of report figures and tables indicates careless quality control in their preparation. There are many discrepancies between different figures, discrepancies between figures and the report text and tables, many features on the figures are not identified, and some features are misidentified. There are many errors on the data tables and discrepancies between tables and other data sources. Some discrepancies and errors on the figures and tables have been discussed in email communications between CH2M HILL and the GSU reviewer. All figures and tables should receive thorough quality control review and revision as necessary before the report is resubmitted.

4. The Group 2 Report does not include any explanation for how sample locations, depths, or constituents analyzed were selected. Without an understanding of the rationale for the exploration that was performed the reviewer can only speculate as to the intent of the exploration program for individual chemicals. The Group 2 Report should be revised to include the rationale for investigation of specific chemicals at each RFI site.

5. In many instances, the professional judgment used in determining whether or not the extent of soil affected by a chemical of concern has been adequately characterized is questionable or clearly deficient. Some examples of issues of professional judgment are presented in items a through f, below. The report should be reviewed and revised as warranted.

    a) The DTSC-approved Standardized Risk Assessment Methodology (SRAM; MWH, September 2005) clearly indicates that the method reporting limits (MRLs)

for samples should be at or below a concentration that is associated with toxicologically relevant levels. Figures and tables do not distinguish analytical results where a chemical was not detected but the detection limit is greater than the screening criteria, and such data points are cited as indicating adequate characterization. As a result, the presence and/or extent of chemical impact at some sites is inappropriately concluded to be adequately characterized. At the LOX site for example, of 17 Aroclor 1254 samples located outside of the limits of the SWMUs, none had reported PCBs but 15 had reporting limits greater than the screening criteria. At SWMU 4.6, 3 of the 4 samples analyzed for PCBs were non-detect but had reporting limits from 2 to 10 times the screening criteria.

b) The horizontal extent of some areas of chemical impact is concluded to be adequately characterized without sufficient basis. For example, the horizontal extent of Aroclor 1254 at the LOX site is concluded to be "addressed sufficiently" but there are no constraining samples to the south of the two exceedance locations and most samples that constrain the likely extent of impacted soils (i.e. samples with concentrations less than the screening criteria) are located 100-200 feet away from the exceedance locations.

c) The vertical extents of some areas of chemical impact are concluded to be adequately characterized without sufficient basis. At the LOX site for example, Aroclor 1254 exceedances were reported in subsurface soil at two locations and deeper samples were not collected at either location. The text states, "…there are multiple locations in the vicinity … that were analyzed for PCBs in similar or deeper sampling intervals" and "The vertical extent of PCB Aroclors in the LOX Plant area has been evaluated adequately." However, the two subsurface PCB samples nearest exceedance location LXTSTP04 are about 40 feet away (to the west and west-northwest), too far for evaluation of vertical extent at the exceedance location. Further, one of those samples was at the same depth as the exceedance (5.5 feet) and the other was only slightly deeper (7.5 feet), of questionable value for evaluating vertical extent unless located much closer. All other subsurface sample locations analyzed for PCBs appear to be 100 feet or more away. This example, like many others, is difficult for the reviewer to evaluate because the samples considered to constrain the exceedance extent are not listed in the text and are not identified on the figures.

d) The evaluation of the extent of chemical impacted soil considers the horizontal extent around locations where exceedances are detected in surface soil, and considers the vertical extent at exceedance locations, but does not fully consider the possible three-dimensional extent. For example, where Aroclor 1254 exceedances were reported in subsurface soil, the report discusses the vertical extent, essentially defining a vertical column, but does not consider the possible subsurface horizontal extent.

e) The scale of characterization is frequently not sufficient to delineate the volume of contaminated media to within an order of magnitude of the total volume of contaminated media, the criteria agreed to by DTSC and the responsible parties for previous RFI Reports (DTSC, 2008). For example, each of the two exceedances for PCB-1254 in surface soil at the LOX site have very large areas around them with no analyses for PCBs, yet both might be small, isolated "hot spots."

f) In addition to characterizing the three-dimensional extent of soil exceeding chemical screening criteria, the concentrations present should also be characterized but there is no discussion of this issue. For example, considering the few surface soil samples analyzed for Aroclor 1254 and broad spacing between samples (as shown on Figure 2.4-5), there is not sufficient data to conclude that the reported concentrations are appropriate for use in the risk assessments. However, based on the inadequate available data, Aroclor 1254 was concluded not to present a human health or ecological risk requiring further action.

g) The interpretation of exceedance extents does not discuss, and might not include, consideration of potential sources, release mechanisms, or migration. For example, the known re-grading of the LOX site after plant demolition suggests that surface distribution of contaminants may be complex and irregular. The text discussion of LOX site subsurface locations with exceedances of Aroclor 1254 states that "Neither location … had a PCB Aroclor exceedance reported in the surface soil." In surface soil, Aroclor 1254 is reported at seven locations, including two that exceed the screening criteria, but none of the seven locations have exceedances in the subsurface. These conditions suggest that if PCBs were released to the soil from electrical transformers, a common source, it is possible that subsequent re-grading of the site has distributed the PCB contaminated soil around the site surface, making the presence or absence of PCBs in the surface soil an unreliable indicator for the presence or absence of PCBs in the subsurface soil.

6. Professional judgment also appears to be deficient in considering the importance of subsurface conditions to site characterization. The only subsurface exploration logs included in the report are those for wells and piezometers. During our review, the GSU requested that CH2M HILL provide "logs for all wells, piezometers, borings (including shallow soil sample borings) and test pits located anywhere within the Group 2 area" (email communication dated 3/27/09). In response, some additional exploration logs were received but many were not provided. At the Landfill site for example, the number of exploration locations indicated by the report text and Figure 3.4-1 (Sample Locations), and the number of logs that have been provided are summarized below:

	Report Text	Figure 3.4-1	Logs Provided
Surface soil (0-2 ft)	87	79*	27
Subsurface soil (>2 ft)	52	51	5
Soil Vapor	33	33	5
Trenches	13	0	0

*The lower number of samples on the figure might be due to the shallow sample symbol not printing where deeper samples were also collected.

For a landfill, exploration logs are necessary to evaluate the horizontal distribution of waste material, variations in waste thickness, and contents of the fill material. The test pits and trenches were excavated at the landfill specifically for these purposes (MWH, 2003). In response to repeated requests for the logs, an email from CH2M HILL (6/18/09) stated, "An attempt will be made to obtain the MWH report referenced prior to revising the next version of the RI." It therefore appears the CH2M HILL evaluation of the landfill was performed without information from the trench logs. While most significant for the landfill, the presence and distribution of fill soil might be significant to correctly interpreting conditions at any of the RFI sites.

7. Subsequent to characterization efforts described in the Group 2 Report, a survey of the sewer system, a survey of debris locations, and preparation of building feature logs has been completed for Area II. While results of these efforts might not have been complete at the time the report was prepared, they all are expected to provide information significant to site characterization. The revised report should incorporate these studies into data presentations and analysis of site conditions.

A list of specific items noted during GSU review is provided below for use during revision of the report. It should be understood that this list is not comprehensive and resolving only the items listed will not be sufficient to resolve the issues discussed in this memorandum.

SPECIFIC COMMENTS AND RECOMMENDATIONS

1. Title Page In order to avoid confusion with other reports, the report title should clarify that this report is limited to evaluation of the Group 2 area.

2. Section 1.1.3 Scope and Objectives of the Group 2 RFI Report The first sentence indicates that the RFI report presents findings and recommendations for the northern portion of Area II. As shown on Figure 1.1.2.3-1, Group 2 includes property outside Area II that should also be addressed by the report. The report should discuss and incorporate data from all studies within the Group 2 boundary, and should include discussion of ongoing studies within the boundary (e.g. the "offsite" debris survey).

3. Section 1.2.4 SSFL Surface Water Features The last paragraph of this section states that, "Three seeps or springs have been identified within the northern drainage on BBI property …". This statement appears to refer to features S-13, S-17 and S-25 as shown on Figure 1.2.4-2. However, this figure also shows two features (S-8 and S-18) within the limits of the Group 2 study area, located along an ephemeral drainage path in the undeveloped area north of the ELV area. Several features are not shown on Figure 1.2.4-2 that are present on Figure 6.1-1 or on Figure 1-6 in the Offsite Data Evaluation Report (MWH, 2007). Also, a pond identified on aerial photographs (EPA, 1997) as "standing liquid" is located in a southwesterly flowing drainage located northwest of the LOX site but is not described in the text. The text should be revised to better describe the occurrence of seeps, springs and the pond, and the discrepancies between figures should be resolved (also see specific comments regarding the figures).

4. Section 1.3 Previous Investigations, Interim Actions, and Monitoring The first paragraph indicates this section presents the primary investigations and actions referenced for the Group 2 RFI, but paragraphs 2, 3, 5 and 8 relate investigations/actions that applied to the whole of SSFL. For example, interim groundwater measures discussed in the second paragraph apply to the site as a whole, and measures applying to Group 2 are not evident from review of the cited reference (MWH, 2004). The second paragraph should be revised, including appropriate references, to clarify that one groundwater interim measure, associated with SWMU 5.4, was performed in Group 2. Paragraphs 3, 5 and 8 should be similarly revised to relate them specifically to Group 2.

5. Section 1.3 Previous Investigations, Interim Actions, and Monitoring The text should be revised to provide references for activities described in paragraphs 4 and 6.

6. Section 1.3 Previous Investigations, Interim Actions, and Monitoring Paragraph 9 discusses the Building 2231 PCB storage facility and indicates it is SWMU 5.2 as does page 1-8 of the indicated reference, the Surficial Operable Unit RFI Program Report (MWH, 2004). However, discussion of the report scope in Section 1.1.3.1 and discussion of the ELV area in Section 4 indicate that the PCB storage facility is SWMU 5.3. In addition, the reference does not discuss details regarding PCB storage facility closure. This discrepancy between cited SWMU numbers should be resolved and appropriate reference(s) provided.

7. Section 1.3 Previous Investigations, Interim Actions, and Monitoring Paragraphs 9, 10 and 12 indicate previous investigation and other activities but the indicated reference (MWH, 2004) does provide any details regarding the activities. Please provide the appropriate references.

8. Section 1.3 Previous Investigations, Interim Actions, and Monitoring In paragraph 11, the reference regarding interim measures discussed in the first sentence should

be “MWH, 2005a,” not “MWH, 2005.” The second sentence indicates further investigation was conducted in the interim measure area but the reference provided (DTSC, 2005) is for a memorandum approving the interim measures report. The sentence should be revised to clarify relevance of the reference or more appropriate reference (e.g. work plan) provided.

9. Section 1.3 Previous Investigations, Interim Actions, and Monitoring Paragraph 13 indicates a previous phase of investigation in the area of Buildings 2758 and 2758a. Please provide the appropriate reference(s) for the first phase of investigation.

10. Section 1.3 Previous Investigations, Interim Actions, and Monitoring Paragraph 14 discusses removal of asbestos-containing material in the area of the LOX plant. However, the reference provided is to a work plan for the removal action. Reference to a report documenting the completed work should be provided. The text should indicate the location of the abatement and reference a figure where the abatement location is shown. The “asbestos abatement” included soil sampling and analysis and soil excavation and removal that should also be discussed.

11. Section 1.3 Previous Investigations, Interim Actions, and Monitoring Paragraph 14 discusses removal of asbestos-containing material from “an ephemeral drainage.” Other sections of the report refer to this drainage as a “small ephemeral drainage ditch” (e.g. Section 2.3.3). This drainage is a significant surface water feature at SSFL, generally known as the “Northern Drainage,” and is referred to as such in the discussion of SSFL surface water features (Section 1.2.4). The text of this and other sections that include mention of the Northern Drainage should be revised to refer to it by that name.

12. Section 1.3 Previous Investigations, Interim Actions, and Monitoring In order to clarify the extent and chronology of site characterization, a table summarizing information presented in this section should be provided.

13. Section 1.5.3.1 Data Evaluation Under “Data Source Review,” this section states that, “Data collected during the Group 2 RFI are considered current, while data collected before the Group 2 RFI activities are considered historical.” Based on data in Appendix G it appears that RFI soil sampling occurred as early as 1993. This section also indicates that the quality of historic data (sampling and analytical techniques, etc.) was reviewed before the data was used in the Human Health Risk Assessment (HHRA).

    Discussions of HHRA specific to different areas of the site (e.g. Section 2.7.1.1) state the data was evaluated in accordance with the protocol in Section 1.5.3.1 but does not indicate the results of that evaluation: specifically, was any data excluded from the HHRA based on this review? If data was excluded from use in the HHRA, was it also reviewed to consider its suitability for site characterization?

Considering that some RFI sampling was performed more than 10 years ago, the GSU recommends that quality review applied to historic data be applied to all data used for site characterization and in the HHRA. Methods of collecting soil samples for VOC analysis and for collecting soil gas samples are a particular concern. The specific results of HHRA data screening, suitability of data screened from the HHRA for use in site characterization, and evaluation of RFI data using historic data criteria should be provided to DTSC for review. (Also see comment regarding Section 1.7)

14. Section 1.5.3.3 Exposure Assessment Discussion in this section indicates that "… complete or potentially complete pathways include direct contact with soil, sediment, weathered bedrock, surface water, air, and groundwater (including seeps and springs), as well as indirect exposure to chemicals in soil via uptake into plants." Exposure pathways specific to each Group 2 area are discussed in later sections of the report (e.g. Section 2.7.2.2). However, complete and potentially complete exposure pathways as shown on the Conceptual Site Model, Figure 1.5.3-1 are not consistent with those described in the text. This discrepancy should be resolved.

15. Section 1.5.3.5 Risk Characterization The reference appearing near the top of page 1-36 (Cal/EPA, 2006b) does not appear in the reference list. The missing reference should be provided.

16. Section 1.7 Data Quality Evaluation Summary This section states that the analytical data were assessed in accordance with the Surficial Media Operable Unit Quality Assurance Project Plan (RFI QAPP) (MECx, June 2008). However, Section 2.0 of the SRAM indicates that the data assessment is to be in accordance with five criteria discussed therein, which includes many items not discussed in the RFI QAPP. Data assessment in accordance with SRAM criteria should be performed and a summary of the methods, findings and conclusions provided to DTSC for review. (Also see comment regarding Section 1.5.3.1)

17. Figure 1.1.1.1-1 Site Plan The legend shows symbols identifying Chatsworth Formation and Near Surface groundwater wells that are effectively indistinguishable and the figure does not show many wells that are indicated by other figures (e.g. Figure 5.3.2-1). The figure should be revised to show and distinguish between all relevant wells or the wells should be deleted from the figure.

18. Figure 1.2.4-2 Seeps and Springs in the SSFL Vicinity This figure does not show four features (S-30, S-31, S-33a and FDP-424) that are shown on figure 6.1-1 and does not show feature S-32 shown on Figure 1-6 from the Offsite Data Analysis Report (MWH, 2007). A symbol for a feature located north of the undeveloped area and west of feature S-18 is unlabeled. These discrepancies should be resolved.

19. Table 1.5.3-6 Dermal Absorption Factors The note "NEED TO CHECK VALUES," highlighted in yellow, appears below the table. The values presented in the table should be verified and the note removed.

20. Section 2. Liquid Oxygen (LOX) Plant In the third paragraph, consider use of em dashes or en dashes set open (i.e. spaces on both sides of dash) to clarify that "soil-benzidine" is not hyphenated.

21. Section 2.1 LOX Site Background and History The text should be revised to include discussion of the use of solvents to clean LOX tanks and pipes.

22. Section 2.1.1 SWMUs and AOCs This section states that, "The LOX Plant Waste Oil Sump and Clarifier has been designated as SWMU 4.5 ...". However, Figure 2.1-1 and other figures identify SWMU 4.5 as encompassing the entire LOX plant area, including a small area within the SWMU that is identified as the sump and clarifier. The text should be revised to better describe and distinguish between the limits of the physical sump and clarifier and the larger SWMU.

23. Section 2.1.1 SWMUs and AOCs This section states that, "… the LOX Asbestos and Drum Disposal Site has been designated as SWMU 4.6." Figure 2.1-2 indicates SWMU 4.6 as completely within the western portion of SWMU 4.5, while Figure 2.3.2-1 shows SWMU 4.6 as much larger and extending partly beyond the western limit of SWMU 4.5. In addition, Figure 2.3.2-1 indicates another asbestos debris area east of SWMU 4.5. The text should be revised to better describe the location and limits of SWMU 4.6 and to include description of the eastern asbestos debris area if it is not part of SWMU 4.6.

24. Section 2.1.2 Site History The second paragraph indicates that the sump, pit and clarifier were removed in 1993 as part of an accelerated cleanup program and that the LOX plant foundations were removed in 1996. References for these actions should be provided and the text should be revised to include a brief summary of the removal action, including feature dimensions, sampling performed, and significant findings.

25. Section 2.1.2 Site History The third paragraph indicates asbestos removal in late 1980's. However, paragraph 3 of Section 1.3 indicates the removal occurred in 1990. This discrepancy should be resolved.

26. Section 2.1.2 Site History The third paragraph indicates that, in addition to asbestos, soil and empty rusted drums were removed from SWMU 4.6. The text should be revised to provide a summary of the removal action including the locations of drums within the removal area, volume of soil removed, range of soil removal depth, sampling performed, and summary of findings.

27. Section 2.1.2 Site History The fourth paragraph indicates that asbestos abatement was performed during 2007 at an ephemeral drainage east of the LOX plant. The reference given (Zenco, 2007) is a work plan for the removal action and should be replaced by a reference for a summary report prepared after the removal action.

This reference should also be provided for paragraph 14 of Section 1.3 and the last paragraph of Section 2.1.3.

28. Section 2.1.2 Site History A letter from Boeing dated 6/19/09 indicates that, in addition to asbestos containing material, the removal action included soil removal and that the combined removal volume was 2,500 cubic yards. The text should be revised to better describe the removal action, including depths of soil removal, sampling and analytical program, and summary of results.

29. Section 2.1.2.1 Site Inventories This section indicates that an inventory of site buildings, tanks, and transformers was completed and that the features are shown on Figure 2.1-1, but that the inventory is not included in the report because the features are no longer present. Knowledge of the location of specific features can inform evaluation of the adequacy of site characterization. The report should be revised to include the inventory (Also see comments on Figure 2.1-1).

30. Section 2.1.2.1 Site Inventories The first paragraph indicates that, "where information was available," chemical use inventories for site buildings, tanks, and transformers is included in Table 2.1-1. However, this table presents an inventory of chemicals for the site without distinguishing the chemicals for individual features. The text should be revised to clarify if chemical information for individual features is available and where such information is available (e.g. solvents used to clean LOX Tanks and lines) it should be provided on the table.

31. Section 2.1.3 Site Chemical Use Areas The second paragraph notes that there were no reported releases from the sump and clarifier but that soil staining was noted. The text should be revised to indicate that a leach pit was located adjacent to the sump and clarifier, as discussed in Section 2.1.2, and was presumably intended to dispose of effluent from the sump and clarifier through infiltration. The text should also note that, although no releases were reported contemporaneous with plant operation, soil contaminated by a release was identified at the site and interim remedial action performed.

32. Section 2.1.6 Historical Document Reviews This section indicates that a leach field was previously present at an unknown location west of the former LOX Plant. The report does not include any other mention of this leach field. Although the exact location is unknown, the text indicates the leach field "… was in an area where extensive soil and soil vapor investigations already have been completed …". The report text and/or figures should be revised to indicate possible limits of where the leach field might have been located. In addition, the text should be revised to include a reference for the source of information for existence and location of the leach field.

33. Section 2.1.6 Historical Document Reviews This section indicates that historical document review identified two new potential features, a leach pit associated with

the sump and clarifier and a septic leach field. The text should be revised to include references for the sources of information for existence of these features.

34. Section 2.1.6 Historical Document Reviews This section fails to note that historical document HDMSE01377048 indicates a concrete block with a radioactive label was found in this area. This information should be discussed in the text, including any information that can be obtained regarding its source and disposal.

35. Section 2.2.2 Sampling Scope The scope of sampling performed is discussed but nowhere does the report present the sampling rationale – the basis for sample locations and depths. In addition, nowhere does the report discuss the basis for selecting the suite of analytical methods for each sample.

36. Section 2.2.2 Sampling Scope The last paragraph indicates that four wells at the LOX Plant area were not sampled due to seasonally dry conditions. The text should note that an addendum or revised report will be provided when groundwater data is available.

37. Section 2.2.3 Key Decision Points The bullet point under the first paragraph indicates that a depth was not recorded for some samples and that a depth interval of between 0 to 2 feet was assumed for these samples. Since significant information (depth) is unknown for these samples, the text should be revised to clarify if these samples meet project data quality objectives. Also, see comment on Section 2.8.3.3.

38. Section 2.3 RFI Characterization Results The subsections under this heading summarize only a small portion of the chemical characterization. For clarity, the text should be revised to indicate where in the report more detailed descriptions of the chemical characterization results are presented.

39. Section 2.3.1 Soil Matrix and Soil Vapor Findings The first paragraph presents analytical results for samples of sludge collected from the Sump and Clarifier before these features were removed. The second paragraph presents analytical results for additional sludge samples collected from the Sump and Clarifier during the removal action. Historical documents (HDMSE00252511 through HDMSE00252535) indicate that other samples collected included sludge from the Leach Pit that was encountered during sump removal. Results of those analyses indicate Leach Pit sludge contained volatile organic compounds (VOCs) with combined concentrations of 30,160 micrograms per kilogram and semi-volatile organic compounds (SVOCs) with combined concentrations of 228,300 micrograms per kilogram (both totals include unidentified and/or tentatively identified compounds). The text should be revised to include this data.

40. Section 2.3.1 Soil Matrix and Soil Vapor Findings The reference for the second paragraph (Ogden, 1996c) is a work plan for further study that includes only a limited

description of the removal action. The text should be revised to include a reference to a summary report prepared after removal of the Sump and Clarifier.

41. Section 2.3.1 Soil Matrix and Soil Vapor Findings The third paragraph states that, "From 2001 to 2003, nine RFI reports were submitted to DTSC for review …". It appears that the indicated reports were work plans but no references are provided. During review of Section 8 (References) only five work plans submitted during 2001 to 2003 are noted. References for the work plans should be provided. In addition, the text should be revised to clarify whether results of these studies were previously reported; references should be provided for summary reports previously submitted.

42. Section 2.3.1 Soil Matrix and Soil Vapor Findings The fourth paragraph indicates that soil vapor investigations were performed in 1993, 2001, 2003, and 2005 through 2008. The text should be revised to provide references for work plans and summary reports for the work performed.

43. Section 2.3.2.1 Background The first paragraph indicates that SWMUs 4.5 and 4.6 comprise an area of about two acres, which is not consistent with the area shown on Figure 2.1-1 and other related figures. This discrepancy should be resolved.

44. Section 2.3.2.3 Local Hydrogeologic Setting The last paragraph mentions a "solvent release area" which is shown on the figures but not discussed in the text. Revise the report to discuss the basis for designating this as a release area and for precisely defining its limits on the figures.

45. Section 2.3.3 Surface Water Findings The text states that, "Surface water features at the LOX Plant consist of a single small ephemeral drainage ditch located to the south of the LOX Plant." Although detailed topography is not presented, five-foot contour intervals on many figures (e.g. Figure 2.1-1) indicate several drainage swales that would conduct surface flow onto the site. It appears water from these swales and sheet flow from rainfall directly onto the site flows southwesterly to a swale on the west side of the site and to the main drainage in the area, commonly referred to as the Northern Drainage, located immediately south of the LOX Plant. The text should be revised to better describe surface drainage.

    The text also states that "Surface water samples were not collected during this RFI investigation because of seasonal dry conditions." The fact that drainage courses in this area are seasonally dry does not relieve the need to evaluate this potential contaminant transport mechanism. For example, contaminants have been reported in samples collected in the Northern Drainage immediately south of the Lox Plant, reportedly due to releases further upstream (see Section 2.3.4, third paragraph). The text should be revised to address potential contaminant transport by surface flow due to dissolution of contaminants in soil the water contacts or due to erosion of contaminated soil from releases at LOX and upstream.

46. Section 2.3.3 Surface Water Findings This section states, "Surface water samples were not collected during this RFI investigation because of seasonally dry conditions." The seasonality of surface water presence does not alleviate the need to address the potential for contaminated surface water. Because soils at the site are know to be contaminated, and because specific operational procedures at the LOX plant and specific materials disposed of in the asbestos debris areas are unknown, it is the GSU's opinion that collection of samples from water that might be impacted by this site is significant to evaluating its potential impacts on human health and the environment. During or immediately after a significant rainfall event, samples should be collected from surface water flow in the Northern Drainage immediately above and below the site (e.g. east end of eastern asbestos debris area and near well PZ-062). Immediately after significant rainfall, the slopes between the site and the channel of the northern drainage should be closely examined for seeps or areas of wet soil that might represent water from interflow (water that infiltrated the surface higher up slope then flowed laterally along a zone of permeability contrast). Water and/or soil samples should be collected from any such locations that are identified.

47. Section 2.3.4 Completeness of Characterization The three paragraphs of this section discuss chemicals found associated with the LOX site. Section 2.5 of the SRAM Work Plan (MWH, 2005) discusses representativeness and completeness of characterization. It states that, "Data will be evaluated to determine how well the chemicals are characterized," including, "… are samples appropriately placed to reveal potential releases …" and "… if the variability of chemical concentrations in time and space are adequately characterized." The text should be revised to explicitly address data representativeness and completeness as described in the SRAM.

48. Section 2.3.4 Completeness of Characterization The last paragraph of this section discusses a possible source of benzo(a)pyrene (BaP) reported in the drainage channel south of the LOX site. Reference for the information source should be provided. If an upstream source has affected the Group 2 area, or if investigations of that source extended into the Group 2 area, that source and associated investigations should be discussed in report sections discussing site history and previous investigations.

    Interim remedial action has been performed upstream and it appears some sampling along the northern drainage near the LOX site might be associated with northern drainage characterization. The discussion should be expanded sufficiently to allow determination (along with review of sample results) of whether contaminants detected in the northern drainage originated from the LOX site, from upstream or from both. The discussion should also address whether or not the data is sufficient to conclude whether or not additional sampling in the northern drainage (upstream or downstream from the LOX site) is warranted or if additional data is needed.

Discussion and data presented in this and other sections regarding samples in and near the channel of the Northern Drainage should distinguish between samples from recent alluvium, older alluvium, and colluvium.

49. Section 2.4 Former LOX Plant Nature and Extent This section (and subsections) addresses the extent of reported contaminants but discussion of the "nature" of the contamination is limited to concentrations encountered. The text should be revised to include discussion of what the findings indicate about possible sources of the contaminants.

50. Section 2.4 Former LOX Plant Nature and Extent The text states that samples were collected, "…per the protocol described in Section 2.2." However, Section 2.2 only presents the objectives of the study, the number of samples collected ("Scope"), and the decision that historic samples with no recorded depth were assumed to be from 0 to 2 feet deep. The text should be revised to indicate appropriate protocols for how and where samples were collected (e.g. MWH, 2004). Records for samples with no recorded depth should be individually reviewed to verify sufficient information is available to conclude the sample collection and handling procedures followed appropriate protocols to meet data quality objectives. In order to provide conservative assessment, samples without recorded depth should be excluded from the risk assessment if the concentration of the constituent of interest is less then the reporting limit.

51. Section 2.4 Former LOX Plant Nature and Extent The text indicates that soil sample data is provided in Appendix B. However, analytical data in Appendix B is limited to summary statistics. The text should be revised to reference analytical data presented in Appendix G and electronic copies of appropriate supporting documentation (field notes, chain-of-custody forms, analytical reports, etc.) should be provided for data not previously reported. References should be provided for previously reported analytical data.

    Appendix B logs of exploration performed is limited to boring and construction logs for wells. The appendix should be revised to include logs of all exploration performed (wells, borings, test pits, hand augers, etc.). Figures should be provided if needed to show exploration locations not shown on existing figures.

52. Section 2.4 Former LOX Plant Nature and Extent The text in the subsections summarizes findings of the exploration, but nowhere in the report is the rationale presented for the number, locations or depths of samples collected. For example, the text indicates that eight surface samples were analyzed for 1,2-diphenylhydrazine, but there is no explanation why this constituent was analyzed (it is not listed on Table 2.1-1, LOX RFI Site Chemical Use, and no potential sources are discussed in the text) or how locations were selected (one location is outside the limits of the SWMU). The report should be revised to present the rationale for the sampling locations, depths and analytical testing for all constituents. It is also

unclear why attention is given to 1,2-diphenylhydrazine in this summary paragraph rather than discussing it in a subsection below.

53. Section 2.4.1.1 Parameters Above Comparison Criteria The text indicates this section and subsections only considers chemicals that had exceedances of the screening criteria. Table B.7.1-3 indicates many organic chemical were analyzed for only a few samples but had high percentages of detection. Some chemicals were detected in only one sample analyzed, and some with several samples had 100% detection. One sample indicates presence of a chemical but is not adequate to characterize concentration or extent. The report should be revised include discussion of characterization for all detected anthropogenic analytes and all naturally occurring analytes that exceed background concentrations.

54. Section 2.4.1.1 Parameters Above Comparison Criteria (Dioxins) The following items should be addressed:

    a) The first sentence of the first paragraph indicates that eight surface soil samples were analyzed for dioxins. The text should be revised to address whether, considering lack of known source or release mechanism, eight samples spaced 200 to 300 feet apart are sufficient to conclude the upper range of concentrations is adequately characterized. Note that of the four locations shown on Figure 2.4-2 that had samples that did not exceed the screening criteria, one is in the asbestos and drum debris area west of the plant, two are in the roadway areas south and west of the former plant, and one is in the area of a former building at the southeast corner of the plant area.

    b) The evaluation of whether extent and concentration of a contaminant are adequately characterized should include consideration of co-located chemicals and possible chemical sources. For example, characterization of dioxins should consider where PCB contamination has been detected.

    c) The second sentence of the first paragraph indicates that five samples have dioxin concentrations exceeding human health comparison criteria but Table 2.4-3 shows only four. The discrepancy should be resolved.

    d) The first paragraph uses the term “human health comparison criteria” and the second uses the term “human health screening criteria.” Consistent terminology should be used throughout the report.

    e) The second paragraph indicates that samples from four locations exceed the 2,3,7,8-TCDD TEQ human health screening criteria and three of those locations also exceed the ecological screening criteria. The report concludes the horizontal extent of this contaminant is adequately characterized on the basis that the sample locations are, “… bound geographically to the north and south by the hill slopes and to the west and east by sampling locations that did not have

2,3,7,8-TCDD TEQ exceedances." Without knowing potential release mechanisms, it cannot be known if topographic slopes will constrain the contaminant distribution. In addition, the sample locations are so broadly spaced that it is questionable whether non-exceedance locations can be considered to constrain the limits of the area of exceedance. For example, southern non-exceedance locations LXBSCB03 and LXBSCB04 are about 600 feet apart, and the southernmost exceedance location LXBSCB05 is roughly mid-way between them and not much more than 100 feet north of a line between them. The text should be revised to recommend additional soil samples to better constrain the extent of dioxin concentrations exceeding the screening criteria.

55. Section 2.4.1.1 Parameters Above Comparison Criteria (Metals) The report should be revised to address the following items:

a) The first paragraph indicates that 74 locations associated with the LOX plant were analyzed for metals in surface soil. Figure 2.4-3 shows most of these locations situated along the channel of the Northern Drainage, within the western debris area, or immediately adjacent to the physical location of the sump and clarifier. No information is available regarding LOX plant processes or operating procedures, but only four sample locations are shown within the area of the graded pad for the LOX plant (i.e. east of plant access driveway). The text should be revised to explain the selection of sample locations. The text should also justify the minimal sampling in the area of plant structures or recommend additional characterization.

b) The second and third paragraphs indicate that aluminum, arsenic, chromium, lead, silver, zinc, and selenium were detected at concentrations exceeding the "comparison criteria" at one location each. However, Table 2.4-2 indicates exceedances of the screening criteria for from two to four samples of each of these metals. These discrepancies should be resolved and the text and/or table revised as warranted.

c) The second paragraph indicates that the horizontal extent of six metals has been addressed sufficiently on the basis that, "… the elevated concentrations encountered were more similar to their respective background values, suggesting that these metals may be naturally occurring at this site at the reported concentrations." Similar justification is made for metals discussed in paragraph 3 (which does not clarify if reported concentrations exceeded background) and for metals exceedances in subsurface soil samples. However, that the detected concentrations of metals ranged up to more than 50 times their respective background concentrations, with concentrations exceeding background for one or more metals at 26 of the 74 sampled locations, suggests that either the background data set is not representative of this site, or that metals were released to site soils, or both. That the encountered concentrations "may" be

naturally occurring is not sufficient to conclude that the extent of elevated concentrations is adequately characterized. For each location where a metal background concentration is exceeded, the text should present rationale for concluding that the extent of potential elevated metal concentration, and range of elevated concentrations, is adequately characterized. If existing data is not sufficient to develop an adequate rationale, additional sampling should be recommended.

d) The second and third paragraphs discuss exceedances for eleven metals, and conclude that the horizontal extent is adequately characterized, but no figures illustrate the data supporting this conclusion. For all constituents with reported exceedances of the screening criteria, a figure should be provided showing the exceedance location and data interpreted as constraining the extent of the exceedance.

e) All exceedances of the screening criteria for aluminum (2) and silver (4) occurred in samples located along the northern drainage (see Figure 2.4-1), suggesting the elevated concentrations could be due to an upgradient source. Further evaluation of background concentrations for SSFL is in progress. However, until and unless background concentrations are revised upward, rationale for determining the extent of elevated concentrations at each location should be provided or additional sampling proposed if insufficient data exists to present a rationale.

f) The third paragraph indicates that a sample at location LXSS04 exceeded the sodium "human health criterion" of 110 mg/kg, which is much lower than the sodium concentration in common snack foods (e.g. one ounce of "Cool Ranch Doritos® contains 180 mg sodium). Please verify if 110 mg/kg is the correct concentration.

g) The fourth paragraph states, "The extents of barium, boron, and cadmium in the surface soil have been evaluated adequately at the LOX Plant area, as shown in Figure 2.4-3. The figure, like many others, shows analytical results for multiple analytes. Some figures also show sample locations not relevant to the analytes of interest. Evaluating the distribution of exceedance locations and data limiting the potential extent of the area where an analyte exceeds the screening criteria is very difficult. The figures should be revised to show exceedances and data delineating the interpreted limits of exceedance graphically; figures provided with reports for other RFI areas included graphic differentiation of concentrations. Sample locations that were not analyzed for the constituent of interest should not be shown.

h) The third, fourth and fifth paragraphs indicate that the potential extent of elevated concentrations for various metals is constrained by nearby slopes. Without knowing potential release mechanisms, it cannot be known if topographic slopes

will constrain the contaminant distribution. Unless other rationale for establishing the potential limits of elevated concentrations can be provided, additional sampling should be recommended. Figures 2.4-3 and 2.4-4 should be revised, and additional figures provided as necessary, to show delineation of the interpreted maximum extent of soil concentrations potentially exceeding the background concentration.

i) The third, fourth and fifth paragraphs indicate that the potential maximum extent of soil concentrations potentially exceeding the background concentration is bound by sample locations without elevated concentrations. In some instances, however, those locations are 200 feet or more from the exceedance location. Figures showing the potential maximum extent of elevated concentrations (as recommended above) should be evaluated to determine if the number of samples is sufficient to adequately characterize the release concentrations. For example, the sample at LXTSTP04 exceeded background concentrations for chromium, lead and zinc. Other than one sample to the east, all surrounding samples are 200 feet or more away. If this entire area were considered to have potentially elevated concentrations of these metals, the one sample available is not sufficient to characterize the concentrations within the area.

j) Although limits of the debris areas are not shown on the Figures 2.4-3 and 2.4-4, review of the metals data and Figure 2.3.2-1 suggests that five of nine sampled locations in the northern drainage below the toe of the western debris area contain a metal concentration in excess of the background concentration. Within the eastern debris area, eight of 17 sampled locations contain metals concentrations exceeding one or more background concentrations. Five of the eight locations exceed the background concentration for more than one metal and one of these locations exceeded the background concentration for nine metals. The report should be revised to include discussion of potential release mechanisms and transport for metals in soil.

k) The fifth paragraph indicates that copper exceeding the background concentration was reported for samples from 10 locations and that the extent of copper exceedances has been evaluated sufficiently based on surrounding sample locations that do not exceed background. Figure 2.4-4 indicates five of the 10 exceedance locations are in close proximity to sump, with spacing of about 10-25 feet. Four of these five locations are east and south of the sump and one location is within the limits of the sump and likely represents backfill. Sample locations to the southwest, west and north are about 100-200 feet away. In addition, the highest and 3rd highest concentration locations are in a drainage swale adjacent to the Northern Drainage that might receive runoff from the sump area. Based on these conditions, the report should be revised to recommend additional samples to evaluate whether elevated concentrations extend along a

drainage path extending west from the sump and to better constrain the northern limit of elevated copper concentrations.

l) The figures (e.g. Figure 2.4-3) indicate several sample locations on the centerline of the northern drainage channel. At least some of these samples might have been collected from sediment in the drainage. Other samples are clearly within the banks of the drainage but might be either sediment or soil. Distinguishing between the sample sources might inform understanding of the metal concentration distributions. The report should be revised to clarify the material type (recent alluvium, older alluvium, or colluvium) for each sample along the northern drainage (also see comment on Section 2.9.2).

m) In order to clarify understanding of possible contaminant sources in relation to sample locations, Figures 2.4-4, 2.4-4, and any new figures showing analytical results associated with SWMU 4.5 and 4.6 should show limits of the various chemical use areas.

56. Section 2.4.1.1 Parameters Above Comparison Criteria (PCB Aroclors/Congeners)
The text indicates that: 1) screening criteria were exceeded for Aroclor-1254 in two samples and that the exceedance locations are bound by nearby locations that did not have PCB exceedances; 2) screening criteria were exceeded by small amounts for PCB-77 in one sample and PCB-126 in one sample but these congeners were reported at less than screening criteria at the other locations analyzed for PCB congeners ; and 3) based on these results the horizontal extend to PCBs in surface soil is considered addressed sufficiently.

With respect to the findings and conclusions indicated in the text, the following is noted:

a) Figure 2.4-5 indicates that samples nearest the PCB-1254 exceedance at location 1662 are about 60 feet east, 180 feet west, and 200 feet north. There are no PCB samples south of this exceedance location and the samples to the east, while not having reported PCBs, all had reporting limits higher then the screening criteria (in fact higher than either sample reported exceeding the screening criteria).

b) Figure 2.4-5 indicates that samples nearest the PCB-1254 exceedance at location LXBS1024 are about 130 feet west, 120 feet north, and 250 feet south. There are no PCB samples east of this exceedance location.

c) While the exceedances of PCB-77 and PCB-126 were close to their screening criteria, only four samples were analyzed for congeners; all contained PCB-77 and three contained PCB-126. A total of ten shallow samples from within the limits of SWMU 4.5 were analyzed for PCBs; only three did not have PCB-1254 reported, one of which had a reporting limit more that twice the screening criteria.

It is unknown what fraction of the reported PCB-1254 might be congeners significant to risk assessment.

Based on the broad spacing between samples, the lack of samples in some directions away from PCB-1254 exceedance locations, and lack of PCB congener analysis at most locations, the conclusion that the horizontal extent of PCBs in surface soil is addressed sufficiently is not substantiated. The text should be revised to recommend additional sampling to address these deficiencies.

Although no information is available regarding LOX plant operations or procedures, a release of oil from transformers associated with motors used to power compressors is a reasonable scenario for the presence of PCBs at this site. Such a release would typically be relatively localized. This suggests that the presence of PCBs at most sampled locations (at least 7 of 10 within SWMU 4.5) might be due re-grading of the site that was done after removal of structure foundations (Ogden, 1996, volume II Appendix C). Future characterization efforts should consider that efforts to identify primary release areas might be enhanced by including samples from below the depth of re-grading.

Figure 2.4-5 indicates 17 locations analyzed for PCBs outside the limits of SWMU 4.5, most located along the northern drainage. PCBs were not reported for any of these locations, but 15 of the 17 had reporting limits above the screening criteria. The text should be revised to recommend sampling to characterize the potential presence of PCBs and PCB congeners in this area.

Although limits of SWMU 4.6 are not shown on Figure 2.4-5, it appears that four PCB samples were located within its bounds; three are close together at the down-slope end of the SWMU, along its east edge, and one is near the highest elevation edge of the SWMU (as shown on Figure 2.3.2-1). The three down-slope samples did not have reported PCBs, but had reporting limits for PCB-1254 ranging from more than twice to more than 10 times the screening criteria, and the highest elevation sample had PCB-1254 reported at an estimated concentration of 10.9 mg/kg (less than the 20.0 mg/kg screening criteria indicated in the text). This sample distribution does not appear adequate to characterize the presence and extent of PCBs and PCB congeners within this SWMU. The text should be revised to recommend additional sampling in this area.

57. Section 2.4.1.1 Parameters Above Comparison Criteria (SVOCs) The text (paragraph 3) states that “Seven of the 9 samples analyzed for benzidine … did not report exceedances.” However, the text fails to note that all seven had reporting limits three orders of magnitude higher than the human health screening criteria.

58. Section 2.4.1.1 Parameters Above Comparison Criteria (SVOCs) The text (paragraph 4) states that “BaP [Benzo(a)pyrene] was encountered in 20 samples ranging from an estimated 110 µg/kg (LXBS0044) to 4,200 µg/kg (LXBS0037),

exceeding its human health criterion of 100 µg/kg." However, Figure 2.4-7 indicates BaP in 12 samples at concentrations greater than 100 µg/kg, in seven samples at concentrations less than 100 µg/kg but greater than 10 µg/kg, and in three samples at less than 10 µg/kg. Discussion on page 112 indicates the human health criterion is 10 µg/kg. These discrepancies should be resolved.

59. Section 2.4.1.1 Parameters Above Comparison Criteria (SVOCs) The acronyms BaP and BAA, used in the text for Benzo(a)pyrene BAA and benzo(a)anthracene are not the acronyms used on Figure 2.4-7. Terminology used in text, figures and tables should be consistent.

60. Section 2.4.1.1 Parameters Above Comparison Criteria (TPHs) The text indicates that the horizontal extents of extractable fuel hydrocarbons have been evaluated sufficiently based on "… multiple sampling stations near each exceedance that did not report elevated concentrations of TPHs …" and "… the hillsides to the north and south provide horizontal boundaries for the exceedances." However, the report fails to note that in addition to nine locations that exceeded the screening criteria, TPHs were reported at 43 of the 46 locations. The text should consistently be clear about the distinction between elevated concentrations – presence of the analyte at a concentration greater than background – and concentrations that exceed the screening criteria.

    The presence of TPHs along the northern drainage channel, including 4 locations exceeding the screening criteria in the eastern portion of the drainage shown on Figure 2.4-9, and particularly an exceedance upstream from the LOX Plant (NDBS73) suggests the potential for an upstream source for these TPHs. The report should be revised to include evaluation of a potential upstream source, including determination of whether additional upstream or downstream sampling is warranted.

    Based on limits of the LOX Western Debris Area shown on Figure 2.3.2-1, nine samples within this area were analyzed for TPHs, all with reported TPH and two exceeding the screening criteria: one near the toe (LZBS0062) and one near the top (LXBSCB01). The text should be revised to discuss locations of the samples and adequacy of characterization with respect to documented locations of drums previously present in this area. Depending upon locations of the drums, or if drum locations are unknown, additional sampling in the central portion of the Debris Area might be warranted. Samples surrounding LXBSCB01 are located from 100 feet to more than 200 feet away. The text should be revised to recommend additional sampling in this area.

    Only five of the 46 samples are located within the main area of the LOX Plant (area of buildings, tanks and surrounding pavement). Four samples had reported TPH and two exceeded the screening criteria. As there is no information available regarding Plant operations or procedures, the text should be revised to recommend

additional sampling in this area, particularly in proximity to the two locations exceeding the screening criteria. Further evaluation of the presence and distribution of TPH should include consideration of possible redistribution of surface soil during re-grading of the site (Ogden, 1996).

61. Section 2.4.2 Subsurface Soil Nature and Extent The second paragraph of this section indicates that, similar to surface soil results, 1,2-diphenylhydrazine was not detected in any samples. As other chemicals were also not detected in any samples (per Table B.7.1-3) the reason for calling attention to this specific chemical should be clarified.

62. Section 2.4.2.1 Parameters above Comparison Criteria (Dioxins) The text indicates no dioxin exceedances were reported for subsurface soil samples collected from the eight surface soil sampling stations analyzed for dioxins (five of which have concentrations exceeding the screening criteria), and concludes, "…the vertical extend of dioxins has been evaluated adequately." The text should be revised to discuss adequacy of subsurface sampling with consideration of lack of information regarding site history and potential redistribution of surface soil due to re-grading of the site after foundation demolition (Ogden, 1996).

63. Section 2.4.2.1 Parameters above Comparison Criteria (Metals) The text: 1) indicates that, of eleven subsurface exceedances for copper, the locations of four highest exceedances had deeper samples that did not exceed the screening criteria; 2) states that, although four exceedances were at the deepest samples at a given location, "…the deepest interval analyzed (20 to 20.5 ft bgs) for copper across the LOX Plant area did not exhibit elevated concentrations"; and 3) concludes that, "…it is inferred that the vertical extent of copper has been evaluated adequately at this site…". Figure 2.4-13 indicates that: 1) the fourth highest concentration, 400 mg/kg, is from the deepest sample at that location; 2) five exceedances were from the deepest sample at the location they were collected; and 3) the "deepest interval analyzed" is located from 175 feet to more than 300 feet from exceedances in the deepest sample at a given location, too far to appropriately be interpreted to constrain the depth of contamination. Figure 2.3.2-6 indicates that the west end of the site, where most exceedances are located contains fill soil. The text should address possible lateral migration of copper contamination along the fill/native material contact. In addition, the text does not address the horizontal extent of contamination in subsurface soil.

64. Section 2.4.2.1 Parameters above Comparison Criteria (PCBs Aroclors/Congeners) The text indicates that the Aroclor-1254 and Aroclor-1260 concentrations of 24 µg/kg and 21.5 µg/kg in the sample from 5 to 5.5 feet deep at location LXTSTP04 exceed the screening criteria but that the vertical extent of PCBs is evaluated adequately based on "… multiple locations in the vicinity … that were analyzed for PCBs in similar or deeper sampling intervals." The nearest samples, located about

40 feet to the west at depths of 5.5 and 7.5 feet, are not sufficient to determine if the release at LXTSTP04 has greater vertical or horizontal extent.

65. Section 2.4.2.1 Parameters above Comparison Criteria (SVOCs) The text indicates that the deepest sample from location 1661 (11.2 to 12 feet deep) exceeded the screening criteria for 2-methylphenol and that the vertical extent has been sufficiently addressed based on samples at LXBSCB03 that did not have exceedances down to 20.5 feet. Location 1661 is about 50 feet northwest of LXBSCB03 and appears to be within but near the edge of fill which apparently thickens to NW. Released fluids may be prone to migrate NW along the fill/native contact, or NW along bedding planes, and a boring 50 ft SE is likely a poor indicator of the limit of impact. Because of potential for fill to affect interpretation, presence and distribution of fill should be discussed as part of site conditions and considered in exploration design and data interpretation.

66. Section 2.4.3 Soil Gas Nature and Extent Analytical data in Appendix G indicates soil gas sampling was performed between 1993 and 2008. The report should discuss changes in soil gas results over time.

67. Section 2.4.3 Soil Gas Nature and Extent The first paragraph of this section indicates that 262 soil gas samples were collected from 123 sampling stations. Figure 2.4-20 shows 186 analytical results for 1,1-dichloroethene whereas Table B.7.1-3 indicates a total of 228 analyses. Figure 2.4-21 indicates 262 analytical results for cis-1,2-dichloroethene while Table B.7.1-3 indicates 229 analyses. The text, tables and figures should be revised as necessary to be consistent for all constituents analyzed. If there are significant differences between the numbers of analyses performed for the constituents, the basis for the difference should be discussed.

68. Section 2.4.3 Soil Gas Nature and Extent The second paragraph of this section indicates that benzene was reported exceeding the screening criteria at only one location and that surrounding locations "… did not have reported benzene exceedances, suggesting that the extent of benzene has been addressed sufficiently." However, for some VOCs, the large majority of analytical results that do not exceed the screening criteria have a reporting limit greater than the screening criteria (see discussion of 1,1-dichloroethene below). The text should be revised, and a figure provided, to clarify the distance and direction from the exceedance location to sample locations with analytical results indicating the benzene concentration is less than the screening criteria. Similar revisions should be made for other analytes, as needed.

69. Section 2.4.3 Soil Gas Nature and Extent The third paragraph of this section indicates that: 1) 1,1-dichloroethene was reported exceeding the screening criteria in nine samples; 2) most exceedances had samples deeper and or/shallower that did not have reported "elevated concentrations," and 3) multiple sampling points

surrounding the exceedances also did not have reported elevated concentrations, and concludes that the extent of 1,1-dichloroethene has been evaluated adequately. Based on Figure 2.4-20 there are only 3 locations with samples deeper than 3 ft that have a 1,1-dichloroethene concentration, or reporting limit, less than the screening criteria. All other results have reporting limits greater than screening criteria or the samples are from 3 ft or shallower (mostly surface). The extent of 1,1-dichloroethene distribution has not been adequately defined and should be further evaluated. In addition, the report should discuss the rationale for collecting very shallow soil gas samples and limitations of resulting data in evaluating site conditions.

70. Section 2.6.1 Contaminant Sources and Release Mechanisms The last sentence states that, "… spills from chemical stored in the drum storage area could have introduced contaminants to the surface media." There is no other mention of a drum storage area in the report text and a drum storage area is not shown on the figures. The text should be revised to present a complete summary of available information regarding the drum storage area and its location should be indicated on appropriate figures.

71. Section 2.6.1 Contaminant Sources and Release Mechanisms This section is limited to two sentences of very general discussion. The text should be revised to discuss possible sources and mechanisms with respect to analytical findings (e.g. transformers as sources of PCBs, findings along channel of the northern drainage, etc.). This discussion could be part of, or referenced by, discussions of completeness of characterization of individual chemicals or classes of chemicals.

72. Section 2.6.7 Soil-to-Groundwater Migration The last sentence of the first paragraph mentions "…the solvent release area by the clarifier and sump." This feature is not discusses elsewhere in the report and is not shown on the figures. Appropriate discussion, references and depiction of this feature should be added.

73. Section 2.6.7 Soil-to-Groundwater Migration The second sentence of the third paragraph mentions "…the documented release area…". Section 2.1.3 indicates there are no documented releases. The discrepancy should be resolved.

74. Section 2.8.1.3 Ecological Conceptual Site Model The first paragraph indicates that the LOX plant is strictly a terrestrial location, but Figure 2.1-2 appears to show "Waters of the U.S." along the Northern Drainage and a tributary. Other figures indicate exceedances of some analytes within or near the "waters." The status and occurrence of non-terrestrial ecological habitat should be clarified.

75. Section 2.8.3.3 Ecological Conceptual Site Model The second bullet point under the first paragraph indicates that depths were unavailable for several soil and soil vapor samples and that data from these samples was included in the 0 to 2 foot depth interval, "In an effort to be conservative." Assuming the samples were from

shallow soil is not necessarily conservative. For example, if a sample was actually from greater depth, a non-detect result for a specific constituent might un-conservatively bias the summary statistics for that constituent. For characterization, such a non-detect result might inappropriately be used to define the horizontal extent of surficial contamination. Available information for these samples should be reviewed and, if they otherwise meet project data quality objectives, professional judgment should be used on a case-by-case basis to determine if they are appropriate for use in site characterization and risk assessment. This evaluation and its results should be described in the report; a table summarizing the evaluation might be helpful.

If these data are found not to meet data quality objectives, the process by which they were incorporated into the database should be reviewed to determine how this data was included in spite of its deficiencies. If the data was incorporated due to a flaw in the process, the database should be reviewed to determine if other data with less obvious deficiencies was also incorporated into the database due to the same process flaw.

76. Section 2.9.2 Risk Assessment Summary The second paragraph states that, "Surface water and sediment samples are not evaluated in this HHRA, because they were not present during the RFI site characterization activities." Lack of surface water during specific site characterization activities does not relieve the requirement to assess this potential pathway. Runoff from chemically impacted areas may move contaminants to drainage courses, where the contaminants might accumulate in sediments or soils, or might infiltrate and emerge further down-slope as seeps or springs. Unless potential for exposure through these pathways can be excluded, the risk assessment should recommend the pathway be characterized.

    Numerous documents discuss sediment in the northern drainage, such as the technical memorandum "Northern Drainage Perchlorate Sampling Results" (MWH, 2003) which reports analytical results for 140 sediment samples collected in the northern drainage, including 4 in the reach adjacent to the LOX plant. The text should be revised to discuss which, if any, samples collected along the northern drainage were collected in sediment. If no sediment samples were collected, the text should be revised to recommend sediment sampling. If sediment samples were collected, the text should be revised to distinguish between analytical results for soils and sediments, including discussions of whether horizontal extent of various chemicals is adequately characterized. If differentiating between sediment and soil samples is not considered necessary, the text should present the rationale.

77. Section 2.9.3 Recommendations for Former Area II LOX Plant The third paragraph appears to be recommending corrective measures for portions of the site after further characterization. A figure should be provided delineating any areas recommended for corrective measures or no further action (if any).

78. Figure 2.1-1 Historical Features The figure (and other figures as applicable) should be revised to address the following items:

a) Symbols on the legend include a dashed blue line for “Leachfield” but this symbol is not used on the figure. Location of the leach field, and septic tank if known, should be shown on the figure.

b) Symbols on the legend include yellow circles for “Northern Drainage Debris Point” and yellow rectangles for “Chemical Use Area.” It is not clear which feature type irregularly shaped yellow areas on the Figure are intended to identify.

c) The entire area of the former LOX plant is identified as “SWMU 4.5 – LOX Plant Former Sump and Clarifier.” The actual structures of the sump and clarifier are not identified but are shown as a chemical use area. Since any chemical in this area presumably came from plant wastewater, the plant area should also be shown as a chemical use area.

d) SWMU 4.6 is not identified or distinguished from other chemical use areas on the figure (Note title of figure is “Historical Features SWMU 4.5 and 4.6 …”).

e) A chemical release area is shown just west of four “other tank” features. Figure 2.3.2-1 identifies this area as “LOX Solvent Release” but this feature is not discussed in the report text.

f) Numerous buildings and tanks shown on the figure are not identified. The type and/or purpose of each structure should be indicated, or indicated as “unknown” if no information is available. Available information regarding all structures should be discussed in the report text. Where specific knowledge is not available, reasonable inference regarding use should be discussed (e.g. based on similarities to existing tanks at SSFL, vertical tanks likely stored LOX and horizontal tanks likely stored nitrogen). A table identifying all previously existing structures and relevant information regarding each would be helpful.

g) The existing truck scale controls building is indicated by the symbol for a “Removed Building.”

h) Review of aerial photographs (e.g. Photo AXI-10W-59, dated 8-21-59) indicates the presence of a building at the location now occupied by the truck scale controls building, but significantly larger. A building is also shown located just east of the sump and clarifier. Both structures should be shown as removed buildings.

i) Review of aerial photographs indicates a series of features along the south side of the LOX Plant, possibly trucks for transporting LOX to the test pads. This area should be identified as a possible tanker-truck parking area.

j) Review of low altitude oblique aerial photographs (e.g. HDMSP00043629) indicates the presence of a small building at the northeast corner of the plant area (at toe of the cut slop), a partially enclosed structure at the southwest corner of the plant area, a series of cradles for horizontal tanks immediately west of the four circular tanks shown on the south side of the plant area, and a retaining wall (utility enclosure?) in the cut slope along the south side of the plant area. All of these features should be indicated as historical features on the figure.

k) Differentiation should be made between existing pipelines and those that have been removed. In addition to above ground pipelines, subsurface pipelines should be shown. The type of pipeline (e.g. "steel potable water line") should be identified. Pipelines should be discussed in the text.

l) Review of aerial photographs (e.g. Figure 10-1965 from DTSC web site) indicates previously existing buildings that are not shown on the figure.

m) Several small debris areas are indicated along the northern drainage. In addition, there is a large chemical use area and tank shown along this drainage at the west edge of the figure. These debris areas, chemical use area, and tank are not discussed in the report text. Based on soil sample locations shown on Figure 2.4-1, soil samples have not been collected at the locations of some of these areas, and for others it is unclear if soil sampling was specifically targeted to those chemical use areas or if the sample locations are coincidental. All chemical use areas shown on the figure should be discussed in the report text, even if only to explain why they are excluded from evaluation under the RFI.

79. Figure 2.1-2 Vegetation Features For some vegetation types, the colors used to designate vegetation types are similar and very difficult to differentiate on the figure. Labels as shown on the Legend should be added to vegetation areas on the figure to aid review.

80. Figure 2.3.2-1 Groundwater Monitoring Locations The figure should be revised to address the following items:

a) The figure title is, "Groundwater Monitoring Locations SWMU 4.5 and 4.6 Former Liquid Oxygen (LOX) Plant and Former Asbestos and Drum Area …". Report text identifies SWMU 4.5 as the "LOX Plant Waste Oil Sump and Clarifier" and SWMU 4.6 as the "LOX Asbestos and Drum Disposal Site." Terminology should be consistent

b) Report text identifies SWMU 4.6 as the "LOX Asbestos and Drum Disposal Site" but it is identified on this figure as the "Lox Western Debris Area." The terminology should be consistent.

c) The Northern portion of SWMU 4.6 has the label "Western Hummocks." Revise text to discuss this feature.

d) The eastern edge of the northern portion of SWMU 4.6 is indicated by color to be a "Metal" chemical use area. Revise text to discuss this feature.

e) The symbol for the limits of a SWMU should be added for SWMU 4.6 to clarify if both the "Debris" and "Metal" areas are included in the unit.

f) A small debris area or a portion of SWMU 4.6 is shown on the south side of the Northern Drainage stream channel. The text should clarify if this is part of SWMU 4.6 and if the channel is excluded.

g) The large debris area at the west edge of the figure is not discussed in the text. A tank shown within this debris area on Figure 2.1-1 is not shown on this figure and is not discussed in the text.

h) The small debris area south of SWMU 4.6, is labeled "ND-3" and the label "ND-4" is shown on the southeastern portion of SWMU 4.6 but these labels do not appear on the legend or on other figures and they are not discussed in the text.

i) An area identified as "LOX Solvent Release" is shown at the northwest corner of the plant site. Report text Section 2.1.3 indicates there are no reported releases and Section 2.6.1 ("Contaminant Sources and Release Mechanisms") does not discuss this area. Section 2.3.2.3 mentions (but does not discuss) a "solvent release area" and Section 2.6.7 mentions "… the solvent release area by the clarifier and sump." The report text should be revised to explicitly discuss identification of this release area, the basis for defining the release limits, possible mechanisms of the release, and to reference the release area on this figure.

j) A large debris area at the east edge of the figure is identified as "LOX Asbestos Debris," a term that does not appear in the report text. This is the location of an asbestos abatement. This debris area should be given a unique identifier used in text and figure. If limits of soil excavation during the asbestos abatement were different than the limits of the debris, the excavation area should be delineated on the figure.

81. Figures 2.3.2-2, 2.3.2-3, 2.3.2-4, and 2.3.2-5 Geologic and Hydrologic Cross Sections The figures should be revised to address the following items:

a) Each Figure except 2.3.2-3 is drawn with east to the readers left, the opposite of the direction of view for the cross-section locations and features when looking at the map view (Figure 2.3.2-1), which complicates three dimensional visualization of site conditions. Consideration should be given to reversing the directions on these figures.

b) The cross sections shown on the figures are generally oriented northeast to southwest, similar to the strike of Chatsworth Formation bedding, and figures 2.3.2-4 and 2.3.2-5 are nearly identical (differing by only one well at the east end). Additional cross sections oriented more perpendicular to bedding should be provided to more thoroughly depict subsurface conditions. Data from test pits could be used to supplement boring data for showing distribution of sandstone and siltstone units.

c) For three cross sections, well PZ-062 is projected to the section line. A note on the figures should indicate if the well is projected perpendicular to the section line or along bedding strike.

d) Figures 2.3.2-4 and 2.3.2-5 show well PZ-062 further west than well RD-52C but Figure 2.3.2-1 shows it located to the east.

e) The figures label some areas of the Chatsworth Formation as sandstone and other areas as siltstone, but all are shown using a single color and it is unclear which designation applies to some areas. In addition, the figures do not show bedding orientations which might affect groundwater occurrence or contaminant migration in the vadose zone. The figures should be revised to show bedding orientation and to differentiate between Chatsworth Formation units or to indicate the formation as “undifferentiated” where there is insufficient information to distinguish between units.

f) Figure 2.3.2-4 shows well RD-52A located roughly equidistant between the faults while Figure 2.3.2-6 shows it approximately on the surface trace of the southern fault. The discrepancy should be resolved.

g) Figure 2.3.2-4 shows the east end of the cross section at location “E_2” but that location is not shown on the map on Figure 2.3.2-1

82. Figure 2.3.2-6 Top of Chatsworth Formation Elevation Map The figure should be revised to address the following items:

a) The limits of SWMU 4.6 shown on this and subsequent figures do not use the symbol shown on the legend (red line) and are not consistent with the limits of the chemical use area shown on Figure 2.1-1 or the SWMU/debris area shown on Figure 2.3.2-1.

b) There are no geologic unit symbols in some areas (e.g. between the faults) making geologic interpretation difficult.

c) The figure or text in the report should discuss what portions represent geologic mapping by others (provide references) and what portions represent original geologic mapping.

d) A large area of artificial fill is shown at the west end of SWMU 4.6 is not discussed in the text. Review of historical aerial photographs suggests a southwesterly sloping drainage was filled during facility construction. The report should include discussion of potential affect of the fill on site conditions and characterization (e.g. potential migration of liquid releases at the Sump and Clarifier or Asbestos and Drum Area).

83. Figure 2.3.2-6 Top of Chatsworth Formation Elevation Map This figure shows two fault strands, identified on the cross sections (e.g. 2.3.2-5) as the "North Fault Primary Strand" to the north and the "North Fault Secondary Shear" to the south. The west end of the "North Fault Primary Strand" is shown extending a short distance west of the SWMU 4.5 where it appears to terminate. The west end of the "North Fault Secondary Shear" is shown extending westerly approximately along the channel of the North Drainage to the edge of the figure.

Figure 3.3.2-1 identifies the fault along the Northern Drainage channel as the "North Fault" and shows its west end terminating about 500 feet into the figure. Figure 3.3.2-1 shows a second fault, south of the first and also identified as "North Fault," extending completely across the figure. The southern fault appears to extend easterly into the area of the LOX Plant but it is not shown on Figure 2.3.2-6. The southern Fault on Figure 3.3.2-1 is shown extending easterly into the ELV area and Figure 4.3.2-7 shows it extending through and west of the ELV area. Cross sections for the ELV area identify it as the "North Fault."

The text describing geology for the LOX Plant, Area II Landfill, and ELV Area should, taken together, present a comprehensive discussion of faulting in the Group 2 area. Figures and cross sections should use consistent, unique identifiers for each fault strand. Geologic sources should be referenced.

84. Figure 2.4-1 Sample Locations The following items should be addressed:

a) Review of aerial photographs indicates the previous existence of a significantly larger building at the location now occupied by the truck scale controls building, a small building near the northeast corner of the LOX Plant area, and numerous features (possibly parked trucks) along the south side of the LOX Plant area (see comment regarding Figure 2.1-1, items h, i and j). It appears from the lack of sample locations at or near the locations of these previously unidentified features that they were not considered during planning for characterization of this site.

Since, as with other features at this site, the use of these features is unknown, additional sampling is recommended to evaluate the possibility of chemical releases associated with these features.

b) Regarding the Asbestos and Drum Area (SWMU 4.6), the reference given (SAIC, 1994) states, "Apparently some drums (the Rockwell representative guessed 12 or 14) were found in the area. These were empty and rusted, and the method of their disposal is unknown." No additional information regarding the drums is provided and it appears that soil sampling specifically targeting drum locations was not performed. Sample locations within the area of the LOX Plant are concentrated at the northwestern portion of the plant where VOCs in soil and soil gas are reported. Few sample locations are present in the southern and eastern portions of the plant.

   The number and locations of samples shown on the figure do not appear adequate to evaluate possible point-source releases from the reported drums or unknown sources within the plant area. Rationale justifying the sample density should be provided or additional sampling in these areas is recommended.

c) The legend indicates that a star symbol represents a near surface well but star symbols on the map are not at well locations.

d) Soil sample locations on the figure are identified by symbols indicating either a surface or subsurface sample. However, the report text and tables indicate both surface and subsurface samples were collected at most locations. Unless surface samples were collected at all subsurface sample locations, and a note on the figure clearly indicates that is the case, the locations of both surface and subsurface samples should be indicated.

e) Many sample locations are shown within the area identified on Figure 2.3.2-1 as “Lox Asbestos Debris.” The report text indicates that debris was removed from this area in 2007. The text should be revised to clarify that soil, including previously sampled soil was also removed. Based on Tables 1 and 3 in the Asbestos/Debris Removal Action Report (MWH, 2008), soil represented by several samples shown on this figure were removed and a number of samples from less than 2 feet deep are indicated on the figure by the symbol for sub-surface soil. These discrepancies should be resolved.

f) Both existing and removed pipelines are shown but none are identified. The status and type of pipeline (e.g. “existing steel potable waterline”) should be identified.

g) This figure does not include sample location NDLS32 that is indicated by Figure 3.4-1 to be about 120 feet east of the small, unidentified tank near the west edge of the figure.

85. Figure 2.4-2 Nature and Extent of 2,3,7,8-TCDD TEQ in Surface Soil This figure and others show analytical results for multiple constituents and many figures show locations of samples not analyzed for the constituents of interest. Exceedances are shown using bold font for the analytical results. The report text indicates the horizontal limits of the areas exceeding the screening criteria are indicated on the figures but these limits must be interpreted by the reader from the analytical results at various locations. In order to simplify and clarify these very data-dense figures, the GSU recommends the following revisions:

    a) Locations of samples not analyzed for the constituents of interest should be removed.

    b) Locations exceeding screening criteria should be shown graphically (e.g. different colored dots) and perhaps using a graded scale for different degrees of exceedance.

    c) Interpreted horizontal limits of areas exceeding the screening criteria should be delineated.

86. Figure 2.4-2 Nature and Extent of 2,3,7,8-TCDD TEQ in Surface Soil The legend indicates that an orange triangle represents a near surface well. However, some triangles on the figure are at the locations of Chatsworth Formation Wells, some are at locations were there are no wells, and triangles are not shown at some locations where near surface groundwater wells exist. The Figure does not identify Chatsworth Formation wells. While evaluating the relationship between vadose zone contamination and groundwater contamination is a necessary part of site characterization, consideration should be given to whether well locations are important to this and other figures related to individual contaminants.

87. Figure 2.4-2 Nature and Extent of 2,3,7,8-TCDD TEQ in Surface Soil Air photos (e.g. HDMSP00043784) show possible burn debris piles in the area south of the main plant and east of the truck scale but no analyses for dioxins/furans was performed for soils in this area. Rationale why such analyses are not needed should be provided or additional sampling performed.

88. Figure 2.4-6 Nature and Extent of Benzidine and Chrysene in surface Soil The benzidine concentrations indicated for samples LXBSCB03 and LXTSTP08 are not the same as the concentrations given in Appendix G. This discrepancy should be resolved.

89. Figure 2.4-6 Nature and Extent of Benzidine and Chrysene in surface Soil The figure indicates benzidine in two of nine samples analyzed but Table B.7.1-3 indicates benzidine in eight of 25 samples from the 0-2 foot depth interval. This discrepancy should be resolved. Use of appropriate data in the summary statistics should be verified. The figure should be revised to clarify (e.g. by color scheme)

that, for all samples in which benzidine was not detected, the reporting limit is greater than the screening criteria. To aid review, the legend for this and other figures should be revised to list the specific ecological and human health screening criteria.

90. Figure 2.4-7 Nature and Extent of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, and Benzo(k)fluoranthene in Surface Soil The report text (page 2-13, first paragraph) indicates the human health criterion for benzo(a)pyrene is 100 µg/kg. However, this figure indicates some lower concentration results as exceeding the screening criteria (e.g. 17.8 µg/kg for sample LXBS1000). This discrepancy should be resolved.

91. Figure 2.4-9 Nature and Extent of EFH (C15-C20) and EFH (C21 – C30) in Surface Soil A figure and the report text discussion should include analytical results for C8-C14 range fuel hydrocarbons.

92. Figure 2.4-13 Nature and Extent of Copper in subsurface Soil The figure and Table 2.4-4 indicate an analytical result qualifier of "E" for the samples from location LXBS1012 (and other samples) but this qualifier does not appear on the figure legend and Table 2.4-4 does not have an explanation of symbols or acronyms. This qualifier is not given for these analytical results in Appendix G. The discrepancy between Appendix G and the figure and table should be resolved. The legend should include all symbols and acronyms used on the figure.

93. Figure 2.4-14 Nature and Extent of Benzidine and 2,4-dimethylphenol in Subsurface Soil The figure indicates benzidine was detected in four of nine samples analyzed for benzidine from depths of 2 to 10.5 feet, while Table B.7.1-3 indicates benzidine analyzed in 25 samples from 0 to 10 feet and detected in eight. Table B.7.1-3 also indicates 25 samples analyzed for Benzidine from 0 to 2 feet, which would mean all benzidine analyses were at 0-2 feet. The discrepancy between the figure and table should be resolved. Use of appropriate data in summary statistics calculations should be verified.

94. Figure 2.4-20 Nature and Extent of 1,1-Dichloroethene in Soil Gas The figure indicates that of 182 samples analyzed, 3 detected 1,1-dichloroethene, all at concentrations exceeding the screening criteria. Table 2.4-5 indicates 1,1-dichloroethene detected in 12 samples, nine exceeding the screening criteria. Table B.7.1-3 (Description of Summary Statistics) indicates 1,1-dichloroethene detected in 10 of 228 samples from depths of 3 to 10 feet. The discrepancies between the figure and tables should be resolved and use of appropriate data in the summary statistics verified.

95. Figure 2.4-20 Nature and Extent of 1,1-Dichloroethene in Soil Gas The figure indicates 34 samples that were collected at depths of three feet or less below ground surface. It is the opinion of the GSU that such shallow samples are not a reliable

indicator of the presence of soil gas and should not be used in evaluating the possible presence of VOCs without specific discussion of the data limitations and how the data were used. Alternative colors or symbols should be used on the figure to distinguish these samples.

96. Figure 2.4-20 Nature and Extent of 1,1-Dichloroethene in Soil Gas The figure indicates that, excluding samples at depths of 3 feet or less, there are three sample locations that indicate 1,1-dichloroethene concentrations less than the screening criteria. At all other locations, the reporting limit is indicated to be greater than the screening criteria. Analytical results greater than the screening criteria are not appropriate for use in determining if the extent of a contaminant has been adequately characterized. The text should be revised accordingly and the figure revised to distinguish non-detect results with reporting limits that exceed the screening criteria. Additional sampling is recommended.

97. Figure 2.4-20 Nature and Extent of 1,1-Dichloroethene in Soil Gas A sample result at the southeast corner of the figure indicates, "LXAA03 is located 567 feet to the east," which is east of the Group 2 boundary. The report text should discuss the reason this sample is included in the Group 2 report.

98. Figure 2.4-21 Nature and Extent of cis-1,2-Dichloroethene in Soil Gas The figure indicates cis-1,2-dichloroethene concentration for the sample from 3-feet at location LXSV48 as "1.25e+006." Analytical results in Appendix G indicate the concentration for this sample as "18." The discrepancy should be resolved.

99. Section 2 Tables Many tables lack a legend or footnotes explaining acronyms and abbreviations. Multi-page tables lack page numbers.

100. Table 2.1-1 LOX RFI Site Chemical Use The current specification for cleaning LOX tanks and piping at the Marshall Space Flight Center (MSFC-SPEC-164B, http://prod.nais.nasa.gov/eps/eps_data/132026-OTHER-001-017.pdf) leaves the choice of cleaning agents to the contractor, with approval by NASA, but requires solvents (Trichloroethylene, Trichlorotrifluoroethane, 1,1,1-Trichloroethane) in cleanliness tests of the components. Based on current practice, it is reasonable to assume solvents were used to clean components at the LOX site. Solvents should be added to the table.

101. Table 2.3.2-1 Groundwater Monitoring Well Construction Summary The table presents construction information relative to depths below ground surface. To facilitate evaluating the monitoring system, the table should be revised to include elevations for the ground surface, top of casing, and other significant features of each well.

102. Table 2.4-1 Samples Collected at the Former LOX Site Based on Table 2.4-5, samples that indicate as matrix "AG" are soil gas samples. Analysis performed on

some of these samples is indicated as “VOCs full” while others are indicated as “VOCs Soil Vapor” and some are indicated to have been analyzed by both methods. The difference between the analyses performed should be clarified.

103. Table 2.4-2 Surface Soil Detection at the LOX Many entries on this table are numbers that are unrealistic, such as sample depths of “-9999” and “0.100000001.” In addition, for many samples the space for data such as method detection limit or reporting limit are blank and the reviewer cannot know if the data is not available or if the lack of data is an error. Data should be entered for each space on the table unless a note is added explaining the meaning of a blank space for each column. The recommendations of this comment should also be applied to similar tables and figures for this site (e.g. Table 2.4-4) and the other RFI sites.

104. Table 2.4-2 Surface Soil Detection at the LOX For an analytical result where the reporting limit exceeds the screening criteria, the possibility that the sample might contain the chemical of interest at concentrations exceeding the screening criteria but less than the reporting limit is not revealed by this table and is not identified on figures using data from these tables. The table should be revised to identify reporting limits that exceed the screening criteria and figures derived from data on this table should be revised to identify reporting limits that exceed the screening criteria. The recommendations of this comment should also be applied to similar tables and figures for this site (e.g. Table 2.4-4) and the other RFI sites.

105. Tables 2.8-2 through 2.8-26 The titles of these tables incorrectly indicate that they are for the “Former Incinerator Ash Pile.” The titles should be corrected.

106. Table 2.8-6 Central Tendency Background comparisons for Soil The following items should be addressed:

    a) For the 0-2 foot interval (surface soil), the table indicates 82 or 83 samples analyzed for most metals. The report text (pg. 2-10) indicates 74 samples were analyzed for metals. Figures 2.4-3 and 2.4-4 each show 65 sample locations analyzed. The discrepancies should be resolved.

    b) For many metals, the number and percentage of background detections indicated on the table do not match those indicated on Table 4-6 from SRAM Appendix D. The discrepancy should be resolved.

    c) Iron, manganese, potassium and sodium were each analyzed for only 4 samples. Uncertainty associated with using the WRS and Gehan statistical tests for such small data sets should be addressed.

107. Section 3.1.2 Site History The first paragraph describes the location and overall dimensions of the landfill. The dimensions given (“500 ft wide by 150 ft deep by 50 ft across) are not consistent with the configuration shown on the figures and

should be revised. The text should also be revised to include description of the estimated total fill volume and distribution of fill thickness. A figure should be provided to clarify fill volume and distribution (e.g. a contour map showing fill thickness or base of fill elevations).

108. Section 3.1.2 Site History The third paragraph states the landfill received "… some drums of unknown content…" and that "Drums and other receptacles containing kerosene also were identified on the landfill face during a VSI" [visual site inspection]. Review of the reference given for the presence of kerosene in various containers (SAIC, 1994) indicates that it does not present any discussion of kerosene containers at the landfill. The text should be revised to present the appropriate reference for the presence of kerosene containers. Locations of the drums and other containers should be indicated on appropriate figures; if locations are unknown that should be stated.

109. Section 3.1.2 Site History The third paragraph indicates that drums at the landfill were removed and that soil samples collected in the area beneath the drums "… confirmed that they had not leaked." The report should be revised to include locations of the drums on a figure, identify the soil sample analytical results, and provide a reference for the report(s) describing the removal action.

110. Section 3.1.2 Site History The fourth paragraph indicates that a geophysical survey identified several mass anomalies. The report should be revised to describe the geophysical survey and to include survey locations and locations of the mass anomalies on a figure.

111. Section 3.1.2 Site History The fourth paragraph indicates that subsurface exploration including test trenches, hand auger samples, and test pits were performed. The report should be revised to describe findings and conclusions of the exploration and to include all exploration locations on a figure.

112. Section 3.1.2 Site History The fourth paragraph indicates Ventura County Environmental Health Division approved exploration trench backfilling. The report should be revised to include a reference for the approval document.

113. Section 3.1.5 Site Conditions This section discusses two small ephemeral drainages ("valleys") on the "southern" [sic] portion of the landfill that extend to the Northern Drainage. In addition, there is an ephemeral drainage south of the landfill, south of the Service Area Road. This section (or elsewhere in the RFI) should include discussion of the potential for surface runoff from the landfill to reach the road and the drainage south of the road, including the potential for precipitation to infiltrate the landfill then migrate laterally at the fill/native contact and come to the surface at the landfill toe.

114. Section 3.1.6 Site Habitats/Land Cover The text states, "The northern portions of the Area II Landfill are covered with chaparral and rock outcrops." It is unclear if this statement is intended to describe just the landfill (SWMU 5.1) or to include the larger surrounding area, possibly the entire area shown on Figure 3.3.2-1. The meaning should be clarified.

115. Section 3.3.3 Surface Water Findings This section indicates that surface water features at the landfill are limited to "… a small ephemeral drainage ditch south of the landfill." It is unclear if this is intended to refer to the Northern Drainage, a significant surface water drainage feature that is immediately north of the landfill (and the location of many samples shown on the figures) or to the smaller ephemeral drainage located south of the landfill (south of the Service Area Road). This section does not mention the two drainages that extend from the landfill to the Northern Drainage that are discussed in Section 3.1.5 (Site Conditions). The text should be revised to clarify the discussion.

116. Section 3.3.3 Surface Water Findings This section states, "Surface water samples were not collected during this RFI investigation because of seasonally dry conditions." The actual contents of the landfill cannot be known based on normal exploration procedures. As such, it is the GSU's opinion that collection of samples from water that might have been impacted by contents of the landfill is very significant to evaluating potential impacts of the landfill on human health and the environment. During or immediately after a significant rainfall event, surface water samples should be collected from the two drainages that extend from the landfill to the Northern Drainage. Samples should also be collected from surface water flow in the Northern Drainage immediately above and below the landfill (e.g. near wells RD-81 and RD-83). Immediately after significant rainfall, the slopes between the landfill and the northern drainage should be closely examined for seeps or areas of wet soil that might represent water that infiltrated the surface higher up slope then flowed laterally along a zone of permeability contrast. Water and/or soil samples should be collected from any such locations that are identified.

117. Section 3.4.1 Surface Soil Nature and Extent This section indicates that surface soil samples were collected from 87 locations, but Figure 3.4-1 shows only 79. This discrepancy should be resolved.

118. Section 3.4.1.1 Parameters Detected in Surface Soil (Dioxins) The first paragraph indicates that seven surface soil samples were analyzed for dioxins "… at this site…" and the second paragraph concludes the horizontal extent of dioxins in surface soil has been evaluated sufficiently. Figure 3.4.2 shows that all surface soil samples analyzed for dioxins were collected in or immediately adjacent to the Northern Drainage stream channel, at distances of about 150 to 300 feet beyond the limits of the landfill. The rationale for not analyzing any surface soil samples from within the landfill should be discussed in the text.

The first paragraph indicates that dioxins were detected in all samples. The second paragraph indicates that only one sample exceeded the 2,3,7,8-TCDD TEQ screening criteria and that other locations up and down gradient along the Northern Drainage Channel do not exceeded the screening criteria. On that basis, the report concludes the horizontal extent of dioxins in surface soil has been evaluated sufficiently. However, there is no discussion of whether the samples were collected from comparable materials (e.g. active channel alluvium, older alluvium, or colluvial soil) and does not consider possible lateral migration from the landfill down gradient to the stream channel.

119. Section 3.4.2 Subsurface Soil Nature and Extent This section indicates that subsurface soil samples were collected from 52 locations, but Figure 3.4-1 shows only 51. This discrepancy should be resolved.

120. Section 3.4.2 Subsurface Soil Nature and Extent This section indicates that one sample from the landfill was analyzed tor explosives, and that no explosive compounds were detected, but there is no other discussion of this sample. The text should be revised to discuss the rationale for explosives analysis at the landfill and for selection of the sample location.

121. Section 3.4.2.1 Parameters Detected in Subsurface Soil (Dioxins) This section indicates that: 1) one sample analyzed for dioxins was collected from each of four locations; 2) two of the samples, each from three feet below ground surface (bgs) exceeded the screening criteria; 3) two samples, from four and five feet bgs did not exceed the screening criteria. Based on the deeper samples not exceeding the screening criteria, the report concludes, “The vertical extent of dioxins in subsurface soil has been evaluated sufficiently.”

    The report fails to consider that dioxins in subsurface soil might extend horizontally from the locations where the exceedances were reported or might be present in other areas of the landfill.

    As stated in the report, the subsurface samples are in a “tight grouping,” with 3 of the 4 located in a horizontal line about 15 feet long and the fourth about 20 feet away. The report fails to note that the ground surface along the line of three locations slopes at least 10 feet between the highest and lowest sample locations (based on Figure 3.4-1), with the sample deepest bgs in the middle. Because of the sloping surface, the lowest exceedance sample appears to be at an elevation at least five feet lower than the non-exceedance sample, and could represent different materials if the fill material was placed in horizontal layers. Although the samples are relatively closely spaced, there cannot be the presumption in a landfill that there is horizontal or vertical continuity of the materials present. The report presents no discussion of evidence that the “deeper,” non-exceedance sample from the group of 3, or the other non-exceedance sample from about 20 feet away, were from the same material as the samples that exceeded the screening criteria

or that the material containing the exceedances is of limited extent. The report includes a boring log only for the location about 20 feet northwest from the three-in-line. The log does not indicate the presence of anthropogenic material. The available evidence does not support the report conclusion.

122. Figure 3.1-1 Historical Features The following items should be addressed:

a) This figure shows a number of small debris areas, a large chemical use area along the northern drainage at the east edge of the figure, a pipeline, two tanks, and an existing building along the channel of the northern drainage. The large chemical use area has the identifier "ND-1" but it is not explained in the legend and that term is not used in the text. All features on the figure should be labeled and the report text should be revised to include discussion of these features and whether or not any potential chemical impacts are associated with them. Subsurface as well as surface sections of pipelines should be shown and they type of pipeline identified.

b) The majority of the landfill is identified as a chemical use area but the chemical use area limits vary significantly from the limits of the SWMU; the basis for the difference should be discussed in the text.

c) A chemical use area identified as the "ELV Debris Area" is shown on the western portion of the figure, but this feature is not discussed in the text for the landfill or ELV area and only a small portion of the area is shown on Figure 4.1-1 (ELV Area historical features). Discussion of this feature should be added to the text.

123. Figure 3.1-2 Vegetation Features This figure shows the label for sample location A2LB15. No other sample locations are identified and this location is not discussed in the text. The purpose for showing this sample location should be indicated or it should be removed from the figure.

124. Figure 3.3.2-1 Groundwater Monitoring Locations The following items should be addressed:

a) The figure shows the northwestern limit of the landfill SWMU overlapping rock outcrop at two locations. Presumably, the overlap areas do not contain continuous fill material or the outcrop limits would not be visible. Per the previous comment on Section 3.1.2 (Site History), fill distribution and thickness should be clarified.

b) The symbol used to indicate a fault on the figure is not the symbol shown on the legend and is shown as a single dashed line in some locations, as a double line in most locations, and as a triple line in some locations.

c) The figure includes a dashed line symbol (e.g. near the location of PZ-134) that crosses topographic lines but is not shown on the legend.

125. Figure 3.3.2-2 Geologic and Hydrologic Cross-Section Along W-E The figure shows PZ-133 and the "Northern Fault" as about 130 feet lower in elevation than shown on Figure 3.3.2-1

126. Figure 3.3.2-3 Geologic and Hydrologic Cross-Section Along N-S The following items should be addressed:

a) The northern fill limit shown on this figure is much higher in elevation than limits of SWMU 5.1 and the chemical use area on shown on Fig 3.1-1. If all are correct, the basis for the different limits should be explained in the report text.

b) A label "Approx. Extent of Landfill" is shown that does not correspond with the area of fill shown on the cross section and does not appear to correspond with the Chemical Use area or SWMU limits shown on Figure 3.1-1.

c) The cross section shows borings extending through the fill but the fill is indicated as "estimated." If the actual fill/native contact could not be identified during site exploration, it should be explained in the text.

d) Fill about 10 feet thick is shown extending to and south of Well WS-09B but Figure 3.3.2-1 shows this well about 170 feet south of the SWMU limit.

e) The horizontal and vertical separation between RD-82 and the trace of the "North Fault" are significantly different than shown on Figure 3.3.2-1.

f) The geologic unit north of the fault trace should be identified.

127. Figure 3.4-1 Sample Locations The following items should be addressed:

a) There are many locations on the figure with a triangle symbol, shown by the legend to indicate a "Near Surface Well," that are not well locations.

b) The symbol shown by the legend to indicate a well is shown at a number of locations (e.g. between sample locations A2BS1042 and A2BS1043) that do not have a well according to Groundwater Monitoring Locations shown on Figure 3.3.2-1.

c) Sample location LXBS0041, shown on Figure 2.4-1, is missing from the same location on this map.

128. Figure 3.4-2 Nature and Extent of 2,3,7,8-TCDD TEQ in Surface Soil The following items should be addressed:

a) The figure shows many locations for surface samples and near surface wells that are not relevant to 2,3,7,8-TCDD TEQ in surface soil and should be removed.

b) One sample located along the Northern Drainage Channel is indicated as having a concentration that exceeds the screening criteria, while samples about 60 to 70 feet upstream and downstream from that location did not have a concentration calculated because no individual dioxin had a concentration that exceeded the screening criteria. Three additional samples were collected along the drainage channel, the nearest about 700 feet down stream, and one was collected along a small tributary channel. While none exceeded the screening criteria for TCDD TEQ, all exceeded the screening criteria for one or more individual dioxins. The pattern of dioxin presence indicated by the limited available data suggests that the distribution of dioxins in soils along the channel is not simple and that additional sampling along the 700-foot reach of the northern drainage between the two groups of samples is warranted.

129. Table 3.4-1 Samples Collected for the Area II Landfill An explanation should be provided for matrix and sample type acronyms and the difference between "VOCs full" and "VOCs Soil Vapor" should be clarified. Also, the number of samples indicated as analyzed for methane and TPHs is not consistent with Appendix G; the discrepancy should be resolved.

130. Table 3.4-4 Subsurface Soil Detections at the Area II Landfill The first line of the table (1,2,3,4,6,7,8-heptachlorodibenzofuran data for sample location A2TS33S01) is repeated on the following 17 pages.

131. Section 4. Expendable Launch Vehicle (ELV) SWMU 5.2, 5.3 The first paragraph mentions a "dry pond" and the second paragraph mentions "the southeastern dry pond." Many sections of the report discuss ponds in the ELV area, but in only one other section is the term "dry pond" used. Consistent terminology should be used to clearly identify each pond.

132. Section 4.1 ELV Site Background and History Discussion of history in this section and subsections is inadequate. There is brief summary of previous building uses. Specific discussion/listing for each building of specific chemicals used and potential environmental concerns should be provided. Table 4.1-4 lists chemical used but does not relate them to specific locations or buildings. All features shown on site figures that might have implications for environmental conditions should be included. Subsections 4.1.1 through 4.1.4 each discuss all of the major buildings, making it difficult to develop a comprehensive understanding of all information for any individual building. Summarizing building specific information in a table would be helpful.

133. Section 4.1.1 SWMUs and AOCs The first paragraph indicates there are two SWMUs within the ELV area, SWMU 5.2 and SWMU 5.3. Table 1-3 of the RFI

Program Report (MWH, 2004) indicates that SWMU 5.29 is the RD-51 watershed. The RD-51 well cluster is within the ELV area. Although re-sampling did not confirm initial samples that were the basis for the SWMU, this SWMU should be discussed.

134. Section 4.1.1 SWMUs and AOCs The third paragraph indicates that USTs UT-51 and UT-53 are AOCs within the ELV SWMU boundary and that both were closed by VCEDH in 1996. However, the reference provided for the closure (MWH, 2004) does not present any information regarding the basis for closure or reference to closure documents. Discussion of the closure basis and reference to closure documents should be provided.

135. Section 4.1.2 Site History The fourth paragraph discusses Building 2206 and states, "A long sump runs the length of the building along one wall." The text should be revised to identify which wall is adjacent to the sump and to describe disposition of waste collected by the sump. Specific features related to waste handling (ditches, pipes, etc.) should be shown on figures.

136. Section 4.1.2 Site History The fourth paragraph discusses Building 2206 and indicates that TCE and TCA were used to wipe and rinse component parts. Historical document HDMSE00356636 presents additional information that should be incorporated into the report.

137. Section 4.1.2 Site History The fourth paragraph discusses Building 2206 and states, "A small earthen catchment pond southwest of Building 2206 was used to contain testing operations wastes." Historical document HDMSP001796606 presents information regarding specific wastes and volumes that should be incorporated into the report.

138. Section 4.1.2 Site History The fifth paragraph includes discussion of metals used in Building 2206. In addition to items discussed, historical document HDMSE00377261 indicates metal plating processes in the building included use of titanium and zinc chromate.

139. Section 4.1.2 Site History The seventh paragraph indicates that there was formerly a drum storage area at Building 2207. The drum storage location should be shown on Figure 4.1.1 Historical Features.

140. Section 4.1.2 Site History The eighth paragraph indicates Building 2211 was used as an "Operations Building" and for furniture storage. It also indicates that a pipeline conveyed nitrogen gas from Building 2211 "… to a storage and filling station that was located down the hill." The text should be revised to clarify the type of operations conducted. Historical document HDMSE00251951 indicates four 32 cubic foot high-pressure tanks in the building. If known operations in Building 2211 are not consistent with storage/use of nitrogen and possibly other

gasses, the text should indicate that there is evidence of other, unknown uses. The “storage and filling station” should be described and the station and associated piping should be shown with other historical features on Figure 4.1.1.

141. Section 4.1.2 Site History The eleventh paragraph indicates that Building 2932 has been associated with two separate locations. References for the conflicting information should be provided. The paragraph also indicates that “… no building currently exists at either of these locations.” Figure 4.1.1 (Historical Features) shows existing Building “932” located within an asphalt area east of Building 2203. The discrepancy should be resolved.

142. Section 4.1.3 Site Chemical Use Areas The specific chemicals associated with historic use of each building should be specified in the text or a table. Where chemical use can be identified within a specific portion of a building, that information should be provided.

143. Section 4.1.3 Site Chemical Use Areas The first paragraph states, “…it is unknown what specific activities occurred in the building [2201].” Historical document HDMSE00377247 indicates Building 2201 was used for electrical assembly that involved lead-tin solder, epoxy, IPA, TCA, and TCE.

144. Section 4.1.3 Site Chemical Use Areas The first paragraph indicates that a 1955 plot plan shows a 7,500 gallon AST on the east side of Building 2201. Reference for the plot plan should be provided and the tank location should be shown on figures. This paragraph also indicates that piping diagrams (same reference?) show that “… the fuel oil also might have been used by Buildings 2202 and 2211” and that “The exact use of the AST is unknown … it presumably was used to store gasoline to power emergency generators for Buildings 2201, 2202, 2203, and 2211.” This paragraph should be revised to resolve whether the tank contained fuel oil or gasoline, and whether it was used by three buildings or four. The paragraph should indicate whether or not it is know if piping from the tank to the buildings is still in place and the pipe locations should be shown on Figure 4.1.1. Each of the major buildings appears to have an associated fuel storage tank. If the plot plan and piping diagrams indicate the AST was connected only to Building 2201, 2202, and 2211, it suggests that an as yet unidentified tank may have been associated with Building 2203.

145. Section 4.1.3 Site Chemical Use Areas The fifth paragraph indicates that the vault on the south side of Building 2206 may have been associated with test bays and drainage for Building 2206. The text should be expanded to describe whether or not there are any inlet or outlet piping or other structures associated with the vault or any other evidence suggesting possible use.

146. Section 4.1.3 Site Chemical Use Areas The eighth paragraph discusses Building 2231, the former PCB Storage Facility. The DOE's February 1989 "Environmental

Survey Preliminary Report" (HDMSE00109635) indicates that some PCBs from Area IV were placed in the PCB storage facility as part of a 1986-87 program to retrofit equipment that contained PCBs. While the document does not give any indication that this material might contain radiologic contamination, and not all materials from Area IV were associated with nuclear research, additional review should be performed to see if further information is available regarding the source and use of the material prior to storage at the ELV.

147. Section 4.1.3 Site Chemical Use Areas The last paragraph states, "…there is no documentation of chemical use at this facility [Building 2232]." The text should be revised to clarify if it is unknown if there was chemical use at this location or if the documentation gives reason to conclude there was no chemical use.

148. Section 4.1.4 Site Conditions Discussion in this section should be expanded to include all site features of potential environmental interest. Examples of features not currently described in the text include a sump south of the Building 2206 parking area, 3 steel plates bolted to the pavement surface in the southeastern corner of the parking area between buildings 2206 and 2207, and numerous concrete slabs not clearly associated with features already described (e.g. removed tanks).

149. Section 4.1.4 Site Conditions Surface drainage might have significantly affected the migration of released chemicals and should be discussed, including both sheet flow and contained flow such as gutters, ditches, and storm drains. Note that historical document HDMSE00251897 indicates that, "… effluent water from CTL 2 and the LOX Plant, both of which drain into a common canyon [Northern Drainage]…".

150. Section 4.1.4 Site Conditions The first paragraph indicates there is a partial cinderblock bermed area where the former AST was located. The location should be identified on Figure 4.1.1.

151. Section 4.1.4 Site Conditions The second paragraph indicates there is a surface water retention pond northwest of Building 2202. The pond and associated pavement should be identified on Figure 4.1.1. Text throughout the report should clearly distinguish between this pond and the pond southeast of Building 2206. Conveyance of water to the pond and discharge from the pond should be described.

152. Section 4.1.4 Site Conditions The second paragraph indicates that the Building 2202 clarifier has been cleaned out and wipe samples "reportedly" have been collected. The text should be revised to clarify: 1) if the clarifier and associated piping is still in place as implied; 2) whether or not wipe sample data is available and was used in site characterization; 3) what chemicals were associated with the clarifier; 4) disposition of sludge and liquid waste from the clarifier; and 5) if the

photo lab neutralizing tank indicated in historical document HDMSE00687918 is a different feature than the clarifier.

153. Section 4.1.6 Historical Document Reviews This section indicates that historical document review identified five new "potential features" at the ELV. However, only one feature described is actually associated with the ELV. The new ELV feature identified, a "potential pipeline from Building 2206 Catchment Pond" is not shown on figures.

154. Section 4.1.6 Historical Document Reviews Historical document HDMSE00581479 indicates that a radiation badge at Building 2207 was exposed after the employee terminated employment. The file for this incident should be reviewed to evaluate the potential that the badge was exposed due to a radiation source at Building 2207.

155. Section 4.3 RFI Characterization Results This section summarizes previous characterization results and interim measures. For each item discussed, reference should be provided to relevant documents and data sources. For each item, the discussion summary should include sufficient information to allow conclusion whether or not closure was appropriate by current standards (including data quality). The summary should include significant observations, scope of work (e.g. whether or not piping was removed with tanks), information regarding any soil removal or confirmation soil sample collection associated with removal activities. Include reference to written closure approval from regulatory agencies as well as closure reports. If status of a concern (such as piping) is not known, the text should discuss whether or not there is sufficient data from other sources to obviate need for further study.

156. Section 4.3.2.3 Local Hydrogeology The fourth paragraph indicates that TCE was piped from four test cells at Building 2206 to the catchment pond. Knowledge of direct piping of TCE from the test cells to the pond, and appropriate reference, should be included in Section 4.1 ELV Site Background and History.

157. Section 4.3.2.7 Chatsworth Formation Groundwater The first paragraph mentions "a small unlined catchment pond at the ELV. It should be clarified if the text intends to reference the pond south of Building 2206 or the pond north of Building 2202.

158. Section 4.4.1.1 Parameters Exceeding Criteria The second complete paragraph on page 4-16 discusses lead and zinc exceedances but in the fourth sentence incorrectly indicates silver exceedances.

159. Section 4.6.1 Contaminant Sources and Release Mechanisms This section cursorily addresses the topic in a single sentence. The text should be expanded

to discuss known or inferred sources and release mechanisms for detected contaminants.

160. Figure 4.1.1 Historical Features The following items should be addressed:

a) The figure distinguishes between existing and removed buildings but does not indicate whether or not buildings are chemical use areas.

b) The symbol shown on the Legend to indicate a leach field is used on the figure to delineate sewer lines. The figure should show and differentiate between existing and former sewer systems (in place and removed), including all pipelines, septic tanks, and leach fields. All buildings connected to water lines should be connected to the sewage system; only buildings constructed after the sewage treatment plant (if any) would not be connected to a septic tank and leach field.

c) Historical document HDMSP01726429 indicates two 75 KVA transformers, with PCBs at 112 ppm and 88 ppm, at building 2211. Show transformers on figure.

d) The small existing building between Buildings 2211 and 2202 should be identified.

e) Historical document HDMSE00455131 shows a transformer in the northwestern portion of Building 2202. Show transformer on the figure.

f) Report section 4.1.2 indicates a mercury release occurred inside Building 2203. The figure identifies the release area as a small rectangle north of the northwest corner of the building. This discrepancy should be resolved.

g) A chemical use area is shown between and extending north of Buildings 2202 and 2203. The specific chemical uses should be identified.

h) Historical document HDMSE00687918 shows a septic tank on the east side of Building 2202. The figure should show the tank and leach field, and indicate if they are existing or have been removed..

i) Historical document HDMSE00251950 indicates a 7500 gal fuel tank was located east of Building 2201, possibly at the location of the unlabeled rectangle on the figure. The location should be determined and labeled.

j) Historical document HDMSP1736630 shows Building 932 attached to Building 2203; the figure shows it within an asphalt area to the east. The discrepancy should be resolved.

k) Historical document HDMSP1736630 shows Building 931 located just east of the northeast corner of Building 2203. This building should be added to the figure.

l) The figure shows only part of Buildings 2201 and 2211 within the limits of SWMU 5.2. Report Section 4.1.1 states, “Other buildings included in the SWMU 5.2 boundaries are 2201, 2202, 2203, 2211, and 2232.” The figure should be revised or the reason for excluding portions of some buildings explained.

m) The figure shows an access road leading to a possible former building pad south of the west end of Building 2201. This feature and others – both existing and identified from photographs – that indicate past site activity should be labeled (e.g. “concrete slab”) and described in the text as “use unknown” if no information is available.

n) Pipelines should be labeled as to type and use (e.g. “steel, potable water”). Subsurface pipelines should be shown.

o) Historical document HDMSE00456454 indicates transformers outside the northeast corner of Building 2207.

p) UT-53 should be shown as a chemical use area.

q) Historical document HDMSE00024353 indicates a septic tank on the east side of Building 2207. The figure should show the tank and leach field, and indicate if they are existing or have been removed.

r) Historical document HDMSP1736630 indicates a removed building, a guard shack, west of building 2207. This building should be added to the figure and discussed in the text.

s) The figure does not show Buildings 2203, 2206 or 2207 connected to the sewer system. The figure should show the current and historic sewer system piping.

t) Historical document HDMSE00688631 identifies Building 2231, the PCB Storage Facility, as the “Dynamometer Control Building.” This former use should be described in the text and investigated to evaluate if it might have involved chemical use.

u) A linear chemical use area is shown between Building 2207 and a sewer line (leach field symbol) extending southeast from the site. This chemical use area appears to be a sewer line to the Building 211 Leach Field. It should be identified on the figure and discussed in the text including whether it is older or part of same system as the sewer line to east, why it does not extend north of the road, and why it is shown as a chemical use area and other sewer lines are not. Did this line go only to bldg 211? The figure should show the complete line and all buildings served, and whether or not existing.

v) Historical document HDMSP1736630 indicates an unidentified feature on the figure located about 400 feet east of Building 2205 was the location of Building 332, identified as “optical building.” This feature should be labeled and discussed in the text, including whether or not there is evidence that chemicals were not used.

w) The existing building shown south of Building 932 should be labeled and discussed in the text.

x) A tank immediately adjacent to the northeast corner of Building 2206 and a tank shown about 80 feet east of Building 2206 are both labeled UT-51. The tank immediately adjacent to the building is actually a high-pressure nitrogen tank (with adjacent high pressure helium tank). The color used for UT-51 indicates it was not used for petroleum but the report text (e.g. Section 4.1.1) indicates it was a diesel fuel tank. These discrepancies should be resolved.

y) Historical photo HDMSP00049322 shows a building at the location of an unidentified rectangle east of Building 2206, just south of tank UT-51. All historic features should be included on the figure and discussed in the text.

z) Concrete in the area just east of the northeast corner of Building 2206 has been removed and replaced by asphalt roughly 6 feet by 10 feet. Given the distance between UT-51 and Building 2206, the possibility that UT-51 was associated with the previously unidentified building and that a separate tank was removed from the patched area should be evaluated.

aa) Historical document HDMSP1736630 indicates Building 230 (Security Control) previously existed northwest of the northwest corner of Building 2206.

bb) The figure identifies a chemical use area east of Building 2206 as “B206 Equip Cl Area” but historical document HDMSE00728155 indicates the equipment cleaning area was west of the building.

cc) Historical document HDMSE00456251 indicates a cooling tower on the west side of Building 2206. Section 5.1.2 indicates that cooling water may have contained solvents or fuels.

dd) All tanks and other features on the east and south sides of Building 2206 should be labeled and discussed in the text, including if use is unknown. Of the 15 tanks shown south of the building, only the 12,000 gallon water tank exists. Differentiation between existing and removed tanks, and a table of tanks and other features would be useful.

ee) The chemical use area adjacent to the south side of Building 2206 should be labeled so it may be correlated with discussion in the text.

ff) The configuration of the Drum Storage chemical use area south of Building 2206 is different from that shown in historical document HDMSE00259683 and extends into the roadway, which is unlikely.

gg) A chemical use area shown about 150 feet east of Building 2206 is labeled "Parking Lot TPH Use ar [sic]" but occupies only a small portion of the paved parking area. This chemical use area should be discussed in the text.

hh) Two drainage channels located on the slope south of Building 2206 (e.g. see historical photo HDMSP00049333) are significant to surface water drainage and should be shown.

ii) Historical document HDMSE00039413 shows two flow paths from the pond southeast of Building 2206, one toward the RD-9 outfall and one toward Silvernale reservoir. Site inspection indicates there are existing pond inflow and outflow structures. Historical document HDMSP001796606 indicates pond effluent was pumped through a pipeline to the "Alpha-Bravo drainage channel." These features should be shown on the figure and flow to and from the pond should be discussed in the report text.

161. Figure 4.3.2-1 Groundwater Monitoring Locations The following items should be addressed:

a) As the only figure that distinguishes between different types of chemical use areas, the figure should be expanded to include the area of Building 2207 which contains UT-53, a drum storage area, transformers, a septic tank, and the Building 2211 leach field sewer line chemical use area.

b) The detail at the top left corner of the figure showing cross section lines should be revised to include the cross section on Figure 4.3.2-5. The detail would be easier to use if the section lines were presented in the order of the figures they represent and if the bottom section presented the well numbers from left to right as presented on the cross section figure (PZ-139 to PZ-145) as the others are presented.

c) The endpoints of the cross-section lines should be extended to correspond with the endpoints shown on Figures 4.3.2-2 through 4.3.2-5.

162. Figures 4.3.2-2 through 4.3.2-5 Geologic and Hydrogeologic Cross-Sections The following items should be addressed:

a) The geologic conditions would be easier to interpret if the symbol used for faults was different from other geologic contacts and if a different color were used for the ELV member of the Chatsworth Formation.

b) The figures should indicate where the Chatsworth Formation is sandstone member, siltstone member, or undifferentiated.

c) To reduce potential misunderstanding, angle points in the section lines should be identified.

d) The legend indicates different symbols for interpreted and inferred geologic contacts, but the difference is not clear from review of the figures. The basis for determining each type of contact should be discussed in the text or presented as a note on the figure. Locations where a geologic contact was identified in a boring should be distinguishable from interpreted locations between borings.

e) The figures should distinguish between contacts that are inferred to extend through alluvium and those that are projected through alluvium. This is particularly important for faults shown extending through alluvium, which has significant implications for fault age.

163. Figure 4.3.2-2 Geologic and Hydrogeologic Profile Along Cross-Section W-E The following items should be addressed:

a) On this figure, Well RD-56A appears closer to PZ-073 than RD-56B, and there appears to be over 100 feet difference in groundwater elevation for wells that are less than 10 feet apart. These appearances are an artifact of projecting RD-56A and RD-56B to the section line. Extending the section line from PZ-073 to RD-56B would better represent the actual condition.

b) The lower elevations on the left side of the figure do not match the right side.

c) Topography in the area immediately west of PZ-144 does not appear to match topography indicated on Figure 4.3.2-1.

d) The areal extent of fill shown in the area of well RD-51B should be presented on a plan-view figure and should be discussed in the text.

e) The distance shown between wells RD-51A and PZ-138 is not consistent with Figure 4.3.2-1.

f) If the east end of the cross section line continues along a projection from RD-51A to PZ-138, the figure should show a fault contact east of PZ-138 which is shown in that location on Figure 4.3.2-7. Locations of contacts bounding the ELV member are not consistent with other cross sections.

164. Figure 4.3.2-3 Geologic and Hydrogeologic Profile Along Cross-Section NW-SE The following items should be addressed:

a) RD-51C is not labeled as projected to the section line. Projected perpendicular to the cross section, RD-51C should appear much closer to RS-29 than to PZ-139, but it is shown approximately equidistant. If wells are projected to section lines along bedding strike, an explanatory note should be added to the figures. If projection both perpendicular and along strike is used, the projection method for each well should be identified.

b) The location of the Catchment Pond should be noted as projected to the section line. The topography at the pond does not appear consistent with Figure 4.3.2-1. If a more detailed topographic source was used to develop the cross section, it should be noted on the figures.

c) Some wells are shown with different line weights than others (e.g. PZ-139 and RS-29) and for some wells (and faults) different line weights are used for different sections of the same well (e.g. RD-51C).

d) The groundwater elevation shown for well C-7 is indicated to have been measured "Circa 2001." The report text should explain validity of this measurement if the actual year the depth was measured is unknown.

e) In addition to the fill shown on the northwest side of the figure, historical air photographs (e.g. historical document HDMSP00049333) indicate the presence of fill material around the perimeter of much of the eastern end of the site. As fill soil can affect the migration of contaminants released to the ground, and the feasibility of various exploration methods, the areal distribution and thickness of fill at the site should be discussed in the text and presented on figures.

165. Figure 4.3.2-4 Geologic and Hydrogeologic Profile Along Cross-Section SW-NE
The figure shows alluvium approximately four feet thick southwest of the North Fault and approximately 80 feet thick northeast of the fault, in the area of well PZ-143. However, Figure 4.3.2-1 shows bedrock cropping out about 15 feet northeast of PZ-143, or about 40 feet northeast of the fault. The bedrock northeast of PZ-143 should be shown on the figure and the mechanism for this thick, narrow zone of alluvium should be better explained in the text.

166. Figure 4.3.2-3 Geologic and Hydrogeologic Profile Along Cross-Section NW-SE
The following items should be addressed:

a) Conditions shown in the area of well PZ-138 are very different from the same cross section segment on Figure 4.3.2-3. To the southwest, the location and orientation of contacts bounding the ELV Member are different and the North Fault strand southeast of well PZ-138 is missing. To the northwest, wells and a strand of the North Fault are missing and the configuration of geologic units is very different.

b) The location of the Catchment Pond should be noted as projected to the section line. The topography at the pond does not appear consistent with Figure 4.3.2-1. If a more detailed topographic source was used to develop the cross section, it should be noted on the figures.

c) The contacts bounding the ELV Member are shown terminating at depth using the same crossing line as used for the bottom of wells.

d) The figure should note that wells and topography southwest of PZ-145 are taken from Figures 5.3.2-1 and 5.3.2-4.

e) The well labeled RD-09 is actually well WS-SP.

167. Figure 4.3.2-7 Geologic and Hydrogeologic Profile Along Cross-Section NW-SE The following items should be addressed:

a) Reference should be provided for the source of geologic mapping.

b) A label for well RS-29 is present but a symbol indicating the well location is missing.

c) The label "NDE" is indicated to mean "Not Deep Enough" and is on the figure adjacent to the juncture of two fault splays. The meaning of this designation should be clarified.

d) A small area indicated to be artificial fill is shown southeast of building 2206, presumably at the pond location. As indicated in previous notes, all know fill at the site should be delineated on the figures and discussed in the text.

168. Table 4.1-1 ELV Area RFI Site Building Inventory The following items should be addressed:

a) Entries under the "Chem Use Area Number" column are followed by one or more numbers in parentheses. The meaning of the numbers should be explained.

b) Both existing and removed buildings are missing under the column "Building." Some buildings included on the list are shown on figures as only partly within the SWMU.

c) The "Operational Status" column lists Building 2932 as "Removed" but figures show it existing east of Building 2203. The entry in the "Current Use" column for this building of "NA" should be revised if the building exists.

169. Table 4.1-2 ELV Area RFI Site Tank Inventory The following items should be addressed:

a) Many above ground tanks are shown with the Tank Designator listed as "unknown." A unique identifier should be listed for each tank so that they may be correlated with tanks shown on figures and discussed in the report text.

b) The second column is "Chem Use Area Number." Chemical use areas shown on figures should indicate the number of each chemical use area to correspond with the table.

c) It is unclear why some chemical storage tanks (e.g. diesel USTs) are listed as not having a chemical use area number. If the listings are correct, the basis for designating chemical use areas should be discussed in the report.

d) The operational status listing for many tanks includes a question mark. The operational status for each should be determined.

e) The third row lists an underground tank designated as "Unknown" and its location is indicated to be unknown but in the area of Building 206; it is indicated to have been removed in 1987. This tank site is not indicated to be "closed." It is unclear how the tank can be confidently concluded to have been removed if the location is uncertain and the tank site was not formally closed. Applicable references should be provided for this and other tanks on the table. Also, see comment "160-z" for Figure 4.1.1.

f) An above ground tank with "Tank Designator" listed as unknown is indicated to be located east of Building 2232 and its size is listed as "Unknown, approximately the size of Building 232." The tank is located southeast of Building 232. The tank exists and the size could be measured in the field or calculated from plan details on historical document HDMSE00455136.

g) Historical document HDMSE00257671 discusses modifications for installation of a 12,000 gallon LOX tank in Bay 2 of Building 2206. Further historical document research and site review should be performed to evaluate if there is evidence this tank was installed.

170. Table 4.1-3 ELV Area RFI Site Transformer Inventory The following items should be addressed:

a) The identification numbers listed on the table do not correspond with transformer identifications on Figure 4.1.1. Each transformer should be given a unique identifier corresponding to identifiers used on the figures and in the text.

b) The table lists seven transformers but Figures 4.1.1 and 4.3.2-1 show only five.

c) A status of "Present?" is listed for Secondary Sub 2E-8711. The actual status should be determined.

d) For transformer Secondary Substation 2-E-650 the column for "Transformer Oil Sampled for PCBs?" indicates "Unknown (likely yes)." A note on the table or to discussion in the text (referenced on the table) should clarify this ambiguous entry.

e) The column for "Soil Sampled?" indicates "Yes(?)" for transformer Secondary Substation 2-E-650. A note on the table or to discussion in the text (referenced on the table) should clarify this ambiguous entry.

f) For transformer Secondary Substation 2-E-650, the column for "Visual Inspection Date & Findings" indicates "10/26/05 / Nothing Noted." The entry or a note on the table should clarify if no notes were made during the inspection or if the notes do not indicate whether or not there was a PCB sticker or evidence of leaking or corrosion.

g) For all transformers, the last column ("Transformer Condition after 2006 Fire") has the entry, "See Visual Inspection." Provide reference to the location of visual inspection reporting.

171. Table 4.1-4 ELV RFI Site Chemical Use The following items should be addressed:

a) The table lists chemicals used at the ELV site but does not distinguish areas of the site at which individual chemicals were used. The table should indicate specific buildings or chemical use areas for each chemical listed.

b) Most items listed under "Chemicals Used" are product names rather than chemicals and it is unclear which, if any, chemicals contained in individual products are of environmental concern. The table should list specific chemicals so that the table of chemicals used can be correlated with analytical testing performed.

c) The reference for 51 of the 79 items on the table is "MWH, 2006. Boeing Company, 2006" but the document by MWH is not included in the references presented at the end of the table. The reference should be provided if different from the Boeing document or not listed if it refers to the same document.

172. Table 4.3.2-3 Summary of VOCs Analyzed at the STP in Samples from Near-surface Monitoring Wells If the correct table is presented, the title should be changed to indicate it is for data from the ELV, not the STP.

173. Section 5.1.1 SWMUs and AOCs The first paragraph indicates that an AOC for UT-52 is located southwest of the STP. The text does not reference a figure showing the location and Section 5 figures do not show the location.

174. Section 5.1.1 SWMUs and AOCs The first paragraph indicates that UT-52 was removed and the tank site closed by VCEHD in 1994. Provide reference for the closure report and agency correspondence granting closure.

175. Section 5.1.2 Site History Discussion of the RD-9 area treatment system in paragraphs 3 and 4 should be expanded to provide clarifying detail. Was it used only in 1990 and 1991? Why was use in 1990 and 1991 only periodic? What contaminants were present in treated water? Did the water contain any contaminants not treated by the system? Did any treatment occur between NFA status (1995 or before) and deactivation in 2001? How can a 1993 report be the appropriate reference for deactivation in 2001? Section 5.1.4 (Site Conditions) says the treatment system was placed on "stand-by" status in 2001. Please clarify if "deactivation" and "stand-by" are the same and whether any treatment was performed after that date.

176. Section 5.1.2 Site History The fourth paragraph indicates that groundwater treated in the RD-9 Area treatment system was "discharged" to the Silvernale Reservoir. The means of water conveyance to the reservoir should be described.

177. Section 5.1.2 Site History The seventh paragraph indicates sewage was pumped from the STP to the treatment plant in Area III. The pipeline from the STP to Area III should be shown on the figures.

178. Section 5.1.2 Site History The eighth paragraph should clarify when the USEFF was identified, what "products" were used in testing, the volumes used and where they were stored or, if this information is not available, should so indicate.

179. Section 5.1.2.1 Site Inventories The wrong table numbers are indicated for the Tank Inventory and Transformer Inventory.

180. Section 5.1.3 Site Chemical Use Areas The second paragraph indicates that the groundwater treatment system was surrounded by a concrete berm. The text should clarify why the Chemical Use Area shown on Figure 5.1.1 is far larger than the treatment system berm.

181. Section 5.1.3 Site Chemical Use Areas The third paragraph should include references for closure of UT-52.

182. Section 5.1.3 Site Chemical Use Areas The fourth paragraph indicates treated water from the STP was pumped to a drainage ditch leading to the Silvernale Reservoir. The ditch should be show on the figures.

183. Section 5.1.3 Site Chemical Use Areas The last paragraph indicates the products "NTO, MMH, and Freon trichlorofluoroethene" were used at the USEFF. Historical document HDMSP00047252 indicates that the site also had tanks for these

products and that "trich," alcohol, and Freon TF may have been used as flushing and cleaning solvents. This document also indicates uncertainty regarding the USEFF location. The evidence for the location should be discussed (with references).

184. Section 5.1.6 Historical Document Reviews This section indicates that one new feature, a cement containment pool behind the RD-9 area groundwater treatment system, was identified during historical document reviews. Sections 4.1.6 and 5.1.2 indicate the USEFF was newly identified by document review. Also no other sections of the report discuss a containment pool behind the treatment system and it is not shown on figures. These discrepancies should be resolved.

185. Section 5.4 Former Area II Incinerator Ash Pile, SWMU 5.6, and Building 515 STP Nature and Extent The evaluation of nature and extent of chemicals released includes SWMU 5.4 and the USEFF.

186. Section 5.4.1.1 Parameters Exceeding Criteria (Metals) In the fourth paragraph, the number of locations indicated to exceed the barium and cadmium screening criteria are reversed.

187. Figure 5.1.1 Historical Features SWMU 5.6 – Former Area II Incinerator Ash Pile AOC – Building 515 Sewage Treatment Plant The following items should be addressed:

a) The title should be revised to reflect that this figure also shows historical features for SWMU 5.4.

b) Pipelines should be identified.

c) The symbol on the legend indicating a leach field appears to also be used to show sewer pipelines. Does the pipeline shown by this symbol extending north to the service area really extend through the area shown as outcrop? Is this an abandoned or removed section of pipeline? Why is no sewer line shown extending to the STP?

d) There is a narrow linear area of the leachfield chemical use area extending northwest toward the service area. Is this a second pipeline extending to the leach field? Why are other sewer lines not chemical use areas?

e) Historical document HDMSE00687518 shows: 1) three septic tanks south of the Service Area Road and east of the sewer line indicated by the leachfield symbol; 2) an existing sewer line extending northwest from the tanks to the service area; 3) a planned sewer line from above the tanks to the STP; and 4) appears to indicate septic tanks were to remain in place. Did three sewer lines extend to the Leach Field and STP from the Service Area? Are the tanks still in place? Show

all in-use, abandoned but in-place, and removed sewer system features on the figure.

f) A rectangular Chemical Use Area east of the STP is labeled “B515 Leach Field.” This feature is described in report Section 5.1.1 as the “Area II Service Area Building 211 Leach Field.” Terminology in the text, figures, and tables should be consistent.

g) Building 2776 is labeled “B515 Clarifier” and is shown, along with an unlabeled building, as within a chemical use area South of Building 2515. The building should be labeled and discussed in the text. Discussion in the text should indicate the basis for including Building 2776 in the chemical use area but not Building 2515.

h) Historical document HDMSE00455190 indicates two buildings, possibly at the locations of the two rectangles northeast and southeast of Building 2515. Were there removed buildings at these locations?

i) Historical document HDMSE00455190 indicates a “Flowmeter Catch Pond” approximately in the area between the STP and the leach field. The possibility of a pond in this area before construction of the STP, potentially receiving effluent from the ELV pond, should be investigated and discussed in the report.

j) Section 5.1.3 indicates STP effluent was pumped to a ditch that conveyed the effluent to Silvernale reservoir. Show effluent piping and ditch. Historical document HDMSE00039413 indicates flow from the ELV pond draining to the STP area and then to Silvernale Reservoir. Was this via the same ditch? Both should be discussed in the report text.

k) Historic document HDMSP01736644 indicates Building 755, identified as “Control House Firing Area 2” on the south side of the STP access road and adjacent to the main road. It should be added to the figure.

l) The irregularly shaped feature directly south of building 755, across an access road, should be identified.

m) A small, rectangular existing building is shown within a square feature south of the STP access road. No building exists in this area. The square feature is a concrete pad surrounded by security posts. If a building previously existed at this location, it should be identified and discussed in the text. The concrete pad should be identified and discussed in the text.

n) There is a line of alternating dots and dashes forming a circle around symbols for two existing and three removed buildings, apparently outlining the area of the

USEFF. An explanation for this line should be added to the legend or it should be removed.

o) Historical document HDMSP01736644 indicates the unidentified removed building within the USEFF was Building 349, identified as “Control Center.”

p) Site inspection indicates that the two features within the USEFF indicated by symbols for “existing buildings” are actually ASTs. They should be identified and discussed in the text. The square around the western AST and the small rectangle just east of this AST should be labeled and, if warranted, discussed in the text.

q) Historic document HDMSP01736644 indicates the removed building symbol labeled “766” was a test pad, not a building. The discrepancy should be resolved.

r) Historic document HDMSP01736644 indicates there was a “security storage building” just south of the circle indicating the USEFF area. This building should be shown on the figure and discussed in the text. Additional research should be performed to attempt to determine what materials were stored in this building.

s) UT-52 is discussed in the report text but not shown on this figure. Historical document HDMSE00687919 suggests it was approximately at the location of the western AST, consistent with historical document HDMSE00108891 which indicates it was formerly called "B776." However, the location of soil sample "AREA-II-UST-05" (see Figure 5.4-1) suggests it was in the area between B238 and B766. The actual tank location should be identified, labeled and discussed in the text.

t) Existing building 2T and three removed buildings are shown on the south edge of the figure with the Group 2 boundary passing through two of the removed buildings. All should be labeled and discussed in the text.

u) Site inspection reveals a small headwall and drainpipe West of Building 2758 that appears to take surface water from this area. The headwall and alignment of the pipe should be shown on the figure and surface drainage discussed in the text.

v) The former incinerator included a separate loading dock structure that should be shown on the figure (see historical document HDMSE00728155).

w) A chemical use area labeled as “Transformers” is shown east of Building 2758. Two existing buildings are shown within that area labeled “Unloading Dock” and “Incinerator.” The unloading dock and incinerator were at the location indicated as removed Building 2758. Both existing buildings should be given appropriate labels and discussed in the text.

x) A symbol for a large removed building, labeled "509," is shown east of the Transformers chemical Use Area, overlapping an area of steep outcrop. It is unlikely a building existed at this location, but Building 509 is shown on many historical documents (e.g. historical document HDMSE00687035). This feature should be discussed in the text.

y) The large chemical use area labeled "Ash Pile Debris Area" should be discussed in the text.

z) Existing and removed features in SWMU 5.4 should be labeled and discussed in the text. The concrete berm surrounding the treatment system, and the cement containment pool behind the treatment system, both discussed in the report, should be shown and labeled.

aa) The basis for the size and shape of the SWMU 5.4 chemical use area should be described in the text.

188. Figure 5.3.2-1 Groundwater Monitoring Locations The following items should be addressed:

a) For consistency with other figures, the "Line of Cross Section" shown above the Legend should show both cross section lines from Figure 5.3.2-4.

b) The legend shows three types of chemical use areas including "Screening" indicated by a pink color. The STP Clarifier, Ash Pile, and Leach Field are all shown as this type of area. A note should be added to the text explaining the meaning of a "screening" chemical use area.

c) The RD-9 Area treatment system is shown as a chemical use area on Figure 5.1.1 but not on this figure or Figure 5.3.2-3. The discrepancy should be resolved.

189. Section 6. Springs and Seeps The title and discussion in this section should be revised to clarify that it addresses wells in addition to springs and seeps. It should also be revised to clarify that the area addressed by this section includes land north of Areas I and II, and that it includes portions of the undeveloped Boeing land within Group 2 limits, plus part of the Brandis-Bardin property.

190. Section 6.1 Springs and Seeps Background The first sentence states, "The land immediately north of the Group 2 RFI area consists of undeveloped land owned by SSFL...". Figure 1.1.2.3-1 indicates that the Group 2 RFI area encompasses the undeveloped land north of NASA Area II, and that the undeveloped land is owned by Boeing, not SSFL.

191. Section 6.1 Springs and Seeps Background The second sentence states, "Groundwater discharges through springs and seeps on the hill slopes adjacent to the Group 2 RFI study Area." Figure 1.2.4-2 shows locations S-8 and S-18 are within the study area; clarify that the report addresses both on-site and off-site seeps and springs.

192. Section 6.1.1 Site Conditions Related to Springs and Seeps The text should be revised to address historic and potential future changes in groundwater levels.

193. Section 6.2 Springs and Seeps Sampling and Offsite Characterization References should be provided for each program in the bullet-point list.

194. Section 6.2 Springs and Seeps Sampling and Offsite Characterization The fifth bullet-point item regarding well OS-9R twice indicates well "OW-9R".

195. Section 6.2 Springs and Seeps Sampling and Offsite Characterization The reference provided for the fifth bullet-point item briefly mentions perchlorate detections in well OS-9, but does not mention OS-9R. It extensively discusses sampling in the Northern Drainage and might have been intended as a reference for the previous bullet-point item.

196. Section 6.3 Sampling Results The discussion in this section is limited to data collected during and after 2002. The section, along with figures and tables as warranted, should be revised to include all spring, seep and offsite well data. Reporting should include figures showing where detections have been reported and time series graphs for detections.

197. Section 6.3 Sampling Results The second bullet item under the third paragraph indicates that perchlorate results since 2002 are presented on tables 6.3-2 and 6.3-3. Data from before 2002, if any, should also be presented. If there is no data prior to 2002, that should be explained. The tables do not include the DTSC samples that had detected perchlorate. There is no discussion suggesting that the DTSC results are not representative and should be excluded from the data set. The text should be revised to include a discussion justifying exclusion of the DTSC results or Table 6.6-3 revised to include the data.

198. Figure 6.1-1 Offsite Seep/Spring and Monitoring Well Locations Locations S-8 and S-15, shown on Figure 1.2.4-2, are missing. Location S-25 is shown but is not labeled. The figure delineates the eastern and western boundaries of an area "down dip of Group 2 RFI Boundary." The text should be revised to clarify if this intended to indicate limits of the area addressed by this section of this report, and to clarify the northern limit included in the study. Note also that, as shown on the figure, these boundaries exclude the westernmost portion of Group 2 within the "Undeveloped Area."

199. Table 6.1-1 STP RFI Site Building Inventory This table is an incomplete version of Table 5.1-1 and should be deleted.

200. Tables 6.3-1, 6.3-2 and 6.3-3 In addition to data shown, these tables should present all data previous to 2002. The title of Table 6.3-3 should be revised to clarify that this table is limited to data for offsite wells.

201. Table 6.3.2-1 through 6.3.2-8 These tables all present data relevant to report Section 5, not Section 6, and should be moved or deleted. In addition, data is missing from Table 6.3.2-1.

202. Table 6.4-1 through 6.4-5 These tables appear to be draft versions of tables presented in Section 5 and should be deleted.

203. 8. References The following items should be addressed:

a) Department of Toxic Substances Control. 1996b. This document is not referenced in the text. In addition, this document has the same title as the reference following it; verify titles and dates are correct.

b) Department of Toxic Substances Control. 2006b. This document is not referenced in the text. In addition, the text and references do not include a "2006a" document from the Department of Toxic Substances Control.

c) Montgomery Watson. 2000. The document source is "Montgomery Watson Harza."

d) MWH Americas, Inc. 2004. The title is incomplete. This appears to be a duplicate of the reference "MWH. 2004."

e) MWH. 2007b. The month of publication (December) should be added.

f) MWH. 2006. The title on the document is similar but with different word order.

g) MWH. 2005d. This "Internal Draft" document should be included as an appendix to the report or otherwise made available for public review.

h) MWH. 2003b and MWH. 2003e. These documents appear to be duplicates.

i) MWH. 2003c and MWH. 2003g. These documents appear to be duplicates.

j) MWH. 2003d. The month of publication (November) should be added.

k) MWH, Inc. 2001. The title is incomplete and two publication months are given.

l) Ogden Environmental and Energy Services, Company, Inc. 1996a. This document should be indicated to be Volume III (references 1996b and 1996c are volumes I and II).

m) Science Applications International Corporation. 1994. This and the reference following it appear to be duplicates.

n) The Boeing Company, Rocketdyne Propulsion and Power. 2002. This appears to reference a letter from Gerard Abrams of DTSC to Art Lenox of Boeing.

204. Appendixes An appendix should be included presenting a compilation of agency correspondence as provided for previous RFI reports.

205. Appendix B Table B.7.1-1 Summary of Soil, Soil Vapor, and Groundwater Samples Used in the Risk Assessment The listing of soil samples from 0-10 feet includes many samples collected deeper than ten feet, including some from RD-80 collected at over 200 feet. The table should be revised to accurately present the data and review should be performed to determine if data from deeper samples was used in the risk assessment calculations.

206. Appendix B Table B.7.1-3 Description Summary Statistics - Soil and Soil Vapor The following items should be addressed:

a) The listing of chemicals analyzed for samples from 0-2 feet includes some chemicals not listed for samples from 0-10 feet.

b) Dioxin and furan congeners are not included on the table even though exceedances are discussed in the text and Table 2.4-2 includes 12 congeners that exceeded the screening criteria. It appears that dioxin and furan results were also excluded from the human health and ecological risk assessments.

c) Benzene, ethylbenzene, toluene, and xylenes analyses are typically performed as a suite, not individually. The table indicates 59 analyses for benzene, ethylbenzene and toluene in the 0-2 foot interval and for 92 analyses in the 0-10 foot interval. The table indicates 56 analyses for o-xylenes and m,p-xylenenes in the 0-2 foot interval and 89 in the 0-10 foot interval. Is there a reason xylenes were not analyzed for three samples?

d) In addition to analyses for individual xylenes isomers, total xylenes analyses are indicated for 15 samples at 0-2 feet and 25 samples at 0-10 feet. Appendix G indicates that for at least some samples (e.g. sample ID RJ287 at location LXBS14) both individual isomer and total xylenes analyses were performed (or individual results reported both individually and combined for a total value). Duplicate xylenes analyses for a single sample should not be used in the summary statistics unless the results are averaged.

207. Appendix G The following items should be addressed:

a) The results for some analytical tests do not appear realistic. On page 124 for example, methylene chloride is indicated as detected in sample 980206*10 at 8.699999809 µg/L.

b) An explanation should be added for sample types and other acronyms.

c) Analytical results for ambient air samples at the LOX site should be discussed in the report text.

REFERENCES

Department of Toxic Substances Control (DTSC). 2008. Letter from Gerard Abrams of DTSC to Arthur J. Lenox of The Boeing Company. June 4, 2008.

MWH. 2003. *RCRA Facility Investigation Work Plan Addendum Amendment Area I and Area II Landfills Investigation Work Plan SWMU 4.2 and SWMU 5.1 Santa Susana Field Laboratory Ventura County, California*. October, 2003.

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