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Subject: Response to Agency Comments, August 2008 Perimeter Groundwater Operable Unit Remedial Investigation/Feasibility Study

Dear Mr. Mayer, Mr. MacDonald, and Mr. Cargile:

Below are Aerojet's and ERM-West, Inc.'s (ERM) responses to the following Agency comments on the August 2008 Perimeter Groundwater Operable Unit (PGOU) (OU-5) Remedial Investigation/ Feasibility Study (RI/FS) for the Aerojet Superfund Site in Sacramento, California.

- Letter dated 2 December 2008 from the United States Environmental Protection Agency (USEPA) Region IX, the Regional Water Quality Control Board (RWQCB), and the California Department of Toxic Substances Control (DTSC) on the risk assessment sections of the PGOU RI/FS (2 December 2008 Letter).
- Letter dated 21 January 2009 from USEPA, RWQCB, and DTSC on the Draft PGOU RI/FS (21 January 2009 Letter).
- Email dated 27 January 2009 from Kevin Mayer forwarding Weston Solutions, Inc. (Weston) comments on Aerojet's implementation of responses to comments in the PGOU baseline risk assessments (BLRAs) (27 January 2009 Email).
- Email dated 3 February 2009 from Kevin Mayer forwarding Weston comments on revised Appendix Q and Section 7 tables for OU5 Lands RI/FS (3 February 2009 Email).

This response to comments also incorporates discussions from a 4 March 2009 conference call between Aerojet, USEPA, RWQCB, DTSC, ERM, and Weston.

The text of each comment is repeated verbatim in bold, followed by Aerojet's response.

2 December 2008 Letter

General Comments

Comment 1: The document(s) does not provide cumulative risk estimates for exposure to soil, soil vapor, and groundwater.

As noted in the text, the August 2008 PGOU Lands BLRA incorporated agreements with the Agencies resulting from on-going discussions between Aerojet and the Agencies regarding the Boundary Operable Unit (OU-6). One of these agreements included performing the risk estimates on a point-by-point basis. However, the soil, soil vapor, and groundwater samples collected at the PGOU are not co-located and therefore cannot be summed.

During a 4 March 2009 conference call, the Agencies agreed this should be addressed by a discussion in the uncertainty section. Accordingly, the following discussions will be added to the uncertainty sections of the PGOU Lands and Groundwater Baseline Risk Assessment.

Section 3.5 of the PGOU Lands Baseline Risk Assessment will be updated with the discussion below. While the point-by-point risk assessment procedure assists with delineating risk domains to facilitate remedial action considerations, cumulative risk across both bulk soil and soil vapor locations cannot be estimated because virtually none of the samples are co-located. In addition, risk assessments are based on chronic, long-term exposures over an areal extent. Therefore, the summing of point-by-point risk estimates is inappropriate and contrary to standard risk assessment practices and guidance.
As seen in Figures 7-1a through 7-4b, the following conditions are evident:

- Virtually all bulk soil and soil vapor samples lack proximity.
- Many of the bulk soil sample locations had estimated risks less than 10^{-6} and below a hazard index (HI) of 1.0.
- At locations where there is some degree of proximity, either both sample types (bulk and vapor) were well below de minimus risk criteria (i.e., 10^{-6} and HI<1.0), or one sample was clearly above de minimus and therefore would "dominate" a combined exposure and risk estimate.

Therefore, the lack of coincidence of the bulk soil and soil vapor measurements prevents cumulative risk estimates across these media and represents an uncertainty. However, based on the nature and magnitude of the risk results, it is unlikely that this uncertainty would substantially affect the interpretation of the data and results. In fact, it is highly unlikely that the risk has been substantially underestimated. Section 3.6 of the PGOU Groundwater Baseline Risk Assessment will be updated with the discussion below.

The risk from vapor intrusion and domestic use were not summed in the Human Health Risk Assessment (HHRA) to estimate a cumulative risk to potential site receptors. As discussed in Section 1.1.1, groundwater on site is not used for any purpose, and future groundwater use on lands removed from the Superfund Site boundary is governed by environmental restrictions included in the Partial Consent Decree (PCD), and recorded against title to the land.

Future additional use of groundwater off site is currently restricted by the Sacramento County Ordinance. The Sacramento County Environmental Management Department manages a "Consultation Zone," which

requires all parties to consult with DTSC and the RWQCB prior to issuing a well permit within a 2,500-foot distance from chemicals in groundwater at the Aerojet site.
Therefore, cumulative risk from vapor intrusion and domestic use were not calculated because this is an unrealistic scenario.

Comment 2: There were a significant number of chemicals that were not detected, however their detection levels were considerably higher than their respective screening levels. While this is addressed in the uncertainty analysis of the HHRA, the authors should consider how these chemicals will be addressed in the Feasibility Study, especially for the groundwater chemicals with elevated DL.

Aerojet believes these chemicals are considered in the FS. The objective of the remedies evaluated in the FS included containment of constituents above their chemical-specific Applicable or Relevant and Appropriate Requirement (ARAR) regardless if the chemical was detected during the RI reporting period (i.e., chlorinated volatile organic compounds [VOCs], 1,4-dioxane, perchlorate, or N-nitrosodimethylamine [NDMA]).

Comment 3: Transparency is needed in the risk calculation tables; how unit risk and unit hazard values are calculated needs to be provided which can be as simple as a footnote indicating that intake factors times /divided by the toxicity values. The risk calculation tables should also indicate which of the depth-dependent attenuation factors were used in the inhalation risk calculations.

Footnotes will be added to the HHRA in response to this comment.

Comment 4: All table inputs and calculations were spot-checked for accuracy. Some errors were noted, as presented in the Specific Comments, though the final risk estimates appear correct.

This comment requires no response.

Comment 5: Consistency in the number of significant figures and uniformly presenting numbers in scientific notation is needed in the majority of the text and attachment tables.

Aerojet proposes to check and revise tables and text that are revised in response to other agency comments to present consistency in the number of significant figures and scientific notation. However, Aerojet proposes to make no changes to the text and tables that are not otherwise revised.

During the 4 March 2009 conference call, the Agencies agreed, but noted that their primary concern is that the final risk estimates presented in the text, tables, and figures should be consistent. Aerojet will verify that there is consistency in the final risk estimates.

Specific Comments on HHRA - Groundwater

Comment 1: <u>Tables 2-3, 2-4, 2-5, and 2-6</u>. Section 2.1.3.3 states that "Organic chemicals below risk-based screening levels with a FOD less than 5 percent are excluded as COPCs provided that 1) the chemical is not related to source-area operations; 2) is not closely related to others detected in the medium; 3) has adequate quantitation limits; and 4) is not a degradation product of other chemicals detected in the same medium.
However, several organics were excluded as COPCs in Table 2-3 that would meet the above criteria for inclusion: 1,1,1-TCA, trans-1,2-DCE, bromoform, chloromethane,

Trichlorofluoromethane were excluded as a COPC in Zone 1; dichlorodifluoromethane and Trichlorofluoromethane in Zone 3; dichlorofluoromethane, methylbromide, 1,3-dichlorobenzene, and trans-1,2-dichloroethene in Zone 4. Please include these COPCs or provide rationale for their exclusion.

The detected concentrations for the compounds listed in the comment were all below both the frequency of detection (FOD) criteria (i.e., FOD less than 5 percent) and the screening levels criteria. This is consistent with the screening criteria requested by the Agencies. Therefore, the constituent of concern screening tables (Table 2-3 through 2-6) will not be revised. The text in Section 2.1.3.3 will be revised to state:

The final step for organic constituent of potential concern (COPC) selection is to evaluate the FOD of each organic compound. Chemicals having maximum concentrations less than screening levels, and FOD less than 5 percent in a medium, are excluded as COPCs.

Comment 2: Table 2-7 and Table 3-2. The detected chemicals and maximum concentrations in Table 2-7 for the HHRA do not match those presented in Table 3-2 for the SLERA. Most notably, NDMA and perchlorate are listed in Table 3-2 but not in Table 2-7. Also, the number of sample locations differs – 8 for the SLERA and up to 135 for the HHRA. Please clarify.

The PGOU Groundwater HHRA used all surface water data collected from Stations S-2, S-5, and S-6 in 2004. Station S-2 is along the Administration Area Ditch and Stations S-5 and S-6 are at the entry and exit points of Alder Creek on the Aerojet property. These three locations are the only surface water sampling locations with the PGOU, but numerous samples have been collected at those stations.

Table 3-2 of the PGOU Screening Level Ecological Risk Assessment (SLERA) only lists surface water data collected from Alder Creek Stations S-5 and S-6 between 2002 and 2004, plus data from surface water seeps within Zone 4. Zone 4 is the only area within the PGOU where groundwater is known to discharge to surface water, and Alder Creek is the only surface water body within the PGOU to which groundwater discharges.

Detection of NDMA is listed on Table 3-2, but not 2-7, because the sample was collected at the entry and exit points of Alder Creek specifically as part of a macroinvertebrate study, and not at Stations S-5 and S-6 as part of Aerojet's routine sampling. The analytical data for the samples collected in 2004 for the macroinvertebrate study will be included in the HHRA.

Perchlorate is listed in both Tables 3-2 and 2-7, but the maximum detected concentration differs due to the timeframe of the data being used. The maximum detected concentration of perchlorate at Stations S-5 and S-6 was 12 micrograms per liter (µg/L) in 2003 and 6.9 µg/L in 2004.

Comment 3: Table 2-9a, page 3 of 4. The AT-c should be presented for the commercial worker, indoor air inhalation.

Table 2-9 will be revised in response to this comment.

Comment 4: Table 2-9a, page 1 of 4 and Table 2-9b, page 1 of 2. The intake equation for dermal contact with water by an adult/child (cancer) needs to be corrected. The DAchild and DAadult term is not presented.

Tables 2-9a and 2-9b will be revised in response to this comment.

Comment 5: Table 2-12b. The inhalation RfD for 1,1,2-TCA is incorrect; the correct route-to-route value is 4E-03 mg/kg-day. This correct value, however, has been used in calculating the groundwater unit hazard, so this error does not impact the risk estimates. Please correct the toxicity table.

The inhalation reference dose for 1,1,2-trichloroethane will be revised on Table 2-12b.

Comment 6: Table 2-14b&c, 2-15b&c, 2-17b&c, Location-Specific Indoor Air Risk Assessment Results. The attenuation factor used for each calculation should be transparent; so the depth-specific attenuation factor used in the calculations should be shown in these tables.

Tables 2-14, 2-15, and 2-17 will be revised in response to this comment.

Specific Comments on SLERA - Groundwater

Comment 1: Table E-5. Nitrate was detected in S-6, but not included as a COPC for surface water. Please include or provide rationale for exclusion.

As noted on page 3-11, 'COPCs were identified as those constituents with exceedence of the ecological screening levels.' An ecological screening level for nitrate is not available based on the surface water screening level sources identified on page 3-10. Therefore, it was not included as a COPC. The absence of a screening level for nitrate and other detected chemicals and the potential to result in an underestimation of potential ecological risk will be discussed in the uncertainty section.

Comment 2: Table 3-1. The surface water ecological screening levels were checked; recommend use of 1800 ug/L for perchlorate based on value presented in the State of Oklahoma, Water Resources Board, Justification for Creation and Promulgation of New Aquatic Life and Human Health Criteria for Perchlorate (14 October 2006). A value of 5500 ug/L for chloromethane is available at the ORNL RAIS (http://rais.ornl.gov/). Surface water concentrations did not exceed either of these alternative values. Also, the SLERA should provide the equations used to develop the hardness-based criteria.

The SLERA text will be updated to state that in addition to the screening levels presented, the alternative screening levels for perchlorate and chloromethane are also not exceeded. Additionally, the SLERA tables will be modified to include the equations used to develop the hardness-based criteria.

Comment 3: Section 3.2.1. The text and tables are unclear on which sample(s) are the upstream data. It is not until Section 3.2.2.1 is Alder Creek #3 defined as the upstream sample. The upstream sample should be identified earlier in the document. There are other lines of evidence that should be considered to support the conclusion of no impact. Measured concentrations should also be compared to acute values. Concentrations of barium and manganese do not exceed acute values; the dissolved cadmium acute value is 2.54 ug/L, which was slightly exceeded at both the upstream and downstream sample locations. There is no acute value for selenium; however, selenium was not positively detected in Zone 4 groundwater, suggesting that selenium detected in surface water is not site-related.

The SLERA text and tables will be modified to clearly define the location of each sample.

Specific Comments on HHRA - Lands

Comment 1: Table 3-1a. Define the "Soil Screening Levels Protective of Groundwater" and what they are used for. It appears that they are adjusted tap water PRGs. Why do the lists of chemicals in Tables 3-1a b&c differ?

The OEHAA soil screening level should be used as the screening level for all Aroclors.
The screening levels presented on Tables 3-1a, b, and c were established in the Final White Paper – Human Health Risk Assessment dated 31 October 2007 (White Paper). The "soil screening levels protective of groundwater" were included in the White Paper tables. These values were not used in the PGOU Lands HHRA and will therefore be removed.

As shown on Table 3-2a, the California Human Health Screening Level (CHHSL) of 0.0089 milligrams per kilogram (mg/kg) was used for all Aroclors except for Aroclor 1016 and 1254. The change to the screening level for these two compounds will not change the results of the COPCs screening or the risk calculations. Table 3-2a will be revised to include the CHHSL for all Aroclors.

Comment 2: Table 3-1b. What is footnote "c" for? There is a PRG for 1,3-dichloropropane; a surrogate is not needed. Also backup calculations should be provided for the "Calculated CHHSL for Shallow Soil Vapor". Should p-cymene be p-xylene? The values presented are for p-xylene.

Footnote "c" will be removed from Table 3-1b. The preliminary remediation goal (PRG) will be added for 1,3-dichloropropane. Backup calculations will be provided for the calculated CHHSL values. Table 3-1b will be revised to include p-xylene as the surrogate for p-cymene.

Comment 3: Table 3-1c. There are "0" values presented for the "Human Health Screening Level including Vapor Intrusion". The numbers should be presented in scientific notation to prevent this, as one in the rest of the table.

The table will be revised in response to this comment.

Comment 4: Table 3-2a&b. The text (Section 3.3.1.4) states "Organic chemicals below risk-based screening levels with a FOD less than 5 percent are excluded as COPCs provided that 1) the chemical is not related to source-area operations; 2) is not closely related to others detected in the medium; 3) has adequate quantitation limits; and 4) is not a degradation product of other chemicals detected in the same medium.
However, several organics were excluded as COPCs in these tables that would meet the above criteria for inclusion. These chemicals should be retained for other rationale for excluding these organics should be provided.

There are a number of compounds not identified as COPCs on Tables 3-2a and 3-2b, because the detected concentrations were all below both the FOD criteria (i.e., FOD less than 5 percent) and the screening levels criteria (rationale for deletion noted as below screening level [BSL]/FOD). As discussed in response to the 2 December 2008 Letter, Specific Comments on HHRA – Groundwater 1, the Agencies have agreed with this approach to COPC screening. Therefore, no changes will be made to Tables 3-2a and b. The text in Section 3.3.1.4 will be revised to state:

The final step for organic COPC selection is to evaluate the FOD of each organic compound. Chemicals having maximum concentrations less than screening levels, and FOD less than 5 percent in a medium, are excluded as COPCs.

Comment 5: Table 3-4. Provide the source for the "diffusivity in air" values. The EPA Risk Assessor recommends using the 2008 Regional Screening Level table rather than 2004 PRG table because it represents state-of-the art practices in risk assessment.

Attenuation factors for outdoor air are provided for differing "feet bgs". How these different attenuation factors are applied in the risk calculations should be provided as a footnote in this table or in the risk calculation tables.

The diffusivity in air values used in the HHRA were taken from the 2004 USEPA Region IX PRGs. A footnote will be added to the table with this reference. During the 4 March 2009 call, the Agencies agreed with this proposal. Footnotes will also be added to the risk calculation tables for the attenuation factors.

In addition, on the 4 March conference call, the Agencies requested an evaluation of the 2004 PRGs used for screening levels and the 2008 Regional Screening Levels in the uncertainty section. Aerojet proposes adding the following language to the uncertainty section (Section 3.5) of the PGOU Lands BLRA:

> After submittal of the Final Draft PGOU RI/FS report, USEPA released the Regional Screening Levels for Chemical Contaminants at Superfund Sites (RSLs) (USEPA, September 2008). Because USEPA Region 9 PRGs were utilized as one of the sources of information from which COPC screening levels were derived (in addition to Cal/EPA CHHSLs), a comparison was conducted between the previously utilized screening levels and the RSLs. The goal of such an evaluation was to understand if any meaningful changes would occur in the COPC selection process if the RSLs had been used to derive the screening criteria.
>
> For soil, this comparison indicated RSL-based screening criteria for the following chemicals would be more conservative than the previous screening criteria:
>
> - Benzo(a)anthracene;
> - Butyl benzyl phthalate;
> - Cobalt;
> - Indeno(1,2,3-cd)pyrene; and
> - Phenanthrene.
>
> Changes to the butyl benzyl phthalate and phenanthrene screening levels would not change elimination of these chemicals as COPCs because the maximum concentrations are less than either potential screening level and have an FOD less than 5 percent. For cobalt, an RSL-based screening would identify cobalt as a potential COPC. However, the background screening demonstrated that the

detection of cobalt in PGOU soil is statistically consistent with background conditions. Therefore, cobalt would still not be recommended as a COPC.

For benzo(a)anthracene and indeno(1,2,3-cd)pyrene, use of the RSLs would result in their selection as COPCs. However, as indicated on Table 3-2a, these chemicals are each detected in only a single sample, C15-SS04 at a depth of 0.5 foot below ground surface. The detected concentrations were identified by the laboratory as estimated values because they were detected above the method detection limit, but below the practical quantitation limit. Furthermore, evaluation of the maximum detected concentration of each chemical to the RSLs indicates that even if included, the cumulative risk associated with these chemicals is approximately 4×10^{-7}. So, even if these chemicals were included as COPCs, they would have no effect on the estimated risks or decisions made for this location.

Subsequently, while there are several soil RSLs that are more conservative than the criteria utilized to derive COPC selection criteria, the RSLs would have an inconsequential effect on the selected soil COPCs for the site and no effect on the risk estimates.

As discussed in Section 3.1.3.2, the soil vapor screening levels were one-tenth of the residential CHHSLs (i.e., CHHSL multiplied by 0.1). For chemicals without CHHSLs, a screening level was calculated using the CHHSL methodology and one-tenth of this value was used. Therefore, the new RSLs did not affect the COPCs screening for soil vapor.

Because the RSL document in some cases contains new toxicity criteria (predominantly ATSDR MRLs and PPRTV) for some chemicals, a comparison was conducted between the previously utilized toxicity criteria and the criteria presented in the RSL document. The goal of such an evaluation was to understand if any meaningful changes would occur in the risk evaluation should the toxicity criteria from the RSL document be utilized.

For soil and soil vapor, this comparison indicated RSL-based toxicity criteria would be more conservative than the previous criteria for:

- 1,4-Dichlorobenzene (inhalation unit risk);
- Methylene chloride (reference concentration);
- 2,3,7,8-TCDD (reference dose); and
- Benzyl chloride (reference concentration).

However, incorporation of these toxicity criteria would not result in substantial increases in risk estimates, nor increase the number of locations above *de minimus* risk. Therefore, the risks for soil and soil vapor are unlikely to have been substantially or meaningfully underestimated.

Aerojet proposes adding the following language to the uncertainty section (Section 2.6) of the PGOU Groundwater BLRA:

After submittal of the Final Draft PGOU RI/FS report, USEPA released the Regional Screening Levels for Chemical Contaminants at Superfund Sites (RSLs) (USEPA, September 2008). Because USEPA Region 9 PRGs were

utilized as one of the sources of information from which COPC screening levels were derived (in addition to Cal/EPA CHHSLs), a comparison was conducted between the previously utilized screening levels and the RSLs. The goal of this evaluation was to understand if any meaningful changes would occur in the COPC selection process had the RSLs been utilized to derive the screening criteria.

For groundwater, this comparison indicated RSL-based screening criteria for the following chemicals would be more conservative than the previous screening criteria:

- Chloromethane;
- NDMA;
- Vinyl chloride;
- 1,4-Dioxane;
- Dimethyl phthalate; and
- 1,4-Dichlorobenzene.

Of these, changes to 1,4-dioxane, dimethyl phthalate, NDMA, vinyl chloride, and 1,4-dichlorobenzene would not result in changes to the COPC selection, as these chemicals are already selected as COPCs. The only chemical for which the RSL appears to indicate additional consideration is warranted is chloromethane (i.e., RSL is more conservative and would potentially result in chloromethane being selected as a COPC if the RSL has been utilized). The RSL is based upon a cancer slope factor from USEPA's 1997 HEAST. However, review of USEPA's IRIS database demonstrates that in the USEPA's most recent update (2001) for chloromethane, the chemical was identified as a Class D carcinogen (data insufficient to determine the chemical's carcinogenicity). This is further supported by the fact that Cal/EPA has not listed it under Proposition 65 as a chemical known to be a carcinogen, and subsequently has not estimated a cancer slope factor for the chemical. Therefore, available data suggest that chloromethane currently is not considered carcinogenic and does not support the use of the CSF-based RSL. Therefore, the noncarcinogenic-based screening criterion utilized is recommended and chloromethane would not be selected as a COPC.

Therefore, while there are several groundwater RSLs that are more conservative than the criteria utilized for COPC selection, the use of RSLs would not likely have an effect on the selected groundwater COPCs for the site or the risk estimates.

Because the RSL document in some cases contains new toxicity criteria (predominantly ATSDR MRLs and PPRTV) for some chemicals, a comparison was conducted between the previously utilized toxicity criteria and the criteria presented in the RSL document. The goal of such an evaluation was to understand if any meaningful changes would occur in the risk evaluation should the toxicity criteria from the RSL document be utilized.

For groundwater, this comparison indicated RSL-based toxicity criteria for cobalt, 1,1,2,2-tetrachloroethane, methylene chloride, would be more conservative than the previous criteria. However, incorporation of these toxicity criteria would not result in substantial increases in risk estimates, nor increase the number of locations above *de minimus* risk. Therefore, the risks for groundwater are unlikely to have been substantially or meaningfully underestimated.

Comment 6: Table 3-6b, page 2 of 3. The AT-c should be provided for the commercial/worker, Indoor air inhalation.

Table 3-6b will be revised in response to this comment.

Comment 7: Table 3-7. The absorption factor for diethyl phthalate should be 0.1.

The risk calculation tables used the correct absorption factor of 0.1 for diethyl phthalate. However, this value was incorrectly listed on Table 3-7. Table 3-7 will be revised to include the correct value.

Comment 8: Table 3-8b. The inhalation RfCs should be provided as two significant figures, as they are in the original source document(s) and in Table 2-12b of the Groundwater HHRA. The inhalation RfC and RfD for 1,1,1-TCA is incorrect; the values should be 5 mg/m^3 and 1.43 mg/kg-day, respectively. When the inhalation hazards Unit HQ was checked, it appears that the correct RfD was used, so only the toxicity table is incorrect.

Table 3-8b will be revised in response to this comment.

Comment 9: Table 3-9b. The inhalation slope factor for cis-1,3-dcihloropropene should be 5.5E-02 per mg/kg-day. The units for "unit risk value" are incorrect; they should be $(mg/m^3)^{-1}$; the correct values and units are used in JEM spreadsheets. The inhalation unit risk value should be provided as two significant figures, as they are in the original source document(s).

Table 3-9b will be revised in response to this comment.

Comment 10: Tables 3-10 through 3-14. The concentration units should be presented in the tables. There should be an equation presented in the footnotes to show how the risk estimates and HI are determined from the concentrations and the unit hazard child & adult and unit risk. The tables should provide direction to the appropriate attenuation factors, especially in cases where the sample depth was not the same as used to develop attenuation factors, (e.g., 18 ft at 35D-SP14 had a sample depth of 18 ft. It would be helpful if Table 3-10b was labeled "…Soil Vapor to Indoor Air…"

Concentration units will be provided in the tables, as well as a generic equation that demonstrates how the risk estimates and HI are estimated from concentrations, unit hazard/risk, and attenuation factors.

Comment 11: Table 3-15. Cumulative risks to each receptor group from the various exposure media (soil, groundwater, surface water, vapor) needs to be presented in the document.

See response to 2 December Letter, General Comment 1.

Comment 12: Appendix B-10 through B-13. Lead exposure / uptake modeling. To agree with EPA comments on groundwater lead model, the groundwater concentrations for lead (rather than the MCL) should be input into the model.

Groundwater use at the site is, or will be, limited through environmental restrictions. Drinking water will come from a local water purveyor and, therefore, the HHRA used the California Department of Health Services Action Level of 15 µg/L as a conservative drinking water value for lead. The soil and groundwater samples collected at the PGOU are not co-located; therefore, do not lend themselves to be summed as requested. The Agencies agreed with this proposal during the 4 March 2009 conference call.

Comment 13: Section 3.1.1.13. TCDD-TEQ calculations should be provided in a table.

As stated in the Report, the dioxin and furan results were converted to 2,3,7,8-TCDD using toxicity equivalency factors developed by the World Health Organization (Van Den Berg et al, 2006). These calculations were completed by the laboratory. A table presenting an example of these calculations will be provided.

Specific Comments on SLERA - Lands

Comment 1: Section 4.1. Provide acreage for each Area and for each Site within an Area.

The estimated acreage for each site will be added to Section 4.1.

Comment 2: Section 4.1.9. Use ecological benchmarks from ORNL RAIS as secondary source after EcoSSLs. Please check the EcoSSL values used in this SLERA; some have been updated.

The SLERA will be revised using current Eco-SSLs selected based on the hierarchy provided in the Ecological Risk Assessment (ERA) White Paper, included as an appendix in the BOU RI/FS Report (Aerojet, December 2008). The ERA White Paper was prepared to document approaches and methodologies to be used during preparation of Ecological Risk Assessments for the Source Area OUs at Aerojet.

As discussed in the recommendations of the Lands SLERA, "the future land use is likely to transform the sites into a fully developed commercial and residential area, which will provide minimal habitat supporting the common species of ecological receptors that currently exist. Further evaluation of special-status species will be conducted by Aerojet, as necessary, as part of the development process to comply with regulations governing the protection of these species and their habitat, should they be likely to occur in these areas." Therefore, the conclusions of the Lands SLERA are not likely to change based on the use of updated screening levels.

Comment 3: Section 4.2.2.4. ProUCL Version 4.02 should be used to develop the 95UCL; do not use ½ DL; rather use the non-detect function in ProUCL.

A revised 95 percent upper confidence limit (UCL) will be developed for Aroclor 1260 concentrations in the Site 10D ditch using the ProUCL Version 4.02 non-detect function.

Comment 4: Table 4-1. The Ecological benchmarks for soil should use the following hierarchy:

1) USEPA EcoSSLs for plants, invertebrates, mammals and birds;

2) ORNL ecological benchmarks available at (http://rais.ornl.gov/) for plants, invertebrates, using the lower of the R6 plants and ORNL plant screening benchmarks and the R6 earthworm and the ORNL soil invertebrate and microbes screening benchmarks; and

3) ORNL PRGs for mammals and birds (Efroymson et al, 1997c).

If needed, Region 5 ESLs can be used to fill in gaps, though these numbers are generally conservative as they were developed for use in QAPPs. If a screening level is not available, it can be discussed in the uncertainty analysis.

Several of the EcoSSLs have been updated (most recently in 05/08); the most EcoSSLs should be used. Unfortunately, many of the screening levels used in this SLERA vary considerably from the primary screening levels (i.e., EcoSSLs), that the conclusions of the SLERA cannot be confirmed. For example, the mammalian screening level for zinc used in the SLERA was the PRG of 1600 mg/kg (Efroymson et al, 1997c), while the mammalian EcoSSL for zinc is 79 mg/kg.

Screening levels are not provided in Table 4-1 for all chemicals detected in soil (Table 3-2a). All chemicals positively detected in soil should be retained for evaluation in the SLERA; else, a rationale for their exclusion should be presented. Chemicals should not be screened out using human-health based screening levels.

The screening benchmarks presented on Table 4-1 represent the benchmarks available at the time the SLERA for PGOU was prepared in 2004. The screening benchmarks used in the PGOU SLERA were selected in the following order:

- USEPA Ecological Soil Screening Levels (Eco-SSLs);
- *Screening Level Ecological Risk Assessment Protocol, Appendix E: Toxicity Reference Values*, located on USEPA Region 9 website;
- ORNL *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision* (Efroymson, Will, Suter, and Woaten 1997);
- ORNL *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process* (Will and Suter, 1995); and
- ORNL Preliminary Remediation Goals (PRGs) (Efroymson et al., 1997), for those constituents where required input information to calculate an Eco-SSL was not available.

As presented on Table A (attached), this closely matches the recommendations of Comment 4. The exceptions include: a) using the lower of the Region 6 and ORNL screening level for plant and soil invertebrates; and b) obtaining Region 5 screening benchmarks where screening benchmarks were not available from Eco-SSL, Region 6, or ORNL documents. This change will not affect the screening of the 2,3,7,8-TCDD, aroclors, or titanium. The screening levels for the other organic and inorganic constituents will change due to updated Eco-SSLs and the difference in hierarchy. Additionally, the constituents that were detected, but not included as part of the SLERA screening have been included on Table A and where available, screening levels were obtained for these constituents according to the hierarchy recommended in Comment 4.

The SLERA text and tables will be modified to follow the hierarchy recommended in Comment 4 and to include the additional detected constituents not previously evaluated.

As discussed in the recommendations of the Lands SLERA, 'the future land use is likely to transform the sites into a fully developed commercial and residential area, which will provide minimal habitat supporting the common species of ecological receptors that currently exist. Further evaluation of special-status species will be conducted by Aerojet, as necessary, as part of the development process to comply with regulations governing the protection of these species and their habitat, should they be likely to occur in these areas.'

Note, this approach is different than that proposed after completion of the PGOU SLERA in A *White Paper – Ecological Risk Assessment* (ERA White Paper) which was included as an appendix in the Boundary Operable Unit (BOU) RI/FS Report (Aerojet, December 2008).

Comment 5: Table 4-4. The calculation of the TEQ should be provided.

See response to Specific Comment #13 on HHRA – Lands.

Comment 6: Table 4-15. As impact to an aquatic system is evaluated in this table, screening levels for sediment rather than soil should be applied.

The downgradient "habitats" or areas presented on Table 4-15 include East Pond, West Pond, Cell 1, and Cell 2, which are within the Westlakes Stormwater Retention Basin. The evaluation of these areas and the Westlakes Stormwater Retention Basin are presented in Part 2 – Human Health and Ecological Risk Assessment (HHERA) of the Boundary Operable Unit RI/FS Report submitted to the Agencies in December 2008. The SLERA text will be modified to indicate that the evaluation of these areas is included in the BOU RI/FS Report.

Comment 7: Section 4.2.2.1 and 4.2.2.4. Aquatic invertebrate screening levels, rather than terrestrial invertebrate screening levels should be used to evaluate impacts in Site 4D, as this habitat is emergent marshland and to sediments transported to aquatic systems from the Site 10D ditch. Else rationale for considering these samples as representative of soil should be provided.

As requested, in addition to soil screening already performed on Site 4D, the SLERA will be modified to screen Site 4D data against sediment screening levels also. The selection of screening levels for aquatic receptors will be based on the hierarchy outlined in the ERA White Paper included as an appendix to the BOU RI/FS Report (Aerojet, December 2008). As presented in the ERA White Paper, the sediment screening levels for aquatic receptors were based on the following stages of hierarchy:

First:

- MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*. Archives of Environmental Contamination and Toxicology. Volume 39. Pages 20 through 31.; or
- *Sediment Quality Advisory Levels/Sediment Quality Criteria* (values are lower limit of 95% confidence limit). USEPA, 1997.

Second:

- Jones, D.S., G.W. Suter II, and R.N. Hull. 1997. *Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision*.; or
- *Apparent Effects Threshold-High* (Barrick et al., 1988).

Third:

- Persaud, D., Jaagumagi, R., and Hayton, A. 1993. *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario*. ISBN 0-7729-9248-7. Ontario Ministry of the Environment, Ottawa, Ontario.

Remaining screening values:

- Long, E.R., MacDonald, D.D., Smith, S.L., and Calder, F.D. 1995. *Incidence of Adverse Biological Effects within ranges of Chemical Concentrations in marine and estuarine Sediments*. Environmental Management Vol. 19, No. 1. pp.81-97.; or
- Lemley, A.D. 2002. *Selenium Assessment in Aquatic Ecosystems*. US Forest Service, Blacksburg, VA.

As discussed in the recommendations of the Lands SLERA, 'the future land use is likely to transform the sites into a fully developed commercial and residential area, which will provide minimal habitat supporting the common species of ecological receptors that currently exist. Further evaluation of special-status species will be conducted by Aerojet, as necessary, as part of the development process to comply with regulations governing the protection of these species and their habitat, should they be likely to occur in these areas.'

Based on the direction of flow within the ditches shown in Figure 4-1, soil from the Site 10D ditch would not be transported to Site 4D. Therefore, Aerojet proposes not to screen the soil in Site 10D against sediment screening levels.

Comment 8: Table G2. How as the log-linear form of the BAF addressed when developing site-specific EcoSSLs? A spot check EcoSSLs that had BAFs was performed, and the calculated SSLs were slightly lower than the values presented in Table G2. Transparency is needed in the calculation of the EcoSSLs.

The comment is acknowledged and this will be clarified in the Final SLERA.

Comment 9: Attachment G, Table G2-4. The EcoSSL TRVs should be updated to the most recent values. EcoSSL TRVs are available for all the metals, which in my cases were higher than the TRVs provided in Table G2-4.

The current Eco-SSL Toxicity Reference Values will be used to modify the site-specific Eco-SSL.

Comment 10: Attachment G, Table G2-3. The April 2007 revision of Attachment 4-1 of the EcoSSL document should be used; as there is no earthworm BAF in the 2007 version, the BAF presented in the 2005 version of Attachment 4-1 is acceptable.

The table will be modified as requested,

Comment 11: Attachment G, Table G2-2. The units for food ingestion rate should be g food DW/g bw WW/day.

The table will be modified accordingly.

Comments on RI/FS Summary of Risk Assessments and ARARs

Comment 1: Groundwater RI/FS, Section 1.4.2. The lists of COPCs by groundwater zone do not agree with the lists presented in the HHRA. This section would need to be updated as the Groundwater HHRA is updated.

Section 1.4.2 of the RI/FS will be revised to be consistent with the COPCs presented in the HHRA.

Comment 2: Lands RI/FS, Section 7.2.1. The results are summarized by Site with Areas 20 & 21, and Area 49, which is not done in the HHRA. The HHRA provides only the sample numbers, which one then has to translate into Site and Area to review the Risk Assessment Summary in the RI/FS. Again, transparency in calculating and presenting risk results is needed. When concluding "No Risk Above RTLs", it should be clarified if this is for both cumulative risks and HIs and for individual chemicals at a specific sample location. This section would need to be updated as the Lands HHRA is updated.

This section will be updated as requested to provide transparency between the results of the HH and Eco Risk Assessment and the areas and sites to which the results pertain. The regulatory threshold limit (RTL) is based on cumulative incremental lifetime cancer risk (ILCR) and non-cancer (HI) risk from all chemicals detected in either soil or soil vapor.

Comment 3: Lands RI/FS. Section 7.2.1. Conclusions on ecological risk cannot be evaluated because there are concerns about the SLERA.

Our evaluation indicates that making the changes requested by the Agencies in their comments will not alter the conclusions regarding ecological risk. Agencies comments stating concerns about the SLERA have been addressed and the SLERA will be revised in response to the comments and responses.

Comment 4: Lands RI/FS Table 7-4 and 7-5. Present a non-zero cleanup number for TCDD. Provide rationale for use of soil vapor at 10 ft bgs (i.e., the attenuation factor for 10 ft) in determining soil vapor cleanup levels. Provide the spreadsheets used to calculate the lead cleanup values for soil. Spot-check of cleanup levels for soil and soil vapor was performed, and values checked were correct.

Tables 7-4 and 7-5 will be revised in response this comment.

Comment 5: Lands RI/FS Table 7-3. Other chemical-specific TBCs that should be considered are the California Human Health Soil Levels (CHHSL), OEHHA Public Health Goals, TSCA regulations for lead, EPA's National Recommended Water Quality Criteria, and Federal MCLs.

These references will be added as chemical-specific TBCs on Table 7-3.

JANUARY 21, 2009 COMMENTS

General Comments

Comment 1: The conceptual site model (CSM) and accompanying analytical data and contaminant plume interpretations presented in the FS do not reflect the most current understanding of site conditions. The Agencies understand that the most recent post-RI data by and large supports the current CSM. The Agencies request that language is included in the RIFS that acknowledges the limitations and uncertainties of the remedial alternatives presented to address current conditions and state how current data will be used in the remedial design to develop an effective remedial approach.

Aerojet agrees to add language to the RI/FS which recognizes the current conditions, the age of the RI/FS report and how current data will be used in the remedial design.

Comment 2: Text should be provided in the form of cover pages that describe the remedial measures that have taken place since the first drafting of the Part 1 document. The text should also include an explanation as to why the remedial measures were implemented and what remains to be undertaken to complete the remedial measures. This is needed as Aerojet has elected to only make minor changes to the document in the spirit of reducing paper usage and minimizing delay of completion of the RI/FS.

Section 1.3 of Part 1 of the PGOU RI/FS will be updated to reflect the material modifications made to GETs A, B, D and ARGET since submittal of the original report.

Specific Comments

Comment 1: Section 1.2.1, page 4, paragraph 2, last sentence. It should be stated that Area 40 is being addressed under the Island Operable Unit. In addition, pilot-testing of a remedial system for the groundwater contamination is currently on-going.

The text of the final report will be updated as requested.

Comment 2: Figure 1-2. The delineation of the PGOU still includes Area 40. Area 40 has been moved to the Island Operable Unit.

Figure 1-2 will be updated with removal of Area 40 from the PGOU in the final report.

Comment 3: Section 1.2.1, page 5, third bullet. This bullet states that Zone 3 includes the area east of the eastern boundary of Area 40. What investigation took place in that area?

The text was in error; the third bullet will be corrected to accurately reflect the Zone 3 area.

Comment 4: Section 1.2.2.3, page 7, fourth paragraph. What aggregate mining is conducted northeast of the SVRA? We know of aggregate mining northwest and west of the SVRA.

The text was referring to aggregate mining previously conducted by American River Aggregate but no longer in operation. The text of the final report will be updated to remove this reference.

Comment 5: Section 1.2.2.4, page 8, paragraph 4. There are several other water supply wells in PGOU, or are very close to PGOU, that are being used. Well 1156 in Zone 1 supplies water to the pond in Sailor Bar Park and has been equipped by Aerojet with a treatment system to remove volatile organics. Well 1029 just south of the Zone 2 portion of the PGOU is being used as an

industrial water supply by a tenant on the property. In addition, Clarke Cattle Company uses groundwater for stock watering at Well 1028.

Section 1.2.2.4 will be updated to reflect the other water supply wells in the area of PGOU that are being used.

Comment 6: Section 2.1, page 30, second paragraph. The paragraph states that the future use of groundwater both at and beyond the property boundary is restricted. There is some existing use of groundwater that is not being restricted – private wells at residences and industrial supply. Restrictions would likely be placed on future uses of groundwater within the PGOU. Also, the paragraph states that there is no current use of untreated groundwater for residential supply. That is not the case. Wells 1298 and 1864 are currently being used by residents for domestic supply.

Agreed. The text will be updated to reflect these comments and to indicate there is no current use of untreated or unmonitored groundwater for residential supply.

Comment 7: Section 2.1, page 31, third bullet. Remove the caveat ("to the extent practicable") at the end of the sentence. The objective is to restore the aquifer to beneficial uses. It may be determined during restoration that all beneficial uses cannot be achieved.

The third bullet will be revised, as requested.

Comment 8: Section 2.3.1, page 32. Are there general response actions for the vadose zone? There are vadose zone sites within this OU. All of the response actions deal with groundwater.

The general response actions in this section are for groundwater only; the general response actions for the soils can be found in section 7.2 of Part 2.

Comment 9: Section 3.1.3, page 50. The description of the ARGET facility should be revised to discuss the past installation of the HiPOX treatment unit and other associated modifications since the previous version of the document was produced.

Aerojet will update Section 3 to reflect the material modifications made to GETs A, B, D and ARGET since submittal of the original report.

Comment 10: Section 3.1.5, page 53. Since the last version of this document Aerojet has undertaken several modifications to the Zone 1 capture system. These modifications should be discussed in the text along with the proposed Material Modifications that have been accepted by the Agencies. An alternative to making these changes is to adding a cover page to the document that discusses these issues.

As stated above, Aerojet will update Section 3 to reflect the material modifications made to GETs A, B, D and ARGET since submittal of the original report.

Comment 11: Section 3.3.3, page 56, last paragraph. Area 39 has been transferred from PGOU to the Boundary Operable Unit.

Agreed. The text will be updated to reflect this change.

Comment 12: Section 4.3.1.2, page 62. As the specifics presented in this section are no longer accurate, there should be a paragraph added that states that a portion of the remedy is already being constructed and that additional evaluation during design has modified new extraction well locations and extraction wells that will be pumping during the remedy. This will also apply to the discussion of the remedy for Zones 3 and 4.

As stated above, Aerojet will update Section 3 to reflect the material modifications made to GETs A, B and D since submittal of this report.

Comment 13: Figures 1-9 through 1-26; 4-1 through 4-8; 7-5 through 7-8; and 7-12 through 7-15. The sample collection time frame (i.e., 2000 – 2004) used to define the extent of contamination needs to be included on each figure

.

Aerojet agrees to provide updates of the figures referenced in the comment to reflect the sample collection time frame.

Part 2 RI/FS Report for Lands – Lands 2008

General Comments

Comment 1: The date on the footer of the text is February 2005 and should be updated.

This will be corrected.

Comment 2: In the hardcopy provided for review, several of the tables did not print correctly (i.e., 6-18 through 6-24, and 7-8 through 7-19) causing portions of the text to be illegible. Please check the final version for printing errors.

The errors were a result of printing through Adobe Acrobat. Clear and legible copies will be provided in the final report.

Comments Regarding Aerojet's Response to Agency Comments

Comment 1: Aerojet response to Agency comment letters are included in Appendix C through E of the Lands RI/FS. The appendices should also include Aerojet's response to the Agencies comment letter dated 13 April 2006.

The Agencies comment letter dated 13 April 2006, as well as all comments received prior to the submittal of the final report and Aerojet's responses to those comments, will be included in Appendix E.

Comment 2: 13 April 2006 Agency Letter, Original Specific Comment 163. The Lands RI/FS continues to use the general term "detection limit." For example, the last bullet on page 4-63 states "No 1,3-butadiene above the laboratory detection limit was detected in the soil vapor samples." The term method detection limit (MDL), or method reporting limit (MRL; also referred as the practical quantitation limit (PQL)) should be used, as appropriate.

The term "detection limit" will be replaced with "practical quantitation limit (PQL)" in the text.

Comment 3: 02 August 2005, Original Specific Comment 196. The Agencies requested that the assumed radius of influence for the SVE wells be shown on Figure 9-2 (Part 2, Volume 2; dated

February 2005). Aerojet's response to this comment stated that the assumed radius of influence would be shown on Figure 9-2 but no changes were made to the figure which is currently labeled as Figure 7-8 in the August 2008 version of the Lands RI/FS.

Figure 7-8 will be revised to show the extent of VOCs in soil vapor at concentrations greater than 1×10^{-6} under a commercial/industrial use scenario, the assumed radius of influence (ROI), and the placement of soil vapor extraction wells based on the assumed ROI. However, it should be noted that the actual ROI and the number of soil vapor extraction wells will be determined based on the results of a pilot test.

Specific Comments

Comment 1: Section 4.3, page 4-8, General Comment. There should be a paragraph discussing the concentrations of PCBs found in the area upstream of Site 11D, northwest of Building 20B73. In the past, the issue of remediation of Site 11D without remediating the source area upstream was brought up by the Agencies. Those source areas are part of the Boundary Operable Unit and should be targeted for evaluation in the upcoming RI/FS for that operable unit.

A brief summary from the Boundary Operable Unit (BOU) RI/FS regarding the concentrations of polychlorinated biphenyls (PCBs) in the area upstream of Site 11D will be added to the PGOU RI/FS text. Aerojet understands that deletion of Sites 10D and 11D from the Superfund site cannot be completed until whatever necessary remedial actions for the upstream sources of PCBs have also been implemented.

Comment 2: Section 4, page 4-80, paragraph 2. In addition to the portion of Area 20 with concentrations greater than 50 µg/L discussed in this paragraph, there is another such area in the eastern portion of Area 20 that apparently comes from sources within Area 20.

The discussion regarding the presence of trichloroethene (TCE) in unconfined groundwater within Area 20 will be updated to reference the recent groundwater evaluation conducted as part of the BOU RI/FS.

Comment 3: Section 6.1.1, page 6-2, paragraph 2. The last sentence provides the Former Company Store as an example of significant "attenuation" of volatile organics in the vadose zone. In most instances this apparent "attenuation" can likely be relegated to release of the volatiles to the atmosphere and migration to shallow groundwater. A reduction in concentration does not necessarily mean that the volatiles have transformed or have been sequestered from the gaseous phase in the vadose zone.

Aerojet agrees that the attenuation of VOCs at the Former Company Store is likely due primarily to migration into the atmosphere and not reductive chlorination. The presence of VOCs, including tetrachloroethene (PCE) and TCE, in shallow groundwater beneath the area of the Former Company Store in 2003 indicates that downward migration also accounts for some portion of the attenuation. Section 6.1.1 will be revised to reflect this information in response to this comment.

Comment 4: Section 6.2.1.2, page 6-7, Summary Table 6-1. This values presented in this table are the average value of those measured in samples collected from Areas 20, 21 and 49. As was used modeling for the vapor intrusion evaluation for the Central Disposal Area, the 95% upper confidence value for the parameters should be used, unless there is sufficient site-specific data for the site being evaluated.

The 95 percent UCL for the parameters will be calculated and used.

Comment 5: Section 6.2.1.2, page 6-8, Chemical Specific Parameters Table. The values presented for the Henry's Law Coefficients are different than those used for the vapor intrusion evaluation for the Central Disposal Area. These values should be consistently applied at the Aerojet site.

The Henry's Law Coefficients will be revised to agree with those in the Central Disposal Area vapor intrusion evaluation.

Comment 6: Section 6.2.1.3, page 6-8, paragraph 2. The evaluation used MCLs as water quality objectives. The water quality objective for input into the model should be the PHG or MCL whichever is lower. Such a change might have only have a slight impact on the analysis of the sites. A scan of the data on Tables 6-9 through 6-11 would appear to potentially add only a single site to the table listed on page 6-9, that being Site 33D for TCE. In addition, it may be that 33D site may not warrant remediation based on a limited extent of volatile contamination.

The lowest of either the public health goal (PHG) or the maximum contaminant limit (MCL) will be used in the VLEACH model and the data re-evaluated using the revised screening level.

Comment 7: Section 6.2.2, page 6-10. The Designated Level Methodology is not appropriate for volatile organic constituents.

Comparison of data to the "Protection of Groundwater Screening Levels" developed for the BOU using the Designated Level Methodology will be removed from the text.

Comment 8: Section 6.2.3, page 6-11. Each of the bulleted items contain language stating "…that could potentially migrate to groundwater." The evaluations that were performed that lead to the conclusions summarized in the bullets analyzed migration to groundwater that would lead to concentrations exceeding a listed value. The evaluations were not done to assess what concentrations would be completely attenuated in the vadose zone. In addition, the last bullet states that the concentrations of VOCs in groundwater in Area 49 are currently attenuating. The assessment found in Section 5.13 does not assert that the VOCs at Area 49 are sufficiently attenuating.

Agreed. The sentence will be revised to indicate that the evaluation indicates that VOCs would not result in concentrations in groundwater above the PHG or the MCL, whichever value is used in the model. VOC concentration trends in the uppermost groundwater aquifer in Area 49 will be re-evaluated and the assessment in Section 5.13 will be updated to reflect those findings.

Comment 9: Section 6.2.3, page 6-11, second bullet. Although PCE soil vapor concentrations at 20 feet were less than the VLEACH SVSL, PCE soil vapor concentrations detected above the SVSL at 10 feet could potentially migrate to groundwater. Aerojet should rerun the VLEACH model using site-specific input parameters (i.e., actual depth to soil impacts instead of the conservative assumption of 30-35 feet) to evaluate if concentrations could migrate to groundwater.

Aerojet will run VLEACH to develop depth-specific screening levels for comparison to soil vapor data.

Comment 10: Section 6.4.3, page 6-19. Aerojet should evaluate the data collected under Aerojet's site-wide NPDES permit consisting of specialized limited sampling conducted for the

California Toxics Rule constituents. Pollutants looked for in that sampling included PCBs and a whole host of other non-volatile compounds.

The final report will provide an evaluation of this data with respect to sites in the PGOU.

Comment 11: Section 7.2.1.2, page 7-4. As stated previously by the Agencies, the source of PCBs in Sites 10D and 11D upstream of 22 need to be controlled in order to eliminate discharge of PCBs to these sites.

Aerojet understands that for the Agencies to delete Sites 10D and 11D from the Superfund site, the required remedial action for site 11D in the Boundary OU RI/FS must be completed as it is the upgradient source potentially responsible for the discharge of PCBs to the 10D and 11D ditch.

Comment 12: Section 7.2.2, page 7-9. Under the commercial/ construction/maintenance worker scenario, why is the $1x10^{-5}$ ILCR used for RTL and not the $1x10^{-6}$ value?

The text was incorrect. The areas identified for remediation for future commercial/industrial use scenarios in the figures and tables of the FS were based on an ILCR exceedence of $1x10^{-6}$ and an HI exceedence of 1. The development plan in the EIR approved by Sacramento County for Sites 32D, 34D, 35D, and 38D anticipates this area to be light commercial, with a large portion serving as a roadway (clover leaf interchange).

The text will be corrected to reflect that the RTL for commercial/industrial/construction/maintenance worker scenario is an ILCR of $1x10^{-6}$ and an HI of 1. For the portion of Sites 32D, 34D, 35D, and 38D that will serve as a roadway in the future, construction and maintenance worker scenario may be evaluated instead of the commercial.

Comment 13: Section 7.2.2.2, page 7-11. As stated above, Site 33 may pose a risk to groundwater quality if the PHG is used as a screening value instead of the MCL.

The soil vapor data for all sites will be compared to screening levels developed using the lowest of either the PHG or MCL in the VLEACH model.

Comment 14: Section 7.3.3.2, page 7-22, Action-Specific ARARs. The list of activities under consideration does not list excavation and disposal. Are there no areas where excavation of non-VOCs to eliminate the risk is not a viable option?

Excavation and disposal will be included in the list of activities under consideration.

Comment 15: Section 7.4.3, page 7-25. The soil vapor screening levels using VLEACH utilized the MCL for TCE. Therefore, this value is not appropriate for use in developing the cleanup goals for protection of groundwater. The Public Health Goal should be used as it is protective of human health. In the equation used provided on page 7-24, the health-based cleanup goal is developed using health-based criteria. Thus, the risk presented by TCE at the MCL is 6.25 times greater than that posed by the current PHG and 2.9 times greater than the draft revised PHG.

The TCE soil vapor screening level for the protection of groundwater will be revised based on the results of the VLEACH model, using both the PHG of 0.8 µg/L and the proposed PHG of 1.7 µg/L. Please note that the equation on page 7-24 was used to calculate the cleanup goals based on the protection of

human health. This equation was not used to calculate the cleanup goals for the protection of groundwater.

Comment 16: Section 7.5, page 7-26. Justification for using $1x10^{-5}$ ILCR value for acceptable risk for the commercial/industrial/ construction scenario should be provided.

As stated previously, the areas identified for remediation for future commercial/industrial use scenarios in the FS were based on an ICLR exceedence of $1x10^{-6}$ and HI exceedence of 1. The text will be corrected to reflect that the RTL for commercial/industrial/construction worker scenario is an ILCR of $1x10^{-6}$ and HI of 1.

Comment 17: Section 7.5.1, Table 7-4. What assumptions were used in developing the cleanup levels for perchlorate? What was the assumed intake of perchlorate from other sources? A technical justification for the use of 0.060 mg/kg perchlorate as the value for protection of groundwater needs to be provided.

The perchlorate cleanup goal was developed based on cleanup goal calculations performed for another site in California. Technical justification for the use of 0.060 mg/kg will be provided in the final report.

Comment 18: Section 7.5.1 and Table 7-7. Due to the age of the soil vapor data used to estimate the areas of Sites with elevated VOCs in the vadose zone (e.g., A49-1 calculations are based on data collected 15 years ago), additional soil vapor data needs to be collected during the remedial design to define of extent of elevated concentration and ensure the effectiveness of the selected remedial alternatives (i.e., SVE, vapor barrier, capping).

Agreed. The costs presented in the FS include additional soil vapor sampling. This task will be broken out on the revised cost table.

Comment 19: Section 7.6.2.5, page 7-32. In-situ treatment of perchlorate at Site C41 should be considered for evaluation. This comment also applies to Section 7.7.2.4.

The in situ treatment of perchlorate at Site C41 will be considered for evaluation.

Comment 20: Section 7.7.2. The bulleted text for each of the FS Groups discussed in this section should be clarified to state the planned future land use so the reader understands the difference between alternatives for Sites included in more than on FS Group. As an example, the following text should be added to end of the first bullet for FS Group A20-1: "FS Group A20-1 assumes that the planned future land use will be commercial."

The suggested clarification will be made.

Comment 21: Section 7.7.2, page 7-34, fourth bullet. Similar to the other bullets, the sites that fall within the group should be listed.

The sites within an FS Group will be listed.

Comment 22: Section 7.7.2, pages 7-34 and 7-35. FS Groups A49-2 and A49-3 are identical and both deal with VOCs. Why are there two study groups looking at VOCs at the same source areas? In addition, why are the septic tank sites at Buildings 49007 and 49011 included in the groups as the results of soil gas sampling collected at those sites was inconsequential? The low concentrations of VOCs at Building 49011 could easily be interpreted to be an extension of the

VOC plume associated with Site 34D. The detected concentrations were also not above screening levels.

FS Groups A49-2 and A49-3 address the same sites associated with VOC impacts, but differ in the future land use. A49-2 is the alternative if reuse of the lands, including these sites, is restricted to commercial. A49-3 is the alternative if reuse of the lands, including these sites, is to be residential.

Aerojet re-evaluated the results of the risk estimated and the revised conclusions are described below which will also be provided in the final report. The results of the risk assessment, as illustrated in Figure 7-4a, show that cumulative risk from VOCs in one soil vapor sample collected near the septic tanks at Building 49007 (sample 49ST07-SP02) and 49011 (sample 49ST11-SP03) are greater than 1×10^{-6} under a residential use scenario. As shown on Table 3-15b, the risk estimates for the commercial, construction, and maintenance worker scenarios are all below regulatory thresholds.

The following bullets describe each of these cumulative risk estimates in further detail based on the results presented in Tables 3-10b and 3-15b.

- 49ST07-SP02 – The cumulative ILCR is estimated at 5×10^{-6} (migration of VOCs into indoor air). The only compound above the risk of 1×10^{-6} is chloroform (4.4×10^{-6}).
- 49ST11-SP03 - The cumulative ILCR is estimated at 2×10^{-6} (migration of VOCs into indoor air). There are no individual compounds detected above the risk of 1×10^{-6}.

Based on secondary review of this data, Aerojet will remove these FS Groups from the PGOU Lands RI/FS.

Comment 23: Section 7.7.2, page 7-35. What is the need for FS Group 49-4 (Building 49022 Septic Tank)? The only concentration of VOCs exceeding screening criteria is 1,3-Butadiene in a shallow soil vapor sample. Is Aerojet now stating that the 1,3-Butadiene is actually there? If so, that would tend to contradict its previous position.

Aerojet re-evaluated the need for an FS for this group and reached the following conclusions which will also be provided in the final report. The results of the risk assessment, as illustrated in Figure 7-4a, show that cumulative risk from VOCs in one soil vapor sample collected near the septic tank at Building 49022 (49ST22-SP03) is greater than 1×10^{-6} under a residential use scenario (4×10^{-6}). The risk estimates for the commercial, construction, and maintenance worker scenarios are all below regulatory thresholds. The primary contributor to the residential risk is potential migration of VOCs into indoor air from benzene (3.3×10^{-6}). Three of five samples collected near the septic tame at Building 49022 did not have detections of benzene above the method reporting limit. The one other detection of benzene in the area was from sample 49ST22-SP02. As shown on Table 3-10b, the estimated ILCR for benzene at this location is 1.1×10^{-7}. Based on the results of this evaluation, Aerojet will remove this FS Group from the PGOU Lands RI/FS.

As discussed in Section 3.3.1.2 of the Lands RI/FS, 1,3-butadiene was not included as a COPC in discussions/comparisons presented in the RI or in the risk calculations. The identification of 1,3-butadiene in the figures showing VOCs above screening levels is in error and will be removed.

Comment 24: Section 7.7.2.2, page 7-37. The statement that current VOC concentrations are likely due to migration from groundwater requires some technical backing. At the concentrations measured in groundwater, what would be the expected concentrations in the vadose zone?

VOCs, including PCE and TCE, were detected in shallow groundwater in the area of the Former Company Store. Conversion of the PCE concentration (4.9 µg/L) detected in perched and unconfined groundwater in the area of the Former Company Store to an equilibrium soil gas concentration using the Henry's Law constant of 0.55 (dimensionless) indicates that the detected concentrations could result in a soil vapor concentration of 2.7 milligrams per cubic meter (mg/m^3). The estimated PCE soil vapor concentration resulting from groundwater would still exceed the residential 1×10^{-6} cleanup goal of 0.72 mg/m^3.

Comment 25: Section 7.8.1, page 7-45. The second sentences states that the alternatives discussed were developed for sites in FS Group 2. The section is discussing FS Group A20-1. There is no FS Group 2 designated for evaluation.

The reference will be changed.

Comment 26: Section 7.8.1.2, page 7-45. The first sentence states that Alternative A20-1B addresses Sites 10D and C4. Site C4 is not in FS Group A20-1.

The sentence will be revised to list the sites addressed under Alternative A20-1B, sites 7D and 11D.

Comment 27: Section 7.8.4, page 7-47. The text states that three alternatives were developed for Site C41. Only two alternatives are presented. As stated above, the potential use of in-situ remediation of perchlorate should be added to the list of remedial alternatives for Site C41.

The potential use of in situ remediation of perchlorate will be added to the list of remedial alternatives for Site C41.

Comment 28: Section 7.8.5.3, page 7-51, third paragraph. The text states the location of the asphalt cap for Feasibility Study Group A49-1 is shown in Figure 7-9 but this figure is for Site C4. It should also be noted that Section 7.8.9 which discusses Site C4 does not refer to a figure showing the proposed soil excavation boundary for this area. Please include a figure showing location of the cap for A49-1, and revise the text to reference the correct figure for C4.

The text refers to the incorrect figures for A49-1 and Site C4. A49-1 is shown in Figure 7-8 and Site C4 is shown in Figure 7-9. Figure 7-8 will be revised to show the location of the asphalt cap and conceptual soil vapor extraction (SVE) system. A reference to Figure 7-9 will be added to the text in Section 7.8.9.

Comment 29: Section 7.8.7.2, page 7-53. The title to the alternative states that it consists of vapor barriers with institutional controls. There is no discussion of the application of vapor barriers in the text of this section. In addition, there still appears to be no distinction between FS Groups A49-2 and A49-3.

The title to the alternative was in error and will be corrected. As discussed under Comment 22, A49-2 is the alternative if the land use for these sites is restricted to commercial and A49-3 is the alternative if the land use for these sites is residential. This will be clarified.

Comment 30: Table 7-8, page 1. Under "Engineering Controls" sub-slab and crawl space venting should be included as a process option to prevent soil vapor intrusion into buildings.

The additional process option will be added to the table.

Comment 31: Tables 7-9 and 7-10. The site IDs for each FS Group should also be listed on these tables for ease of use with other portions of the document where only the site ID is referenced.

The tables will be revised in response to this comment.

Comment 32: Table 7-15. The table for A49-1B needs to be reformatted so the text under Detailed Analysis Summary for State and community acceptance is not truncated.

This error will be corrected; the table will be reformatted and printed clearly.

Comment 33: Section 7 Figures. Additional figures showing proposed excavation boundary for Site 10D, 11D, 11D Source and C41 should be included.

Additional figures will be provided showing the excavation boundaries for the sites where excavation is proposed.

Comment 34: Figure 7-8. The figure should show the proposed area for the asphalt cap. The term "Feasibility Study Group 2" is no longer used in the RIFS report. Please update the figure accordingly.

As stated in response to Comment 28, a figure showing the area of the asphalt cap will be provided.

Comment 35: Appendix Q, Table A20-3a. The second alternative listed should be "Excavation and Landfill Disposal" instead of institutional controls.

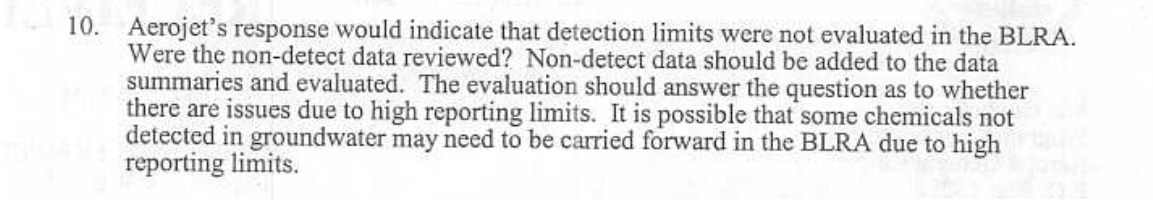
A corrected Table A20-3a was provided in Aerojet's 17 December 2008 submittal.

Comment 36: Appendix Q, Table A49-1d. Because the SVE remedial alternative for A49-1 is based on data collected 15 years ago, the SVE well radius of influence data is not provided, and the existing SVE wells are not evenly distributed within the estimated extent of elevated soil gas VOCs, it is unclear whether the total cost of the alternative would be within a rough order of magnitude of +50/-30 percent. The assumptions used in the cost estimate and the primary uncertainties need to be discussed in Section 7.

Aerojet will provide the assumptions regarding the radius of influence and used in the cost estimate for the Area 49 SVE remedial alternative as well as the primary uncertainties in Section 7.

27 January Email

Appendix A to PGOU Lands BLRA - July 29, 2004 Comments



10. Aerojet's response would indicate that detection limits were not evaluated in the BLRA. Were the non-detect data reviewed? Non-detect data should be added to the data summaries and evaluated. The evaluation should answer the question as to whether there are issues due to high reporting limits. It is possible that some chemicals not detected in groundwater may need to be carried forward in the BLRA due to high reporting limits.

The BLRA does address non-detect concentrations in the uncertainty analysis, but the discussion does not completely address concerns about elevated reporting limits. An example of a high reporting limit in groundwater can be seen in the data summary table for Zone 2 groundwater.

Vinyl chloride is non-detect in this zone, at detection limits up to 10 ug/L compared to a screening level of 2E-03 ug/L. In addition, TCE was detected in Zone 2 at a maximum concentration of 440 D. The "D-code" indicates sample dilution. Thus, it is plausible that vinyl chloride, a degradation product of TCE, was non-detect due to this dilution. The impacts of non-detect concentrations of site-related chemicals needs to be addressed in the BLRA, as well as in the delineation of the nature and extent of contamination in the RI/FS.

The Aerojet Contract Laboratories report the results from the primary sample (i.e., not diluted), as well as the results from secondary dilutions required for constituents that exceed the calibration range. Therefore, if TCE exceeded the calibration range in the primary sample, just this constituent would be rerun in the dilution and reported with a 'D' qualifier.

As stated in the report, the reporting period for the HHRA included analytical results collected from groundwater monitoring well samples from January 2000 through June 2004, as well as supplemental data from Zones 2 and 4 collected after June 2004. During this timeframe, samples were analyzed by multiple methods, including Test Method 601, 624, 8240B, and 8260B. Some of these test methods may have reported elevated PQLs. Currently, Aerojet analyzes all groundwater samples by Test Method 8260.

The nature and extent of impact defined in the RI/FS is based on the data collected during the reporting period. On-going monitoring of the plume limits will include the analysis for vinyl chloride, even though it was not evaluated as a constituent of potential concern in the HHRA. The nature and extent of the groundwater impacts in the future and upon which the remedy is designed will include comparison to the chemical-specific ARAR regardless if this chemical (i.e., vinyl chloride) was detected during the reporting period evaluated in the RI/FS.

80. ***Because of the uncertainties associated with the J&E model, information needs to be provided that indicates that indoor air concentrations predicted by the model are conservative and not underestimated. It is recommended that soil gas data collected during historical investigations be used to validate model. The J&E model can be used to predict concentrations in soil gas at different depths based on volatilization from groundwater through the capillary fringe and into the vadose zone. Compare the predicted soil gas concentrations with actual soil gas data.***

Copies of the J&E model and a list of all parameters used in the model will be provided in an appendix to the RI/FS Report. The risk assessment will include a table comparing predicted soil gas concentrations to actual soil gas data.

No table of comparison of predicted soil gas data to actual historic soil gas data is presented. It appears that this no longer necessary because actual soil gas data has been collected as part of the PGOU RI and is evaluated in the BRA.

Aerojet agrees this is no longer necessary; however, as noted in the HHRA, Aerojet conducted a site-specific investigation and analysis of the vapor intrusion pathway to support the use of the Johnson and Ettinger (J&E) model in the risk assessment. This evaluation included the collection of groundwater data, soil gas data, site-specific soil physical property measurements, and the implementation of a vapor migration model to establish the input assumptions and values needed for vapor intrusion model. The results of this evaluation are presented in the Updated PGOU Vapor Intrusion Screening Assessment, Aerojet Superfund Site (Geosyntec, 2008).

96. *The risk characterization tables (Table 8.1a to 8.4j) exclude potential current risks from the migration of VOCs from groundwater to indoor and outdoor ambient air. As a result, cumulative risk to current/future child and adult receptors from all exposure routes have not been assessed in this BRA. A BRA should estimate the cumulative risk from exposure routes that impact the same receptor (i.e., child and adult residents). As such, the BRA should provide an assessment of cumulative risk to the current/future child and adult receptor through groundwater ingestion, inhalation of VOCs and dermal contact with groundwater during non-ingestion groundwater use, and inhalation of VOCs in indoor/outdoor air as a result of groundwater volatilization. Clear justification needs to be provided in the BRA for excluding one or more of the aforementioned exposure routes from the assessment of cumulative risk.*

An evaluation of the potential migration of VOCs from soil and groundwater is being conducted as part of the revised BLRA and will be incorporated into the RI/FS Report.

The BLRA does not present cumulative risk for all exposure routes that impact the same receptor. For example, cumulative risk from soil exposure, groundwater exposure, and indoor air exposure should be calculated for the residential receptor.

See response to 2 December 2008 Letter General Comment 1

<u>Appendix C to PGOU Lands RI/FS -</u> (AJ Response to EPA's 2 August 2005 comments)

161. 2, Vol. 1, page 7-4, Section 7.1.1, Dioxins and Furans. The text states that dioxin and furan results were converted to 2,3,7,8-TCDD equivalents. The method for doing this needs to be discussed in the data evaluation including the list of TEFs that were applied. Also, how were non-detects handled in converting to 2,3,7,8-TCDD equivalents.

Response

The method for converting dioxin and furan results to 2,3,7,8-TCDD equivalents will be described in further detail in the PGOU Lands BLRA. Non-detects were converted using the practical quantitation limits.

In Section 3.1.1.13 of the Lands BLRA, TCDD-TEQ calculations are not provided as requested.

As stated in the report, the dioxin and furan results were converted to 2,3,7,8-TCDD using toxicity equivalency factors developed by the World Health Organization (Van Den Berg et al, 2006). These calculations were completed by laboratory. A table presenting an example of these calculations will be provided.

172. Part 2, Vol. 1, page 7-24 through 7-28. Section 7.4. The baseline risk assessment should include a section that outlines the remedial goal options ("RGOs") for the chemicals and media of concern. This section should include both ARARs and human health-based cleanup goals for all media considered. From the RGOs, risk managers choose Remediation Levels for the Chemicals of Concern, and these numbers, derived from RGOs, are addressed in the Feasibility Study and are included in the Proposed Plan and the Record of Decision.

Response

See earlier response to specific comment 97.

A. RGOs should be developed for those exposure pathway scenarios that generated a cumulative cancer risk in excess of 1E-06 or a HI greater than one. For those scenarios that meet the aforementioned criteria, RGOs should be developed for each of the COPCs which poses a cancer risk equal to or greater than 1E-06 or a HQ equal to or greater than 0.1. RGOs may be calculated based on target cancer risks of 1E-6, 1E-5 and 1E-4, and chemical-specific hazard indices of 0.1, 1, and 3. It is noted that RGOs should be calculated for chemicals that pose an HQ greater than 0.1 to account for cumulative effects. That is, the cleanup level of some COPCs may have to be adjusted below an HQ of 1 to achieve the desired cumulative HI.

Table 7.4 does not provide range of RGOs as requested.

Table 7.4 includes risk-based cleanup values based on:

- Hazard quotient of with a target concentration of 1;
- Incremental lifetime cancer risk with a target risk 1 x 10^{-4}; and
- Incremental lifetime cancer risk with a target risk 1 x 10^{-6}.

In response to this comment, the revised FS will include:

- Hazard quotient of with a target concentration of 0.1; and
- Incremental lifetime cancer risk with a target risk 1 x 10^{-5}.

90. Part1, Vol. 4, Appendix E, page 2-23, Section 2.4.2, last paragraph. The first sentence need to be revised as follows: "USEPA and Cal-EPA have both defined a range of cumulative risk range of 1E-06 to 1E-04 that may be considered acceptable in accordance with the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (USEPA, 1990)."

Section 7.2 of the Lands RI/FS defines risk for a commercial worker as:

- **Commercial/Construction/Maintenance Worker: "No risk above RTLs" signifies that estimated ILCRs are between 1 x 10^{-5} (one in 100,000) and 1 x 10^{-4} (one in 10,000) and/or an HI less than 1.**

This does not agree with the following above comment 90, which states that a 10^{-6} threshold should be used.

The text will be revised to state the regulatory threshold limit for commercial/construction/maintenance worker signifies that estimated ILCRs are greater than 1 x 10^{-6} or greater than an HI of 1.

2. Part 1, Vol. 1. It is the State's position that in order to comply with the Central Valley Regional Water Quality Control Board's Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin River Basins, the remediation/containment goal for TCE should be 0.8 µg/L, the Public Health Goal established by the Office of Health Hazard Assessment of the State of California.

Table 7-3 does not identify the Public Health Goals chemical specific ARARs or TBCs.

Table 7-3 of Part 2 of the PGOU RI/FS will be updated to inclue PHGs as TBCs.

103. Part 1, Vol. 4, Appendix E, Tables 9.1 and 9.2. The date for both RfD and target organ information should be entered as the date of the IRIS data was searched. Please revise to be consistent with this requirement in RAGS D.

In Table 9.1, please provide the RfC for all chemicals with a listed inhalation RfD.

In Tables 9.1 and 9.2, chemicals without noncancer toxicity values should be indicated with an NTV rather than a dash. NTV stands for "No Toxicity Value Available".

In Table 9.2, the inhalation RfC for Tetrachloroethylene is 0.035 mg/m^3 (source: Cal EPA). The converts to an inhalation RfD of 0.01 mg/kg-day as presented in the EPA 9 PRG table. An RfD of 0.1 is listed for tetrachloroethylene in Table 9.2. Please change this to 0.01.

In Table 9.2, the inhalation RfD for TCE should be 0.01 mg/kg-day as recommended in the EPA Region 9 PRG table. This is an NCEA value. Please use the EPA NCEA recommended value because it is more conservative than the Cal EPA value.

Response

Tables 9.1 and 9.2 will be revised to include the date of the IRIS search and provided within the PGOU GW BLRA.

Tables 3-8a&b and 3-9a&b. The term "NA" is used in these tables, but it is not defined in the footnotes. The term "NTV" has been recommended, as presented above.

The term NA will be defined on Tables 3-8 a & b and Tables 3-9 a & b.

Appendix D to PGOU Groundwater RI/FS - (AJ Response to EPA's 16 December 2005 Comments)

Original Comment 2. The California Public Health Goals (PHGs) are listed as a "to be considered" Applicable or Relevant and Appropriate Requirement (ARAR). The discharge limit for the Groundwater Extraction and Treatment Systems (GETs) will need to comply with the substantive requirements of the RWQCB's National Pollution Discharge Permit (NPDES) which is an applicable ARAR. Aerojet's current NPDES discharge limit for trichloroethylene is 0.5 µg/L.

In addition, Pursuant to Title 27 the State will not certify closure of the waste management units in Zone 4 until it is demonstrated that capture of the pollutants with concentrations exceeding Water Quality Objectives is taking place. The Water Quality Objective for TCE is 0.8 µg/L.

Response Comment noted.

Table 7-3 does not identify these as chemical-specific ARARs or TBCs.

Table 7-3 of Part 2 of the PGOU RI/FS will be updated to include PHGs as TBCs.

3 February 2009 Email

General Comments

Comment 1: Costs associated with institutional controls (ICs) for sites in OU5 should be more accurately presented. On Table Q-1 in Appendix Q, the total costs for alternatives that only include institutional controls are shown to be $0 because the costs are included in the Boundary OU RI/FS. To more accurately present the cost of each alternative, costs could be allocated for each feasibility study group. For example the total estimated cost could be divided by the number of feasibility study groups that include ICs as an alternative, or assigned a portion of the total costs based on area, or other factors. The tables in Appendix Q and Section 7 should be revised accordingly. Assumptions and calculations used to estimate costs associated with IC's need to be included in the PGOU RI/FS and not referenced in a separate document. For the purpose of the FS, the costs associated with an alternative should to be included in another OU.

Aerojet agrees to break out the institutional controls costs from the Boundary OU and include them in the Final PGOU RI/FS.

Specific Comments
Comment 1: Section 7.8.3.2, page 7-47. Note 1 of Table A20-3b, Appendix Q states that the costs associated with the exaction and disposal of soil containing PCBs at Source Area 11D are included in the Boundary OU RI/FS. Will this source area be removed prior to excavation of Sites 10D and 11D in FS Group A20-3? The text of the PGOU RI/FS should clarify how this source area will be addressed.

Aerojet understands that for the Agencies to delete Sites 10D and 11D from the Superfund site, the required remedial action for site 11D in the Boundary OU RI/FS must be completed as it is the upgradient source potentially responsible for the discharge of PCBs to the 10D and 11D ditch. It is uncertain at this time what the timing for those actions may be.

Comment 2: Table 7-12 and Section 7.8.2.2, page 7-46. For Alternative A20-2B, Table 7-12 states that vapor barriers may become ineffective over time and are unlikely to be accepted by the State and community assuming residential land use. Except for "No Action", no other alternatives are proposed. Other alternatives that are likely to be accepted by the State and community need to be included such as subslab venting or installation of more durable vapor. Other land use scenarios could also be evaluated.

The enforcement of the vapor barrier requirement along with its effectiveness is much improved since this document was originally prepared in 2004. Table 7-12 will be updated to reflect this more recent information. Regarding other land use scenarios, note FS Group A20-2 evaluates alternatives for a commercial, rather than residential, land use scenario for sites 7D and the FCS.

Aerojet appreciates your expeditious review of these responses to comments. We will schedule an opportunity at our next bimonthly technical, Agency meeting to discuss any questions or concerns you may have with these responses. As we discussed previously, Aerojet anticipates submittal of the Final Perimeter Groundwater Operable Unit RI/FS 60 days after approval of Aerojet's responses to all Agency comments. I can be reached at 916-355-2601 with any questions you have.

Cindy Caulk

Cindy Caulk
Partial Consent Decree Program Coordinator

Attachment

cc: G. Stuesse, Weston
M. Silva, CVEI,
B. Jelinek, EMSI
B. Lewis, ERM

Table A *Ecological Risk Benchmarks for Soil*
Response to Agency Comments (SLERA - Lands Specific Comment #4)
Aerojet Superfund Site
Sacramento County, California

		PGOU SCREENING LEVELS				AGENCY PROPOSED SCREENING LEVELS			
Constituents	**Units**	**Soil Invertebra**	**Plant**	**Mammalian**	**Avian**	**Soil Invertebrate**	**Plant**	**Mammalian**	**Avian**
Organics									
1,1,2,2-Tetrachloroethane	µg/kg					na	na	na	na
2,3,7,8-TCDD	µg/kg	500 2	na	0.00315 5*	0.0158 5*	500 4	na	0.00315 6*	0.0158
Aroclor 1016	µg/kg	2510 2	10000 2	371 5^	655 5^	2510 2	10000 2	371 6^	655
Aroclor 1221	µg/kg	2510 2*	10000 2*	371 5^	655 5^	2510 2*	10000 2*	371 6^	655
Aroclor 1232	µg/kg	2510 2*	10000 2*	371 5^	655 5^	2510 2*	10000 2*	371 6^	655
Aroclor 1242	µg/kg	2510 2*	10000 2*	371 5^	655 5^	2510 2*	10000 2*	371 6^	655
Aroclor 1248	µg/kg	2510 2*	10000 2*	371 5^	655 5^	2510 2*	10000 2*	371 6^	655
Aroclor 1254	µg/kg	2510 2	10000 2	371 5^	655 5^	2510 2*	10000 2*	371 6^	655
Aroclor 1260	µg/kg	2510 2*	10000 2*	371 5^	655 5^	2510 2*	10000 2*	371 6^	655
Chrysene	µg/kg	25000 2	1200 2	na	na	18000 1*	1200 3	1100 1*	na
Benzo(a)anthracene	µg/kg					18000 1*	1200 2	1100 1*	na
Benzoic Acid	µg/kg					na	na	na	na
bis(2-Ethylhexyl)phthalate	µg/kg					na	na	925 7	na
Butyl benzyl phthalate	µg/kg					na	na	239 7	na
Diesel	µg/kg					na	na	na	na
Diethylphthalate	µg/kg	na	100000 4	na	na	na	100000 3	24800 7	na
Di-n-butylphthalate	µg/kg	na	200000 4	na	na	na	200000 3	150 7	na
Fluoranthene	µg/kg					18000 1*	na	1100 1*	na
Indeno(1,2,3-cd)pyrene	µg/kg					18000 1*	1200 2	1100 1*	na
Oil & Grease	µg/kg					na	na	na	na
Perchlorate	µg/kg					na	na	na	na
Phenanthrene	µg/kg					29000 1**	na	100000 1**	na
Pyrene	µg/kg					18000 1*	na	1100 1*	na
Inorganics									
Aluminum*	mg/kg	na	5 2	na	na	600 5*	5 2	na	na
Antimony	mg/kg	78 1	0.5 2	0.29 1	na	78 1	0.5 2	0.27 1	na
Arsenic	mg/kg	0.25 2	1 2	9.9 5	102 5	0.25 4	18 1	46 1	43
Barium	mg/kg	330 1	5 2	1000 1	283 5	330 1	5 2	2000 1	283
Beryllium	mg/kg	40 1	0.1 2	36 1	na	40 1	0.1 2	21 1	na
Boron	mg/kg	na	0.5 4	na	na	20 5*	0.5 3	na	na
Cadmium	mg/kg	140 1	32 1	0.38 1	1 1	140 1	32 1	0.36 1	0.77
Calcium	mg/kg					na	na	na	na
Chromium	mg/kg	0.4 3	1 4	110 5	16.1 5	0.4 5^	1 3	34 1	26
Cobalt	mg/kg	na	13 1	240 1	190 1	1000 5*	13 1	230 1	120
Copper	mg/kg	32 2	1 2	370 5	515 5	80 1	70 1	49 1	28
Hexavalent Chromium	mg/kg	0.2 2	0.018 2	na	na	0.2 4	0.018 2	130 1^	na
Iron**	mg/kg					na	200 5*	na	na
Lead	mg/kg	1700 1	110 1	59 1	16 1	1700 1	120 1	56 1	11
Magnesium	mg/kg					na	na	na	na
Manganese	mg/kg	na	500 4	na	na	450 1	220 1	4000 1	4300
Mercury	mg/kg	2.5 2^	0.349 2^	0.146 5	0.00051 5	0.1 5*	0.349 2^	0.146 6	0.00051
Molybdenum	mg/kg	na	2 4	4.75 5	44 5	200 5*	2 c	4.75 6	44
Nickel	mg/kg	100 2	25 2	246 5	121 5	280 1	38 1	130 1	210
Potassium	mg/kg					na	na	na	na
Selenium	mg/kg	7.7 2	0.05 2	0.21 5	420 5	4.1 1	0.52 1	0.63 1	1.2
Silver	mg/kg	na	0.02 2	na	na	50 5*	560 1	14 1	4.2
Sodium	mg/kg					na	na	na	na
Thallium	mg/kg	na	0.01 2	2.1 5	na	na	0.01 2	2.1 6	na
Titanium	mg/kg	1000 3*	na	na	na	1000 5*	na	na	na
Vanadium	mg/kg	na	2 4	55 5	na	20 5*	2 3	280 1	7.8
Zinc	mg/kg	199 2	0.9 2	1600 5	8.5 5	120 1	160 1	79 1	46

Notes are provided on Page 2

Table A ***Ecological Risk Benchmarks for Soil***
Response to Agency Comments (SLERA - Lands Specific Comment #4)
Aerojet Superfund Site
Sacramento County, California

Notes:
µg/kg - Micrograms per kilogram
mg/kg - Milligrams per kilogram
na - not available or not applicable
* - As explained in the PGOU SLERA text, aluminum will not be considered a COPC since the soils do not exhibit a low pH.
** - Iron will not be considered a COPC since the soils do not exhibit a low pH.

PGOU SCREENING LEVELS:
1 -*Ecological Soil Screening Levels* (ECO SSLs), Interim Final, USEPA, November 2003.
OSWER Directives: Antimony (9285.7-61), Barium (9285.7-63), Beryllium (9285.7-64), Cadmium (9285.7-65), Cobalt (9285.7-67), and Lead (9285.7-70).
2 - *Screening Level Ecological Risk Assessment Protocol, Appendix E: Toxicity Reference Values, located on USEPA Region 9 website at http://www.epa.gov/region09/waste/sfund/prg/otherlinks.htm*
2* - Aroclor 1016/1254 value used
2^ - Mercuric chloride value used
3 - *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process (Will and Suter, 1995).*
3* - Soil microorganism benchmark used
4 - *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision (Efroymson, Will, Suter, and Woaten 1997).*
5 - *Preliminary Remediation Goals for Ecological Endpoints* (Efroymson, Suter, Sample, and Jones, 1997).
The short-tailed shrew was the species used for mammalian screening with the exception of selenium, which was the white-footed mouse.
The American woodcock was the species used for avian screening with the exception of selenium, which was the red-tailed hawk.
5* - TCDD value used
5^- PCB value used

AGENCY PROPOSED SCREENING LEVELS:
Receptors:
MI = Mammalian Insectivore (Short-tailed Shrew)
SI = Soil Invertebrate
MW = Mammalian Wildlife
AW = Avian Wildlife
1 - USEPA Ecological Soil Screening Levels (Eco-SSL). http://www.epa.gov/ecotox/ecossl/index.html.
1* - Eco-SSL for high molecular weight PAHs
1^ - The Eco-SSL for Chromium was updated in May 2008. The current Eco-SSLs are presented.

Lower of the:
2 - Plant screening benchmarks obtained from: USEPA Region 6. Toxicity Reference Values. Appendix E. Screening Level Ecological Risk Assessment Protocol. August 1999.
2* - Aroclor 1016/1254 value used
2^ - Mercuric chloride value used
3 - Plant screening benchmarks obtained from: *Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants : 1997 Revision* (Efroymson, Will, Suter, and Woaten 1997).

Lower of the:
4 - Soil Invertebrate screening benchmarks obtained from: USEPA Region 6. Toxicity Reference Values. Appendix E. Screening Level Ecological Risk Assessment Protocol. August 1999.
5 - Earthworm and microbe benchmarks obtained from: *Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process* (Will and Suter, 1995).
5* - Microbe screening benchmark was used
5^ - Earthworm screening benchmark was used
6 - *Preliminary Remediation Goals for Ecological Endpoints* (Efroymson, Suter, Sample, and Jones, 1997).
6* - TCDD value used
6^ - PCB value used
7 - USEPA Region 5, RCRA, Ecological Screening Levels. August 2003.
http://www.epa.gov/reg5rcra/ca/ESL.pdf

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