APPENDIX J

The following provides Aerojet's and CVEI's responses to Agency comments dated October 23, 2003 on the Draft PGOU Remedial Investigation Report dated September 18, 2003.

General Comments

Comment 1:
Summary documents are needed incorporating all Zone 1, 2, 3 and 4 data to be used for public meetings and the Record of Decision. An Executive Summary is needed which would include a composite maximum extent of contamination plume map, composite plume map for each layer of the aquifer and summary table of all potential contaminants of concern.

Response:
Summaries of the pertinent findings of the Remedial Investigation (RI) in each zone are included in Section 1 of the Feasibility Study. The summaries include composite maximum extent of contamination plume maps prepared for each layer of the aquifer. Composite plume maps for the entire Aerojet Site have not been prepared, although it is anticipated that they would be submitted to the Agencies prior to completion of the Agency's selection of the remedy for PGOU. Summary tables listing all chemicals of concern detected above the lowest potentially applicable ARAR are included in the Baseline Risk Assessment.

Comment 2:
On many of the figures presenting information on concentrations of pollutants in groundwater, there are numerous postings of NS if the well was not sampled recently. In many cases, historic sample results from those wells that were not sampled could be useful in interpreting extent of plume and source areas. Posting the older data in a lighter shade and not using the data for contouring is recommended. A good example is found on Figure 4-39, nearly all of the monitor wells were not sampled. The extent of TCE beneath Zone 2 of the PGOU in Layer D cannot be ascertained.

Response:
Comment noted. Additional data were incorporated into the Final RI Report by extending the "cut-off" date for the RI Sampling Period from April 2003 to June 2004. In addition, "supplemental" samples were collected from wells located in Zones 2 and 4 to verify historical data or evaluate plume extents for wells not sampled during the RI Sampling Period. "Historical" water quality data collected prior to January 2000 were incorporated into the RI Report and are noted on the figures with an asterisk.

Comment 3:
The specific comments for Zones 1, 3 and 4 address the need for additional monitoring well to define the extent of contamination. However, there appears to be sufficient information to evaluate proposed remedial alternatives. The identified groundwater contaminated data gaps do not require the delay of the completion of the RI/FS but must be addressed prior to the remedial design.

Response:
Comment noted. Monitor wells were installed in each of these zones following the DRAFT RI Report, and additional monitor well installations are anticipated through remedy implementation, where necessary.

Comment 4:
Each of the Zone discussions of Land Use needs to discuss Aerojet development plans which the Agencies understand to be residential use. Figure(s) need to be prepared showing the current land uses in developed areas and projected land uses in the undeveloped areas.

Response:
Figure 1-4 in the Feasibility Study (FS) presents a site-wide figure illustrating Superfund site boundaries and identifies the current development plans for land within the PGOU owned by Aerojet and for which Aerojet has submitted development applications to the County of Sacramento and/or the City of Rancho Cordova. Development plans for other lands owned by Aerojet but not within the PGOU are tentative and confidential at this time.

Comment 5:
In each Zone please review the aquifer layer descriptions to consistently provide layer "x" extends from "y" to "z" below ground surface.

Response:
The layer descriptions have been revised in each Zone to include depths to the top and bottom of each layer.

Comment 6:
A list of screening chemical concentrations used in evaluating the significance of chemical data are not provided in the report. Screening concentrations are needed to determine the potential chemicals of concern and if the sampling program was sufficient in evaluating the nature and extent of contamination. A screening concentration for each chemical constituent needs to be selected for groundwater from the lowest potentially applicable chemical-specific ARARs, TBCs, and risk-based criteria. Chemical concentrations need to be compared to the selected screening concentrations to determine if additional characterization is needed to define the extent of contamination. The laboratory data tables associated with each zone need to be revised to highlight sample results that exceed the screening concentration. The document needs to state which chemical constituents exceed the screening concentrations and evaluate the nature and extent of each chemical. Fate and transport parameters for these chemicals are also needed.

Response:
Potentially applicable ARARs for groundwater are included in the Aerojet Site-wide Quality Assurance Program Plan, under which the RI data were collected. The screening levels used to determine which chemicals were retained as CoPCs are included in the Baseline Risk Assessment. The data summary tables for each Zone in the RI were modified to highlight the results that exceeded the screening level concentrations. Discussion of the fate and transport parameters for TCE, perchlorate, NDMA, metals, and 1,4-dioxane is included in Section 1.3.5 of the FS.

Comment 7:
In order to clarify the relationship between cross sections, a figure is needed for each zone showing the cross-section transects, the well locations, and the zone boundary.

Response:
A figure showing cross-section transects, well locations, and the Zone boundaries have been added to the sections for each Zone.

Comment 8:
Several of the cross sections do not present layer designations, chemical and/or water level data (e.g., Figures 3-3, 3-4; 5-6 through 5-12). Revise the cross sections for each zone, as needed to include the layer designations and the most recent chemical and water level data.

Response:
The requested information was added to most cross sections; however, there were too many wells on Zone 1 cross section A-A' to post these data (Figure A-6).

Comment 9:
The area definitions provided in the individual zone reports are confusing and should be clarified so that the reader has a clear understanding of the area definitions. The PGOU RI work plan has a better discussion of the area definitions and boundaries. Definitions with supporting figures should be provided for the following area definitions: Zones, Sectors, Study Areas, and Zone PGOU.

Response:
The area definitions and figures have been revised in each Zone report and a discussion of zones, sectors, and management areas is included in Section 1 of the FS. References to the "Study Areas" were removed from the RI text.

Comment 10:
Include a topographic map showing the surface topography in each zone discussion.

Response:
United State Geological Survey (USGS) topographic maps have been added to each zone.

Comment 11:
Include a map in each zone discussion showing the spatial extent of dredged areas within the zones.

Response:
The USGS topographic maps include the spatial extent of dredged areas.

Comment 12:
Private wells surveyed in the Stage 1 RI should be located on Figure 2-3 and included in the individual zone reports. The map and discussion can be updated once the proposed surveyed is completed. The PGOU RI/FS work plan discussed the location of water supply wells but an expanded discussion was not carried forward into the RI report.

Response:
A discussion of the private well survey is included in Section 1 of the FS and in the individual zone reports, Appendices A-D. The public and private wells identified have been added to Figure 1-5 and the wells and status are summarized in Table 1-2.

Comment 13:
Provide a table in each zone report which summarizes constructions details of the extraction and monitoring wells construction details. The table should include but not necessarily be limited to coordinates, ground surface and top of casing elevations, total depth of boring, depth to top and bottom of screen and layer designation.

Response:
Tables including the well construction details have been added to the RI Reports for each Zone.

Comment 14:
Provide a list of the reports which document the historical investigations pertaining the PGOU RI.

Response:
A list of the reports that document the historical investigations pertaining to the PGOU RI have been added to each Zone, Appendices A-D.

Comment 15:
Include a digital copy of the comprehensive chemical database for PGOU on CD with the next version of the report.

Response:
The date range of the chemical database included on the CD has been extended to encompass January 1998 through December 2004 and is included as Appendix L.

Comment 16:
The discussion of the existing remedial systems (e.g. GETs, ARGET) presented in the individual zones reports are not adequate to evaluate the systems for FS. The discussions are too brief and do no cover all the topics required for evaluating the systems in the FS. All the historical performance information that will be used in FS for evaluating the system needs to be in include in the RI. Examples of topics that should be discussed include but not limited are:

- Describe the hydrogeologic layer(s) the extraction wells are screened across.
- Summarize the history and development of the extraction system.
- Provide a summary in text and table format the mass removal rates and other system performance measures.
- Provide a summary of historical development of the systems.
- Describe changes over time of the treatment systems.
- Describe the results of performance monitoring of treatment systems.
- Include a map showing location of extraction wells.
- Include cross-sections showing extraction and applicable monitoring wells.
- Summarize any hydraulic evaluations of the systems.

Response:
Additional information regarding the GET facilities have been added to this report. A detailed analysis of the effectiveness of the GET facilities is beyond the scope of this RI/FS Report, and would be more appropriate during PGOU remedy implementation.

Comment 17:
The discussions of the sources areas are not sufficient to determine whether the historical assessments are adequate to characterize at the various source sites and whether these areas continue to be significant sources of contamination to groundwater. Provide separate discussions of the historical and current uses of chemicals at the various source areas. A statistical summary of chemical analysis for soil and groundwater should be included for each area.

Response:
The requested analysis is beyond the scope of work addressed by this PGOU RI/FS and is better suited to the source operable unit RI/FS scheduled through the Program Plan Modification Report. The PGOU RI/FS report does include adequate source area history and description to support the evaluation and selection of remedial alternatives for the PGOU.

Comment 18:
Provide the number of wells and samples for groundwater at each of the potential source areas. Indicate past remedial actions and that future source remedial activities are planned (Program Plan Modification Report).

Response:
As stated above, the requested information is beyond the scope of the PGOU RI/FS but will be provided in future Operable Unit RI/FS Reports prepared specifically to address the potential source areas.

Comment 19:
Discussion of vertical gradients should be based on the vertical gradients calculated between co-located well pairs. Provide calculations used in determining vertical gradients in separate table(s).

Response:
Contour maps showing the head differences between layers were added to the discussion of potential vertical gradients in each zone. Vertical gradients were not calculated for this RI/FS Report.

Specific Comments

Comment 1:
Page iii. A review needs to be made for missing acronyms. As a minimum the following acronyms are missing for the List of Acronyms: BTEX, FSC, ICF, NFH, PQL, SVOC, Z1SA, Z2SA, Z3SA, and Z4SA.

Response:
The list of acronyms has been reviewed and expanded within the Final RI/FS Report.

Comment 2:
Page 2-3, Section 2.5.1, paragraph 3. This paragraph recommends that Area 40 be removed from the PGOU. Several years ago Aerojet was requested to develop an Engineering Evaluation/Cost Analysis for Area 40 due to the extremely elevated concentrations of Trichloroethylene (TCE) in the soils and groundwater in Area 40 and the desire to prevent the TCE from migrating into the fractured bedrock. Those concerns still exist. Additional delays in developing a remedy for Area 40 may allow unwanted migration of TCE into areas where it will be difficult to remove. In order to remove Area 40 from the PGOU, an acceptable schedule to complete the Remedial Investigation/Feasibility Study (RI/FS) and develop an appropriate remedy will need to be submitted by Aerojet for Agency approval. Also the paragraph does not adequately explain the mechanism for downgradient hydraulic containment and reference document figures for the explanation.

Response:
After receipt of these comments, Aerojet and the Agencies conducted several discussions regarding this issue. It was agreed between the parties that the potential source sites within Area 40 would be included in a future Operable Unit RI/FS Report, currently scheduled within the Program Plan Modification Report.

Downgradient hydraulic containment of groundwater originating in Area 40 is provided by GET A. Figures C-86 and C-87 in Section 5.6 of the RI Report show the hydraulic gradient from Area 40 is west to northwest onto the Aerojet Site in both the alluvial sediment and bedrock layers.

Comment 3:
Page 2-5, Section 2.1.3. Information regarding Valley Ditch needs to be included.

Response:
Information on Valley Ditch was added to Section A1.1.3 of the Zone 1 RI Report (Appendix A).

Comment 4:
Page 2-7, Section 2.1.6, paragraph 1. The Federal aquifer classification "Federal Classification IIA" needs to be provided.

Response:
The Federal aquifer classification has been added to the text in each Zone (Appendices A through D).

Comment 5:
Page 2-7, Section 2.1.6, paragraph 2 and accompanying bullets. Figure 2-3 does not show the Carmichael Water District listed under this paragraph. For consistency, Citizens Utilities Co. should be listed as the previous name for CalAm. The City of Folsom needs to be added to the text to agree with the Figure 2-3.

Response:
Figure 1-5 in the FS has been revised to include the Carmichael Water District. The Citizens Utilities Co. has been changed to the California American Water Co on Figure 1-5 and this change is also reflected in the Section 1 text. The City of Folsom is included in Figure 1.5 as a water purveyor, but was not added to the bulleted list in Section 2.1.6. The bulleted list shows only those water purveyors that use groundwater; the City of Folsom provides only treated surface water (Water Forum Action Plan, January 1999).

Comment 6:
Page 2-7, Section 2.1.6, paragraph 3. AC-21 operates periodically and it was operating during the latest monthly sampling of water supply wells conducted by Aerojet. Revise the document to reflect operating conditions.

Response:
Section 1.2.2.4 has been revised to reflect current operating conditions.

Comment 7:
Page 2-12, Section 2.4 and Figure 2-6. Per the EPA risk assessment guidance, the Site Conceptual Model (SCM) diagram should present a complete picture of the linkages among contaminant sources, release mechanisms, exposure pathways and routes to current and potential future receptors that may be exposed at the site. In this respect, the SCM presented as Figure 2-6 and the text in Section 2.4 needs much more detail explaining all possible pathways and why they were eliminated. Specific comments are provided in the Agencies comment letter regarding the Baseline Risk Assessment for PGOU.

Response:
A revised Site Conceptual Model is provided as Figure 1-27 and within the Baseline Risk Assessment, Appendix E.

Comment 8:
Figure 2-2. For use as the composite Regional and Local Surface Water Features for Zones 1, 2, 3 and 4, provide the figure in color (see Figure 2-4 of PGOU Work Plan) so the surface water features are legible. The River Terrace designations could be confusing suggest changing to Geological Old River Terrace feature.

Response:
Figure 1-6 (previously Figure 2-2) has been revised to incorporate the requested changes.

Comment 9:
Figure 2-3. Citizens Utilities Co. should be California American Water Co. Not all the well referenced in the text are contained on the figure see comments under the Base Line Risk Assessment for Figure 2. Under EXPLANATION, Consent Decree Boundary should be Partial Consent Decree Boundary.

Response:
Figure 1-5 (previously Figure 2-3) has been revised to incorporate the requested changes.

Comment 10:
Page 3-4, Section 3.1.5. All wells discussed in the second paragraph of section should be located on a figure.

Response:
Comment noted. Water supply wells are shown on Figure 1-5 of the FS.

Comment 11:
Page 3-6, Section 3.1.8, paragraph 2. The American River Groundwater Extraction and Treatment (ARGET) system also uses an air stripper to remove VOCs from the extracted groundwater.

Response:
Comment noted. Section A1.2.4 has been revised.

Comment 12:
Page 3-8, Section 3.2.1, fourth paragraph. Due to the complex stratigraphy and the fact that releases from sources areas migrated through Layer A and B to Layers C, D, E and F, the statement that Layer A and B are "hydraulically isolated" is not substantiated.

Response:
Comment noted. Layers A and B may be hydraulically connected with Layers C and D in portions of the Aerojet Site and the PGOU. The text has been revised to be more specific to the off-site areas that the cited DWR literature was referencing.

Comment 13:
Page 3-9, Section 3.2.1.1, first paragraph. The statement that Layers A and B are not significant in Zone 1 because they are either unsaturated or absent is inconsistent with the cross-sections (e.g., Figure 3-2) that show the water levels in Layers A and/or B. Revise the document to clarify and include tables with Layer A and B water level data.

Response:
The text has been revised accordingly.

Comment 14:
Page 3-10, Section 3.2.1.2, paragraph 3. Contaminated groundwater from Layer C appears to be discharging into the American River based on a review of iso- concentration and potentiometric surface maps, and the cross-sections. Further evaluation of this groundwater to surface pathway is needed because the American River is a potential drinking water source and an important aquatic habitat.

Response:
Comment noted. The cross sections were revised to clearly show the lower permeability sediments present beneath the American River near the Nimbus Fish Hatchery. There are minimal head differences between Layers C and D throughout most of Zone 1. However, potentiometric surface elevations are up to 20 feet higher in Layer C, approximately 2,000 downstream of the Nimbus Fish Hatchery. The higher potentiometric surface elevations near the American River suggest that the river may be a "losing" river to Layer C in this area. If the American River is losing, then Layer C groundwater is not discharging to the river.

Comment 15:
Page 3-11, Section 3.2.2, paragraph 2. The discussion in this paragraph states that suspected anomalous data were not included in the maps. The report should provide the suspected data that was excluded in developing the groundwater potentiometric surface maps.

Response:
The potentiometric surface maps were regenerated using more recent data (October 2003 and April 2004). All water level data were posted on the figures. Water level elevations from wells that did not fall within the contour interval based on the well location were not used to prepare the maps. In general, there were very few, if any, data points that were not used to prepare the potentiometric surface maps.

Comment 16:
Page 3-12, Section 3.2.2.2. It is stated that some wells assigned to Layer D need further evaluation. Which wells are the ones in question?

Response:
The well layer assignments for several wells were revised between submission of the Draft RI and the Final RI/FS Reports. Due to the large number of wells in Zone 1, it is anticipated that well layer assignments may be refined in the future as lithologic and geophysical data are evaluated at the individual wells.

Comment 17:
Page 3-14, end of section 3.2. There needs to be a discussion, with appropriate figures, on vertical gradients between the layers.

Response:
Maps showing the head differences between the layers are included in the Final RI/FS Report.

Comment 18:
Page 3-15, Section 3.3.2. Contaminated groundwater (e.g. TCE, perchlorate) is not adequately defined north of wells 1531/1532 and west of wells 30219/30220. Additional wells are necessary to define extent of contamination.

Response:
Characterization of the area west of wells 30219/30220 is addressed by the WGOU. As discussed with and approved by the Agencies, nested Monitor Well 30252-4 was constructed north of the TCE plume to provide the requested characterization data north of Wells 1531/1532.

Comment 19:
Page 3-19, Section 3.3.3. TCE contaminated groundwater is not adequately defined north of wells 1540/30197 and perchlorate contaminated groundwater is not adequately defined north of wells 1376/1510. Additional wells to define extent of contamination are necessary.

Response:
See response to Comment 18.

Comment 20:
Page 3-22, Section 3.3.4. Perchlorate contaminated groundwater is not adequately defined west of well 30209. Additional wells to define extent of contamination are necessary.

Response:
Characterization of the area west of well 30209 is addressed by the WGOU.

Comment 21:
Page 3-17, Section 3.3.2.1, paragraph 1. It is stated that the Well 1532 is upgradient of the extraction wells. From Figure 3-11, it would appear that Well 1532 is side-gradient to the extraction wells and that water that passes that point is not captured by the extraction field.

Response:
Section A3.2.1 has been revised.

Comment 22:
Page 3-17, Section 3.3.2.1, paragraph 2. The first sentence refers to Well 1488. The well should be 1487.

Response:
The text has been revised.

Comment 23:
Page 3-17, Section 3.3.2.1, paragraph 2. It is stated that Well 1361 is generally upgradient of Well 4370. According to Figure 3-11, the water passing through Well 1361 goes west and is not captured by Well 4370.

Response:
Section A3.2.1 has been revised to state that groundwater passing through Well 1361 flows west towards the WGOU.

Comment 24:
Page 3-17, Section 3.3.2.2, paragraph 1. The second sentence states that 1,4-dioxane was found in 9 wells, including 6 extraction wells. Two sentences later it then say that 1,4-dioxane was found in four monitor wells. Thus, the total number of wells should be listed as 10.

Response:
Some well layer designations have changed since the Draft RI Report. The number of Layer C wells in which 1,4-dioxane was detected has been updated (Section A3.2.2).

Comment 25:
Page 3-19, Section 3.3.2.6, paragraph 1. The last sentence stated that concentrations of general water quality parameters in samples from newly installed wells were within the range of values typically expected for background. The document needs to include the background values and source for each parameter compared to background.

Response:
The text has been revised to state the ranges of these parameters were within the ranges typically observed in areas where there were no known groundwater impacts.

Comment 26:
Page 3-20, Section 3.3.3.1, paragraph 3. The Feasibility Study (FS) will need to consider capture of the plume extending between Wells 1540 and 1533 that is not captured by the current extraction well operation.

Response:
The Zone 1 PGOU remedial alternatives include capture of the plume in this area.

Comment 27:
Page 3-20, Section 3.3.3.1, paragraph 5. Update the figure to show location of well between well 30194 and 30221.

Response:
The Zone 1, Layer D potentiometric and chemical iso-concentration contour figures have been revised to include recently constructed Well 30237, located between Wells 30194 and 30221.

Comment 28:
Page 3-20, Section 3.3.3.2, paragraph 1. The reader is referred to Figure 3-39. Figure 3-39 provides information for Layer E, not Layer D. It would appear that Figure 3-44 for Layer E was duplicated by mistake and provided as Figure 3-39.

Response:
The correct figure showing the 1,4-dioxane iso-concentration contours in Layer D is included as Figure A-42.

Comment 29:
Page 3-25, Section 3.4, paragraph 2. The wells near, and within, Zone 1 should be surveyed, not just the wells one mile around Zone 1.

Response:
The private well survey included wells located within Zone 1.

Comment 30:
Page 3-25, Section 3.4, general.

- It would appear that additional wells are needed in the area that is covered by the western portion of the Perimeter Groundwater Operable Unit (PGOU) and the eastern portion of the Western Groundwater Operable Unit (WGOU) for plume definition.

- Additional sampling for 1,4-dioxane with a PQL near 3 µg/L is needed to adequately define the plume and show that all of the 1,4-dioxane above levels of concern is included in the plume of VOCs and/or perchlorate that is above their respective levels of concern.

- There appears to be sufficient information to evaluate remedial alternatives for Zone 1. The identified data gaps in extent of groundwater contaminated provided in the comments above must be addressed prior to the remedial design. The GET E/F influent and effluent should be sampled for 1,4-dioxane.

Response:
Additional Monitor Wells 30237, 30243, 30244, and 30245 were installed for plume definition in the western portion of the PGOU and eastern portion of the WGOU.

Low-level sampling for 1,4-dioxane was conducted at a number of monitor wells located near the downgradient extents of 1,4-dioxane defined by the 10 µg/L contour. The results are included in the appropriate sections of the Zone 1 RI (Appendix A).

GET E/F is in the WGOU and monitoring of the influent and effluent is performed in accordance with the UAO and NPDES Permit.

Comment 31:
Figure 3-1. Change Natoma South Canal to Folsom South Canal for consistency with other figures. Area 46 and ARGET need to be clearly identified on the figure.

Response:
Figure 1-6 shows the Folsom South Canal and Figure A-1 includes Area 46 and ARGET.

Comment 32:
Figures 3-2 and 3-4. The geology presented at the intersection of cross-sections A-A' and C-C' on these figures does not match. Revise as needed.

Response:
Cross sections A-A' and C-C' are from previous reports and the stratigraphy was not modified for the RI Report. The layer designations were changed to be more consistent with the current nomenclature, although there are some remaining inconsistencies.

Comment 33:
Figures 3-4 and 3-9. The geology presented in the cross-sections presented on these figures does not match in area around Well 3198. Revise as needed.

Response:
Figures 3-4 was included in the Draft RI for comparison of the "old" and "new" layer designations in Zone 1. It was anticipated that the layer designations would not match.

Comment 34:
Figures 3-5 and 3-6. The geology presented in the cross-sections presented on these figures does not match the area around Well 1466-8. Revise as needed.

Response:
The figures were revised.

Comment 35:
Figure 3-11. Review and revise contours as needed by wells 1406/1407 and 3472.

Response:

New potentiometric maps have been prepared using more recent data. The contours around wells 1406/1407 and 3472 have been reviewed on Figures A-12 through A-15.

Comment 36:
Figure 3-31. How can the 4 µg/L perchlorate iso-concentration line loop to the east between Wells 30210 and 30067? The concentration lines looping well 4530 and well 3517 need to have concentration number.

Response:
A concentration number has been added to the lines looping wells 4530 and 3517 (Figure A-40).

Comment 37:
Table 3-6. The detection/quantitation levels indicated by the data with a "<" does not appear to be acceptable in many cases for selected metals. The <0.20 mg/L for antimony is significantly above the MCL of 0.006 mg/L. The same can be said for hexavalent chromium, lead and arsenic. In addition, footnote 4 states that the sample was unfiltered. The only footnote 4 found in the table was on hexavalent chromium samples. All other samples were filtered? This also applies the appropriate tables in Sections for Zones 2, 3, and 4. Sufficient information will need to be supplied in order to determine effluent limitations from treatment facilities and types of treatment needed.

Response:
Although the detection limit for antimony is above the MCL, antimony was not detected in any samples collected in Zone 1 PGOU wells. Antimony was also not a compound used historically at the site.

Hexavalent chromium is regulated under the 0.05 mg/L MCL for total chromium (State of California, DHS). As such, the detection limits for hexavalent chromium (<0.01 and <0.001 mg/L) are below the MCL. The samples collected for hexavalent chromium analysis were unfiltered. All other samples collected from Zone 1 PGOU wells were filtered prior to laboratory analysis.

Some of the detection limits for lead and arsenic (0.002 µg/L) are below the MCLs for these compounds (0.015 and 0.05 µg/L, respectively). Lead was not reported in any samples collected in Zone 1 PGOU wells. Arsenic was reported in three extraction wells at concentrations ranging from 0.0021 to 0.0031 µg/L. These concentrations are all below the MCL.

Typically, the Agencies determine the effluent limitations for the GET systems based on the disposition of the treated water. The adequacy of the reporting limits will be assessed when those limitations are established.

Comment 38:
The analytical data tables need to include all laboratory data presented on the iso-concentration contour figures. Data for the following wells needs to be included on the tables listed below:

- Table 3-3, Layer C Wells: As shown on Figure 3-27, TCE data for selected wells (e.g., 30219, 30220, 30067, 30076, 3353, 3517, 3403, 4375) needs to be included on the table.

- Table 3-5, Layer C Wells: As shown on Figure 3-31, Perchlorate data for selected wells (e.g., 30219, 30220, 30067, 30076, 3353, 3517, 3403, 3399, 4375,) needs to be included on the table.

- Table 3-5, Layer C Wells: As shown on Figure 3-32, NDMA data for selected wells (e.g., 30219, 30220, 30210, 30067, 30076) needs to be included on the table.

- Table 3-3, Layer D Wells: As shown on Figure 3-33, TCE data for selected wells (e.g., 30221, 30139, 1436, 443, 4535, 3054, 1211, 4330, 4155, 4160, 4165, 4170, 4175, 4180, 4185, 4190, 4205, 1488, 4375, 1572, 30158, 1569, 4345, 4360) needs to be included on the table.

- Table 3-4, Layer E Wells: As shown on Figure 3-39, 1,4-Dioxane data for selected well (e.g., 30188) needs to be included on the table.

- Table 3-5, Layer D Wells: As shown on Figure 3-40, Perchlorate data for selected wells (e.g., 30221, 30139, 1436, 3320, 1211, 4330, 4155, 4160, 4165, 4170, 4175, 4180, 4185, 4190, 4205, 4375, 30158, 4345, 4360) needs to be included on the table.

- Table 3-5, Layer D Wells: As shown on Figure 3-41, NDMA data for selected wells (e.g., 30221, 4535, 30158) needs to be included on the table.

- Table 3-3, Layer E Wells: As shown on Figure 3-42, TCE data for selected wells (e.g., 30134, 30135, 30136, 3333, 3334, 3404, 3405, 3595, 3596, 3321, 3322, 30188) needs to be included on the table.

- Table 3-5, Layer E Wells: As shown on Figure 3-45, Perchlorate data for selected wells (e.g., 30188, 30134, 30135, 30136, 3333, 3334, 3404, 3405, 443, 110, 3595, 3596, 3321, 3322) needs to be included on the table.

- Table 3-5, Layer E Wells: As shown on Figure 3-46, NDMA data for selected wells (e.g., 30188, 443, 3595, 3596) needs to be included on the table.

- Table 3-3, Layer F Wells: As shown on Figure 3-47, TCE data for selected wells (e.g., 2066) needs to be included on the table.

Response:
As Aerojet and the Agencies discussed prior to Aerojet's submittal of this report, most of the wells listed above are located outside the perimeter of Zone 1 (i.e., they are located within the WGOU). The wells were included on the potentiometric and iso-concentration contour figures to aid in the determination of hydraulic gradients and plume delineation. However, since these wells are not part of the Zone 1 PGOU, they are not included in the analytical data tables for Zone 1. Analytical data for the remaining wells within the Zone 1 PGOU were included in the Zone 1 summary tables.

Comment 39:
The analytical data provided in the tables needs to be presented on the iso-concentration contour figures. Data provided in the following tables needs to be included on the appropriate iso-concentration contour figure:

- Table 3-3, Layer C Wells: Data from TCE for selected wells (e.g., 33, 447, 1396, 1466, 1488, 2067, 3058, 3594, 4165) need to be included on the appropriate iso-concentration contour figure.

- Table 3-3, Layer D Wells: Data from TCE for selected wells (e.g., 3389, 3456, 3623, 3624) needs to be included on the appropriate iso-concentration contour figure.

- Table 3-3, Layer E Wells: Data from TCE for selected wells (e.g., 1572, 2065) needs to be included on the appropriate iso-concentration contour figure.

- Table 3-3, Layer F Wells: Data from TCE for selected wells (e.g., 3184) needs to be included on the appropriate iso-concentration contour figure.

- Table 3-5, Layer C Wells: Data from Perchlorate and NDMA for selected wells (e.g., 447, 2067, 3058, 4301) needs to be included on the appropriate iso-concentration contour figure.

- Table 3-5, Layer D Wells: Data from Perchlorate and NDMA for selected wells (e.g., 3138, 3167, 3168, 3389, 3623, 3624) needs to be included on the appropriate iso-concentration contour figure.

- Table 3-5, Layer E Wells: Data from Perchlorate and NDMA for selected wells (e.g., 2065, 3396) needs to be included on the appropriate iso-concentration contour figure.

Response:
Some of the wells listed above are located outside the perimeter of Zone 1 (i.e., they are located within the WGOU). The wells were included on the potentiometric and iso-concentration contour figures to aid in the determination of hydraulic gradients and plume delineation. However, since these wells are not part of the Zone 1 PGOU, they have been omitted from the final analytical data tables for Zone 1. Analytical data for the wells within the Zone 1 PGOU are posted on the chemical iso-concentration contour maps and are also included in the Zone 1 PGOU summary tables.

Comment 40:
Page 4-1, Section 4.1.1, paragraph 1. Provide the acreage for Zone 2 as done with other sections.

Response:
Section B1.1.1 has been updated with the acreage for the Zone 2 PGOU.

Comment 41:
Page 4-3, Section 4.1.5, paragraph 1. Change Figure 2-7 to 2-3.

Response:
The text has been revised to reference Figure 1-5, Public and Private Water Supply Well Locations.

Comment 42:
Page 4-3, Section 4.4.5, paragraph 3. Need discussion that private well 1816 has wellhead treatment for TCE.

Response:
Private well 1816 is located south (and downgradient) of the WRND and is not included in the Zone 2 PGOU; however, Well 1816 is included in the private well survey (Table 1-2).

Comment 43:
Page 4-5, Section 4.1.8, paragraph 1. The RWQCB has not yet received a proposal for a groundwater extraction and treatment system along the western boundary of the Inactive Rancho Cordova Test Site (IRCTS).

Response:
The Boeing Corporation and Aerojet are working with the RWQCB and DTSC to evaluate potential remedies for the IRCTS. It is Aerojet's understanding that since the submittal of the draft report, RWQCB and DTSC have received RI/FS reports for the IRCTS groundwater.

Comment 44:
Page 4-7, Section 4.2.1.1. Provide additional information (i.e., cross section) to document why Layer A in Zone 2 is not hydraulically connected to Zone A in WRND.

Response:
The text has been revised and a discussion of Layer A in the Zone 2 PGOU and the Layer A in WRND is included in Section B2.2.1.

Comment 45:
Page 4-14, Section 4.3.1.6, paragraph 2. The HMX/RDX sampling downgradient from Site G(a) was not conducted due to the designated well was dry. Alternate sampling needs to be proposed to provide adequate information.

Response:

Section B3.1.6 has been revised. A sample was collected from Well 3071 and analyzed for HMX and RDX. Sample results were both non-detect (<1.2 µg/l).

Comment 46:
Page 4-19, Section 4.4. Figure 4-26, 4-29, 4-33, 4-34, 4-38, 4-42 imply that existing GET E system extraction wells will adequately control groundwater contamination to the west of the Zone 2 PGOU. The RI does not provide adequate information to assess capture is being obtained by GET E. If the intention is to use the states' IRCTS remedy to control the contamination, a letter of agreement from the state needs to be provided to the EPA as part of the RI/FS. The same applies on the east side of Zone 2 PGOU where it is implied that the Area is addressed by RWQCB CA096-150. Without agreement from the RWQCB, Superfund contamination needs to be controlled to prevent continued contamination flow into the RWQCB remedy.

Response:
The adequacy of capture by the GET E extraction wells is not within the scope of the PGOU RI/FS. This area is addressed in the Statement of Work for the WGOU. Similarly, the PGOU RI does not address contaminants in groundwater beneath or south of the WRND. A letter from the RWQCB confirming that the WRND remedy will address this area is pending (Alex MacDonald, personal communication 2005).

Comment 47:
Figure 4-4. Water level shown on figure for well 3558 (129.72 feet) does not fit with adjacent contour lines (155 and 160 feet). Revise figure as needed.

Response:
Figure B-6 (previously Figure 4-4) has been revised. The draft potentiometric maps have been updated with more recent data collected in October 2003 and April 2004 and new contour lines were generated for the new data.

Comment 48:
Figure 4-5. The 80-foot contour line is labeled as 60 feet. Please revise.

Response:
Figure B-7 (previously Figure 4-5) has been revised. The draft potentiometric maps have been updated with more recent data collected in October 2003 and April 2004 and new contour lines were generated for the new data.

Comment 49:
Figure 4-7. The 190-foot contour line is labeled as 200 feet. Please revise.

Response:
Figure B-9 (previously Figure 4-7) has been revised. The draft potentiometric maps have been updated with more recent data collected in October 2003 and April 2004 and new contour lines were generated for the new data.

Comment 50:
Figure 4-11. The 170-foot contour line is labeled as 180 feet. Please revise.

Response:
Figure B-13 (previously Figure 4-11) has been revised. The draft potentiometric maps have been updated with more recent data collected in October 2003 and April 2004 and new contour lines were generated for the new data.

Comment 51:
Figure 4-29. Perchlorate concentration for well 177 (6.8 ug/L) is located outside 4 ug/L contour. Please revise.

Response:
Figure B-33 (previously Figure 4-29) has been revised.

Comment 52:
Figure 4-34. TCE concentration for well 3069 (3500 ug/L) is located outside 500 ug/L contour. Please revise.

Response:
Figure B-36 (previously Figure 4-34) has been revised.

Comment 53:
The analytical data tables need to include all laboratory data presented on the iso-concentration contour figures. Data for the following wells needs to be included on the tables listed below:

- Table 4-2, Layer A Wells: As shown on Figure 4-26, TCE data for selected wells (e.g., 3043, 4007, 3057, 75, 131, 30142, 1281, 1706, WR-4, WR-19A) needs to be included on the table.

- Table 4-4, Layer A Wells: As shown on Figure 4-29, Perchlorate data for selected wells (e.g., 3043, 4007, 3057, 30142, 1281) needs to be included on the table.

- Table 4-2 or 4-2a, Layer B Wells: As shown on Figure 4-30, TCE data for selected wells (e.g., 3591, 1330, 1353, 1251, 1252, 399, 1242, 1243, 132, 1229, 1237, 1238, 1282, 30099, WR-8B, WR-19B, WR-23B, WR-16B, etc.) needs to be included on the table.

- Table 4-4 or 4-4a, Layer B Wells: As shown on Figure 4-33, Perchlorate data for selected wells (e.g., 1330, 3591, 399, 1353, 132, 1251, 1252, 30099, etc.) needs to be included on the table.

- Table 4-2 or 4-2a, Layer C Wells: As shown on Figure 4-34, TCE data for selected wells (e.g., STSW-27B, STSW-04C, STSW-52B, STSW-51B, etc.) needs to be included on the table.

- Table 4-4 or 4-4a, Layer C Wells: As shown on Figure 4-38, Perchlorate data for selected wells (e.g., STSW-27B, STSW-52B, STSW-51B, 1267, 1400, etc.) needs to be included on the table.

- Table 4-2, Layer D Wells: As shown on Figure 4-39, TCE data for selected wells (e.g., 3593, 140, 3416, 3439, 1279, etc.) needs to be included on the table.

Response:
As Aerojet and the Agencies discussed prior to Aerojet's submittal of this report, data collected from wells located outside the Zone 2 PGOU boundaries were generally not included in the data summary tables, although data from some of these wells were posted on figures where useful to illustrate the extent of chemicals in groundwater. The majority of wells identified above are located beyond the Zone 2 PGOU, although some of the wells are located in the Zone 1 PGOU and are included in the data summary tables for Zone 1.

Comment 54:
The analytical data provided in the tables needs to be presented on the iso-concentration contour figures. NDMA and perchlorate data provided in Table 4-4 for selected Layer D wells (e.g., 164, 179, 1327, 1336, 1348, 3070) need to be included on the appropriate iso-concentration contour figure.

Response:
The analytical data for the above-referenced wells was included on the chemical iso-concentration contour maps. NDMA data were not posted for the noted Layer D wells because they were not analyzed for NDMA during the RI Sampling Period.

Comment 55:
Page 5-1, Section 5.0, paragraph 2. The first introduction of the acronym Z3SA needs to be spelled out.

Response:
Comment noted. This area designation and associated acronyms have been removed from the RI Report.

Comment 56:
Page 5-2, Section 5.1.4, paragraph 1. Discussion of wells 1159 and 1299 shown on Figure 2-3 needs to be included. Also the format changes and reader is referenced to Figure 5-1 vs. 2-3 as done previously. The surface water body names on Figure 5-1 are very small compared to Figure 2-3.

Response:
Section C1.1.4 has been revised to include a discussion of all private water supply wells within a 1-mile radius of the Zone 3 PGOU.

The figure reference has been changed to the Figure 1-4 in the RI/FS Report.

Comment 57:

Page 5-2, Section 5.1.5. Morrison and Coyote Creeks are not labeled on Figure 5-1. Recommend changing reference to Figure 2-2 as was used for Zones 1 and 2 in volume for the location of surface water bodies and drainages.

Response:
The figure reference has been changed to the Figure 1-5 in the RI/FS Report.

Comment 58:
Page 5-3, Section 5.1.6.1. The Open Burn Facility is discussed in the text but is not labeled on Figure 5-1.

Response:
The former Open Burn Facility has been labeled on Figure C-1 (formerly Figure 5-1).

Comment 59:
Page 5-3, Section 5.1.6.2. Perchlorate is present in groundwater but not listed as a chemical handled in Zone 3. It is noted that a solid rocket test site was located at Area 37, which appears to suggest that perchlorate should be a potential chemical of concern at Area 37. Please clarify.

Response:
Perchlorate has been added to the list of materials potentially handled historically in the Zone 3 PGOU.

Comment 60:
Page 5-4, Section 5.1.6.2, paragraph 1. Deluge water discharge prior to 1962 was not always treated to remove Hydrazine prior to discharge to Buffalo Creek (Reference Aerojet letter January 29, 1962 by Joseph Gorlinski, Executive Officer).

Response:
Comment noted. The text was revised and a reference to the subject letter was added.

Comment 61:
Page 5-5, Section 5.1.7.4. An determination of groundwater flow direction needs to be made.

Response:
Comment noted. The text has been revised.

Comment 62:
Page 5-6. Section 5.2.1. The for the record the reasoning for changing the layer designations between the work plan and the this report needs to be presented in the report.

Response:
The Zone 3 layer designations were changed in 2001 to match the sitewide layer designations. They were not changed in the period between the PGOU RI/FS Work Plan and the Draft RI Report.

Comment 63:
Page 5-6. Section 5.2.1. The discussion of Layer B is included in the section on Layer A.

Response:
Comment noted. The text has been revised.

Comment 64:
Page 5-6, Section 5.2.1. Maps showing the lateral extent of the layers A and B are needed to help understand the distribution of saturated zones

Response:
The potentiometric surface maps for Layers A and B (Figures C-15 through C-18) show the areas where these layers are either saturated and dry.

Comment 65:
Page 5-6, Section 5.2.1. A map showing the western extent of bedrock at the surface is needed.

Response:
With the exception of Area 40 in the east, there are no locations in the Zone 3 PGOU where bedrock is exposed at the surface.

Comment 66:
Page 5-9, Section 5.2.2 The discussion of the construction of the potentiometric surface maps in the 3rd paragraph is confusing. It appears that potentiometric surface maps were created from two different data sets for each layer. Please revise accordingly.

Response:
The text has been revised to more clearly explain that two potentiometric surface contour maps were prepared for each layer using two different data sets.

Comment 67:
Page 5-11, Section 5.2.3. A rudimentary evaluation of the vertical gradients was presented in this section. However, figures should be provided that show the vertical head differences between the various layers and data provided to support the conclusions that are presented.

Response:
Maps showing the differences of the potentiometric surface elevations between layers were added to the RI Report, Appendices A-D.

Comment 68:
Page 5-11, Table 5-3. The table should reference the report from which the aquifer test data was obtained.

Response:
Table C-3 has been revised to include references.

Comment 69:

Page 5-12, Section 5.3. Include in the document how many wells have been sampled for each chemical group in each layer.

Response:
This information is provided in the Baseline Risk Assessment (Appendix E).

Comment 70:
Page 5-12, Section 5.3.1, Layer B. Elevated concentrations of NDMA and perchlorate have been detected in downgradient well 1544 thus, the downgradient extent of groundwater contamination in Layer B has not been determined. Additional monitoring wells are needed to confirm the southern extent of contamination in Layer B.

Response:
Elevated concentrations of NDMA and perchlorate have been detected in Well 1544; however, additional wells have not been installed because the area farther downgradient is dry. Monitoring and extraction wells have been installed downgradient of Well 1544 in underlying Layer C.

Comment 71:
Page 5-14, Section 5.3.2.5. The significance of the exceedance of chromium in groundwater from Well 154 needs to be addressed. Has the extent of chromium contamination in the vicinity of Well 154 been defined?

Response:
Section C3.2.5 has been revised. Since hexavalent chromium does not have an established MCL, it is regulated under the total chromium MCL of 0.05 mg/l. As such, the concentration of hexavalent chromium in Well 154 (0.0047 mg/l) did not exceed the MCL. Additional samples were collected from Wells 145, 154, 1451, 3276, and 3477 in February 2004 and analyzed for hexavalent chromium. Reported concentrations were below the MCL in Wells 145 and 154 at concentrations of 0.0012 and 0.0017 mg/l and concentrations were below detection limits of 0.001 mg/l in Wells 1451, 3276, and 3477.

Comment 72:
Page 5-14, Section 5.3.3.1. The wells north of Gate 7 were not sampled for VOCs but not explanation is provided as to why this data is not needed for the RI investigation.

Response:
The wells north of Gate 7 have been sampled for VOCs as shown on Figure C-46.

Comment 73:
Page 5-14, Section 5.3.3, Layer C. The upgradient extent of groundwater contamination in Layer C has not been determined. Aerojet should propose a means of determining the upgradient extent of groundwater contamination. Elevated concentrations of perchlorate have been detected in downgradient well 30189 thus, the downgradient extent of groundwater contamination in Layer C has not been determined. The plan mentions new wells south of 30189 but does not provide a location or results of analysis from the new wells.

Response:
The upgradient extent of groundwater contamination in Layer C will be evaluated during the Remedial Investigation conducted for the source sites.

The new Layer C well located south of Well 30189 is Well 30225. Data from this well were unavailable for the Draft RI Report, but are included in the RI/FS Report.

Comment 74:
Page 5-15, Section 5.3.3.2, paragraph 1. The data shows that 1,4-dioxane is present in the groundwater, however the extent of 1,4-dioxane is not known since only a very limited number of wells were sampled for the compound. The extent of 1,4-dioxane needs to be determined. In addition, the GET B treatment system will need to be evaluated to determine if it is effectively removing 1,4-dioxane to below levels of concern.

Response:
Section C3.3.2 has been revised to include data collected to characterize the extent of 1,4-dioxane, and the results of 1,4-dioxane analysis of the GET B influent and effluent.

Comment 75:
Page 5-16, Section 5.3.3.5, paragraph 2. As stated in a previous comment, the background concentrations of metals needs to be established in order to make the statement that concentrations found are within ranges typically found.

Response:
The text has been revised to state the ranges of these parameters were within the ranges typically observed in areas where there are no known groundwater impacts.

Comment 76:
Page 5-17, Section 5.3.4, Layer D. The upgradient extent of groundwater contamination in Layer D has not been determined. Aerojet should propose a means of determining the upgradient extent of groundwater contamination. The western extent of contamination in Layer D is not defined. Elevated concentrations of perchlorate have been detected in downgradient wells 30190 and 30191 thus, the downgradient extent of groundwater contamination in Layer D has not been determined. The plan mentions new well(s) south of 30190-1 but does not provide a location or results of analysis from new well(s). GET B does not appear to be preventing the downgradient migration of contamination in groundwater as intended.

Response:
The upgradient extent of groundwater contamination in Layer D will be evaluated during the Remedial Investigation conducted for the source sites.

Data collected from monitor wells located on or near the former White Rock North Dump have been added to the chemical iso-concentration contour maps.

The new Layer D wells downgradient of Wells 30190-1 are Wells 30226-7. Data from these wells were unavailable for the Draft RI Report, but are included in the RI/FS Report.

The pumping rates at GET B have been limited by the treatment system capacity. The FS includes adding the additional treatment capacity estimated to achieve hydraulic capture.

Comment 77:
Page 5-19, Section 5.3.5, Layer E. The upgradient extent of groundwater contamination in Layer E has not been determined. Aerojet should propose a means of determining the upgradient extent of groundwater contamination. It is recommend Well 1431 be sampled or a new well installed to confirm the southern extent of contamination in Layer E. Additional wells maybe needed to confirm southern extent of contamination in Layer E.

Response:
The upgradient extent of groundwater contamination in Layer E will be evaluated during the Remedial Investigation conducted for the source sites.

Well 1431 is obstructed and cannot be sampled. An additional monitor well is proposed downgradient of Well 1431 to aid in delineating the plume extent in this area.

Comment 78:
Page 5-20, Section 5.3.6, Layer F. The upgradient extent of groundwater contamination in Layer F has not been determined. Aerojet should propose a means of determining the upgradient extent of groundwater contamination. The downgradient extent of TCE, perchlorate and NDMA in Layer F has not been completely documented. Additional monitoring wells south of existing well 1549 are needed. Wells 1495 and 380 need to be sampled to define the eastern extent of the contamination in Layer F. It recommend that Well 1228 be sampled to confirm the western extent of contamination in Layer F.

Response:
The upgradient extent of groundwater contamination in Layer F will be evaluated during the Remedial Investigation conducted for the source sites. However, Layer F does not appear to be present north of White Rock Road as shown on cross sections prepared for that area (Figures C-8 and C-11).

Wells 380, 1495, and 1228 were sampled in 2004 and results are posted on the updated figures (C-55 through C-57). A monitoring well is proposed downgradient of Well 1549 and will be constructed when site access is approved and weather conditions allow.

Comment 79:
Page 5-20, Section 5.3.6.2, paragraph 1. The last sentence states that the extent of N-nitrosodimethylamine (NDMA), like TCE, is defined by specified monitor wells. On the contrary, relying on Well 1543 to show that the downgradient extent of concentrations found in Well 1549 is defined is not correct. Groundwater potentiometric surface elevations provided in Figures 5-23 and 5-24 show that Well 1543 is not downgradient from Well 1549. Groundwater from 1549 is headed towards the Off-Highway Vehicle Park (OHVP). Figure 5-66 shows that the plume is not defined south of Well 1549.

Response:
The text has been revised and includes reference to the monitor well proposed south of Well 1549.

Comment 80:
Page 5-21, Section 5.3.7. The wells screened in Layer B do not appear to be in locations that would detect concentrations of pollutants found in the vicinity of the detections found in wells screened in Layer A. Additional Layer A and B wells are warranted in the OHVP. In addition, is there an explanation as to why the groundwater flow at the OHVP in Layer A and B is to the southeast, whereas the flow in Layers C through F is generally south and southwest?

Response:
Additional monitor wells are proposed in Layers A and B in Area 39, and will be constructed as soon as site access is approved and weather conditions allow.

An error was discovered in the survey data for monitor well 1575. The potentiometric surface maps were updated to include the revised survey data. The groundwater flow direction will be further evaluated in the RI for Area 39.

Comment 81:
Page 5-22, Section 5.4. There appears to be sufficient information to evaluate remedial alternatives for Zone 3. The identified data gaps in extent of groundwater contaminated provided in the comments above must be addressed prior to the remedial design. The GET B influent and effluent should be sampled for 1,4-dioxane. The name and location of the new well was not provided in the document.

Response:
It is anticipated that additional water quality data will continue to be collected and monitor wells installed, as necessary, during PGOU remedy implementation and monitoring processes.

See response to Comment 74 regarding 1,4-dioxane analysis from GET B.

The new well numbers and locations are included in the RI/FS Report.

Comment 82:
Figure 5-2. The screen interval for well 30011 is not consistent with the screen interval for 30011 shown on Figure 5-5.

Response:
Figure C-7 (previously Figure 5-5) has been revised to show the correct screened interval for well 30011.

Comment 83:
Figures 5-36, 5-39, 5-42. Water quality data from wells 162, 3071 and WR-5 were not included in Table 5-4

Response:
Wells 162, 3071, and WR-5 are not included in the Zone 3 PGOU, although data from these wells were posted on the figures to present a more complete picture of the overall distribution of chemicals in groundwater. The data from Wells 162 and 3071 are included in the data summary tables for Zone 2. Well WR-5 is located within the White Rock North Dump and is addressed under CAO 96-150.

Comment 84:
Figures 5-43, 5-48, 5-53. Water quality data from wells outside of Zone 3 provided on the figures should also be included in a table. There a number of wells which are screen both in Layer C and D (e.g. 4570, 30011). These wells should labeled on the figure to indicate that wells are screened across multiple formations.

Response:
Water quality data from wells located in Zone 2 and the IRCTS are included in the data summary tables for Zone 2.

Wells screened in multiple layers are identified on the chemical iso-concentration maps.

Comment 85:
Table 5-4. There are a number of values with a questions mark (e.g. TCE 30190 and 30191). Please resolve and update the applicable figures as needed.

Response:
The meaning of the “question mark” was explained on each table. However, the “question mark” symbol has been replaced with an asterisk (*) in the tables.

Comment 86:
Figures 5-66, 5-67, 5-64. There a number of wells which are screen both in Layer D, E and F (e.g. 4475, 4480). These wells should labeled on the figure to indicate that wells are screened across multiple formations.

Response:
Wells screened in multiple layers are identified on the chemical iso-concentration maps.

Comment 87:
Figures 5-3 through 5-12. Cross-sections A-A’ and/or B-B’ should be extended to the south to incorporate new information from new wells. Layer A is not labeled on any of the cross-sections. Layer designations are not provided on any of the “new” cross-sections (Figures 5-6 through 5-12).

Response:
There was not adequate time prior to submittal of this report to expand the existing cross section and incorporate new information from recently-installed monitoring wells. Data will be incorporated into the cross-sections as necessary and prior to remedy implementation.

Comment 88:

Table 5-5. Tentatively Identified Compound (TIC) data needs to be evaluated in the Base Line Risk Assessment (BRA).

Response:
Comment noted.

Comment 89:
Figure 5-35. Information on this figure states that detailed information for Area 40 is provided on Figures C-29 to C-33. No such figures are provided in the document.

Response:
Information for Area 40 is provided on Figures C-75 through C-91.

Comment 90:
Figure 5-42. Information from the White Rock Road North Dump should be used to help delineate the perchlorate plume shown on this figure.

Response:
Data from several White Rock North Dump wells have been added to the Zone 2 and 3 potentiometric surface maps and chemical iso-concentration contour maps.

Comment 91:
Figures 5-43, 48, 53, 59, 66 and 67. Extent of contaminant migration needs to be defined.

Response:
Additional monitor wells are proposed to characterize the extent of contaminants in groundwater.

Comment 92:
Figure 5-60. The plume of TCE shown is not defined by the information supplied. Data from Well 1431 and south of 1431 would be useful. The same can be said for the NDMA plume shown on Figure 5-61 and the perchlorate plume shown on Figure 5-61.

Response:
Wells 1431 and 1432 are obstructed and cannot be sampled. Additional monitor wells are proposed to characterize the extent of contaminants in groundwater.

Comment 93:
Page 6-1, Section 6.1.1. Include on a map showing the area removed from the Superfund site boundaries.

Response:
A figure showing the Superfund site boundaries has been included in the RI/FS Report as Figure 1-4.

Comment 94:
Page 6-2, Section 6.1.5. Provide a map showing the map encumbered by environmental restrictions.

Response:
A figure showing the Superfund site boundaries and land encumbered by environmental restrictions has been included in the RI/FS Report as Figure 1-4.

Comment 95:
Page 6-3, Section 6.1.6.1. Please clarify in text and figures. Does 4600 Area equals Area 46?

Response:
The 4600 Area is the same as Area 46. The text and figures have been revised to consistently identify this location as Area 46.

Comment 96:
Page 6-3, Section 6.1.6.2. Exhibit III Potential Source Sites has not been defined.

Response:
A definition of Exhibit III Potential Source Sites has been included in Section D1.2.2.

Comment 97:
Page 6-7, Section 6.2.1.4. Include a map showing the depth of bedrock and the thickness of the sediments above the bedrock.

Response:
Figure D-7 was added to show the thickness of the sediments (or depth to bedrock).

Comment 98:
Page 6-10, top of the page. The "potential seep" does not appear to be located on Figure 6-1 although there is a located label "Seep 3." Please clarify and locate the seep on the map as applicable.

Response:
Section D2.5.1 has been revised to note that the "potential seep" is labeled as "Seep #3" on Figure D-1.

Comment 99:
Page 6-10, Section 6.2.5.2. Discuss whether Alder Creek is a losing or gaining stream and implication for contaminate discharges to surface water.

Response:
Section D2.5.2 includes discussion of the potential groundwater discharge to Alder Creek.

Comment 100:
Figure 6-17. It appears that Freon-11 was detected in well 3185 not Freon-113. Please verify.

Response:
Figure D-23 (previously Figure 6-17) has been revised.

Comment 101:
Page 6-13, Section 6.3.2. No wells or data directly downgradient of extraction in area with the highest VOC concentrations. Suggest new wells or sample wells 435 and 436. NDMA data from well 4500 suggest that GET A may not be performing as designed. Additional downgradient wells maybe needed to monitor performance of system. Upgradient extent of groundwater contamination has not been defined the sampling wells 362 and 363 is recommended.

Response:
Wells 3625 and 3626 are located downgradient of some GET A extraction wells. Well 3625 is dry, and neither VOCs nor NDMA were detected in Well 3626. In addition, neither VOCs nor NDMA were detected in Wells 481, 482, also located downgradient of some GET A extraction wells.

The presence of chemicals in extraction well 4500 does not suggest that GET A is not performing as designed because the extraction wells are designed to capture chemicals.

Groundwater in the upgradient portions of Zone 4 will be addressed in the Remedial Investigations for the source sites.

Comment 102:
Page 6-14, Section 6.3.2.2, paragraph 2. It should not be assumed that the GET A treatment system will reduce the concentration of 1,4-dioxane to concentrations below levels of concern for discharge. The extent of 1,4-dioxane in groundwater should be delineated on a figure. Recharge from the GET A treatment system could be creating a plume of 1,4-dioxane downgradient from Rebel Hill Ditch just southwest of the GET A treatment system. Additional wells in that area need to be sampled for 1,4-dioxane.

Response:
1,4-Dioxane was not detected (<1.0 µg/L) in at least four samples recently collected from the GET A effluent.

Figure D-26 was added to the RI/FS Report to show the distribution of 1,4-dioxane in Layer A.

Comment 103:
Page 6-14, Section 6.3.2.3, paragraph 4. The source of NDMA in Sector C could easily be the past discharge from the GET A treatment system which originally was designed to meet a much less stringent effluent limitation for NDMA. The recharge from Rebel Hill Ditch would be upgradient from the wells that are currently found to contain NDMA in Sector C.

Response:
Section D3.2.3 has been revised to include this potential source of NDMA in Sector C wells.

Comment 104:
Page 6-16, Section 6.3.2.6, paragraph 1. The last sentence states that concentrations of general water quality parameters in samples were within the range of values typically expected for background. What are the background values for the general water quality parameters and metals?

Response:
The text has been revised to state the ranges of these parameters were within the ranges typically observed in areas where there are no known groundwater impacts.

Comment 105:
Page 6-18, Section 6.4, last paragraph. The first sentence states that the extent of NDMA in groundwater is undefined to the west and northwest of Layer A Well 79 and Layer B Wells 454 and 455. Looking at Figure 6-23 it would appear that in Layer A, the area west and northwest of Well 79 is not of concern. However, the area between Wells 453 and 463, east of Well 79 is of concern. For Layer B, the area of concern to complete the plume definition is northwest of Well 454. The NDMA appears to be migrating from Layer A to Layer B between Wells 3389 and 454.

Response:
Comment noted. A monitor well was recently constructed off-site, northwest of the referenced wells, although the data have not been received.

Hydrogeologic Analysis of Gladys Grey Site, Area 40

General Comments

Comment 1:
Include a list of environmental reports prepared for Area 40 in the report.

Response:
Previous investigations are summarized in Section C.5.1

Comment 2
Prepare a table which summarizes the construction detail of monitoring wells. The table should include coordinates, ground surface and top of casing elevations, total depth of boring, depth to top and bottom of screen and layer designation.

Response:
Table C-9 was added and includes the well completion information.

Comment 3:
A statistical summary table of chemical analysis should also be included. Screening concentrations should also be included.

Response:
Table C-11 was added and shows the average and ranges of chemical concentrations detected in the monitor wells.

Specific Comments

Comment 1:
Page 1, Section 5.6. Provide a figure which shows the location of all the potential source sites applicable to Area 40.

Response:
Figure C-77 was added to show the locations of the potential source sites in Area 40.

Comment 2:
Page 2, Section 5.6.1. Show soil and vapor sampling locations on separate figure.

Response:
The soil borings and soil vapor sample locations are shown on Figures C-76 and C-77, respectively.

Comment 3:
Provide a figure which shows a contour maps of the depth to bedrock based on a combination of geophysical and boring data.

Response:
Figures C-84 and C-85 show the elevation of the bedrock surface and thickness of the sediments, respectively.

Comment 4:
Page 3, Section 5.6.2.1. Provide a map showing the topography and surface features of Area 40.

Response:
Figure C-77 was added and shows the topography and surface features of Area 40.

Comment 5:
Page 8, Section 5.6.5. A delay in remediation of Area 40 will allow additional migration of the TCE into the fractured bedrock making removal and tracking more difficult. It is best that the containment and removal of the pollutants take place sooner rather than later as outlined in Specific Comment #2.

Response:
Comment noted.

Comment 6:
Table 2. The detection limit should be substituted for ND in the table.

Response:
Table C-A was revised as requested.

Comment 7:
Figure 13. Perchlorate and TCE concentrations should be provided on separate figures. Include isoconcentration lines for interpretation of the distribution of contaminated groundwater.

Response:
Figures C-90 and C-91 were added and show the iso-concentration contours for TCE and perchlorate, respectively.

Appendix K

RESPONSE TO AGENCY COMMENTS ON DRAFT PGOU FS

Appendix K

RESPONSE TO AGENCY COMMENTS ON DRAFT PGOU FS

General Comments:

1. **The Feasibility Study ("FS"), in the case of source areas that are totally within the Perimeter Groundwater Operable Unit ("PGOU") such as the Former Groundwater Extraction and Treatment ("GET") F Spray Field and Area 39, must address any needed soil remediation or the FS needs to establish why there is no threat to public health and the environment from the source area.**

   After receipt of these comments, Aerojet and the Agencies conducted several discussions regarding this issue. It was agreed between the parties that the Former GET F Sprayfield would be addressed by the RI/FS program being conducted on the Inactive Rancho Cordova Test Site. In addition, based on direction from EPA, Aerojet prepared, submitted and obtained Agency approval of a Field Sampling Plan to complete the RI/FS at the Area 39 potential source sites. Unfortunately, due to delays caused by weather conditions Aerojet was unable to complete the RI/FS at the Area 39 source sites within the PGOU schedule and was directed by the Agencies to delay it to the next Operable Unit RI/FS, the Boundary Operable Unit.

2. **The no action alternatives, that have nearby threatened water supply wells such as 1049 and 1059, need to include an estimated time projection for contamination to reach the water supply wells.**

   Fate and transport modeling was not conducted for the Feasibility Study; however the requested analysis will be completed if the No Action alternative is selected as the preferred alternative for the PGOU.

3. **Applicable or Relevant and Appropriate Requirements ("ARARs") are not met when containment is not provided for a Federal Class IIA aquifer (for example Zone 1 contamination downgradient of monitoring wells 4355, 4360 and 4365 and Area 39). A justifying Technical Impracticability ("TI") Waiver request would need to be provided with the FS, as well as meeting the RWQCB's Containment Zone requirements.**

   See revised alternatives in Final FS Report.

4. **The Zone 2 portion of PGOU needs to establish an inner groundwater barrier that ties to the Operable Unit 3 ("OU3") GET F to allow for remediation of the aquifer between the inner and outer barriers. The inner barrier for PGOU needs to include**

the Former GET F Spray Field and other Aerojet contamination flowing onto the Inactive Rancho Cordova Test Site ("IRCTS"). The outer barrier for OU3 is GET H and the DTSC remedy for the IRCTS. Based on discussion with Gene Riddle of DTSC and his letter of February 6, 2004, DTSC wants the EPA to prevent further contamination from Aerojet migrating on to the IRCTS as close to the Aerojet site as possible. A copy of DTSC's letter is provided as Attachment 1.

See revised alternatives in Final FS Report.

5. 1,4-Dioxane is listed as a Contaminant of Concern ("CoC") in Section 1.3.4 for Zones 1, 3 and 4 and is discussed to a limited extent in comments contained in Appendix B "2003 Results for 1,4-dioxane". Enough data needs to be gathered in the FS to provide for adequate Remedial Design to insure destruction of this CoC.

Additional data were collected to characterize the nature and extent of 1,4-dioxane in groundwater in Zones 1, 3, and 4. Additional data were collected in the effluents of GETs A and B and were not detected at a PQL of 3.0 ug/L. However the effluent of GET D was not sampled and will be prior to remedial design of the selected alternative for Zone 1.

6. Based on the review of the risk assessment portion of the FS, it does not appear that the comments provided in the PGOU Base Line Risk Assessment ("BLRA") were addressed (see Agencies comment letter on the PGOU BLRA dated October 28, 2003). The final version of the FS needs to incorporate the BLRA comments contained in this letter and the Agencies letter of October 28, 2003.

By ERM letter dated 9 July 2004 Aerojet and ERM responded to the Agency comments on the PGOU Base Line Risk Assessment. Those responses were incorporated into the Final BLRA included as Appendix E to this report.

7. There are 42 individual CoCs listed in the text in Section 1 for Zones 1 through 4, that exceed actions levels, with 25 common to Zone 1, 11 common to Zone 2, 19 common to Zone 3 and 25 common to Zone 4. Table 2-A in Appendix A only lists 18 individual CoCs. Section 1 and Table 2-A need to be in agreement.

Table F-2 in the Final FS has been revised to include the COCs of interest.

8. The alternatives need additional work. An Alternative Z2-3 needs to be presented for Zone 2. The Alternative Z1-3 for Zone 1 needs to include its impact for reducing 1) OU3 Area 2 and 2) PGOU American River Groundwater Extraction and Treatment ("ARGET") remedy operation costs and times to properly evaluate this alternative. Alternative Z3-3 should be the base alternative since it is faster and cheaper than Alternative Z3-2 and a better additional mass removal alternative

provided. There needs to be a more substantive Alternative Z4-3. The current Alternative Z4-3 is hardly different that Z4-2, only extracting and treating an additional 15 to 25 gpm of contaminated groundwater. The remedy completion projections need to be better explained in Appendix C. Supplemental non-discounted constant dollar cost estimates to remedy completion need to be provided in Appendix D since all the remedy durations are significantly beyond 30 years. The supplemental cost information will aid in the presentation of Section 6.

The Final FS includes all of the requests in this comment.

9. An overall composite CoCs PGOU plume map is needed.

Figures 1-9 through 1-26 provide composite PGOU plume maps for Zones 1, 2, 3 and 4. In a submittal separate from this PGOU RI/FS report, Aerojet will provide the Agencies with sitewide composite plume maps. Aerojet anticipates completion and submittal of the sitewide composite plume maps prior to the Agency's completion of the remedy selection process for PGOU.

Specific Comments:

1. Page viii and ix, List of Acronyms. The acronym list needs to be reviewed. At a minimum the following acronyms need to be include SARA, CRWQCB-CVR, PGOU, CVEI, ERM, GRA, GET, BOR, ClO4, lbs., TBD, IRIS, DWHA, SNARL and WRND.

The list of acronyms has been revised.

2. Section 1, page 6, 1.2.2.3. Aerojet's land development use plan for the PGOU area needs to be discussed per the Agencies' letter of 10/23/2003.

As requested, Aerojet has included Figure 1-4 in Part 1 of the RI/FS Report which identifies Aerojet's current land development plans for the land it owns within the PGOU and for which it has submitted plans to the County of Sacramento.

3. Section 1, page 7, 1.2.2.4. The Federal Class IIA aquifer classification needs to be indicated in the text description as per the Agencies' letter of 10/23/2003.

The classification has been added to the appropriate sections of the Final RI/FS Reports.

4. Section 1, page 7, 1.2.2.4, last paragraph and Section 4, page 66, 4.3.3.3 . There are other supply wells in the area of the PGOU as indicated the Agencies' letter of 10/23/2003. Wells in the vicinity of Zone 3 include 1298, 1299, 1301, 1031, 1159, 1864, 1943 and 1917. Wells 1154 and 1221 are in the park area of Lake Natoma.

The discussion of DHS Policy Memo 97-005 applicability needs to be discussed in Section 4.

Comment noted. DHS Policy Memo 97-005 is applicable to water utility companies serving treated water to a public water system, and therefore, is not applicable to the private water supply wells noted above.

5. **Section 1, page 14, 1.3.4.1. In the first and third full paragraphs, Layers A and B need to be discussed. The implication is Layers A and B are not saturated which needs to be stated if that is the case.**

Comment noted. The text has been revised.

6. **Section 1, page 15, 1.3.4.2. In the first paragraph, the Layer E thickness range needs to be indicated. Also by omission it is implied there is no Layer F which needs to be clearly stated.**

Comment noted. The text has been revised.

7. **Section 1, page 15, 1.3.4.2, 2nd paragraph. The concentrations for Trichloroethylene ("TCE") and perchlorate seem to be reversed.**

This area is part of the source site areas and will be addressed in the Program Plan Modification Report (PPMR).

8. **Section 1, page 15, 1.3.4.3. In the last paragraph, the range of thickness for Layers E and F needs to be indicated.**

Comment noted. The text has been revised.

9. **Section 1, pages 17 and 20, 1.3.5 and 1.4.2.3. The description on pathways and potential risk needs to address the Former GET F Spray Field which is a source area totally within PGOU. The FS needs to address any needed soil remediation or establish why there is no threat to public health and the environment from the source area. Section 4, page 56, second paragraph which will need to be modified for any soils effort.**

See response to Comment 1 above.

10. **Section 1, page 18, 1.4.1, Data Evaluation. The second to the last sentence states that "all inorganic compounds potentially associated with rocket fuels were selected as CoCs". Other naturally occurring inorganic chemicals should have been**

evaluated in the BLRA as discussed in EPA's comment 8 dated October 28, 2003, on the PGOU Baseline Risk Assessment.

Comment noted. The intent of this statement was to include all inorganic compounds potentially related to rocket propellants, but not exclude other inorganic compounds potentially related to site activities.

11. **Section 1, page 18, 1.4.1, Exposure Assessment. The first sentence indicates there is no known current use of groundwater for residential supply from unmonitored or untreated wells either at the property boundary or beyond the property boundary within the PGOU Study Area. The text needs to indicate that the statement above will be confirmed when the 1991 survey is updated and the currently known privately owned wells water uses are reviewed (see EPA's October 28, 2003, Comment 72 related to the PGOU BLRA).**

Appendices A-D and Section 1 of the Final RI/FS report include the results of the update to the 1991 private well survey.

12. **Section 1, page 18, 1.4.1, Exposure Assessment. Indicate why ecological populations were not evaluated at this time. Also describe what other pathways were eliminated from evaluation in the BLRA based on the site conceptual model and why. See EPA's October 28, 2003, Comments 13 and 14 related to the PGOU BLRA.**

See response to General Comment 6 above.

13. **Section 1, page 18, 1.4.1, Toxicity Assessment. Was the toxicity data corrected as presented in the comments on the BLRA of October 28, 2003?**

See response to General Comment 6 above.

14. **Section 1, page 19, 1.4.1, Risk Characterization. In the first bullet, indicate that the statement will be confirmed when the 1991 survey is updated and the currently known privately owned wells water uses are reviewed (see EPA's October 28, 2003, Comment 72 related to the PGOU BLRA).**

See response to Comment 11 above.

15. **Section 1, page 19, 1.4.2.1. The summation of risks across all exposure routes for each Contaminant of Potential Concern that was identified as a risk driver needs to be performed and presented in the Risk Assessment Guidance for Superfund ("RAGS") Part D Table 9 format. A risk driver would be any chemical generating a cancer risk of 1E-06 or a hazard index of 0.1. In addition, RAGS Part D table 1 also needs to be completed.**

See response to General Comment 6 above.

16. Section 1, page 20, 1.4.2.2, 2nd Bullet. See comment above, but applied to cancer risk.

See response to General Comment 6 above.

17. Section 1, page 20, 1.4.2.2, 3rd Bullet. Rather than presenting cancer risk results separately for the child, adult, and combined child/adult in RAGS Part D format, cancer risks need only be presented for the combined child/adult in RAGS Part D format. However, present the noncancer HIs separately for the child and adult. In calculating the cancer risk for the combined child/adult, the same exposure assumptions used in EPA Region 9's Preliminary Remediation Goals ("PRGs") table should be used in the risk assessment, including the recommended age-adjusted factors. The same exposure assumptions used in the EPA Region 9's PRGs table should also be used in calculating noncancer HIs for the child and adult.

See response to General Comment 6 above.

18. Section 1, page 20, 1.4.2.2, 2nd paragraph. Use the term "excess" when explaining the definition of cancer risk. Example text is provided below.

Cancer risk is expressed in terms of lifetime excess cancer risk. This concept assumes that the risk of cancer from a given chemical is in "excess" of the background risk of developing cancer (i.e., approximately 1 in 3 chances during a lifetime according to the American Cancer Society). For example, a risk of 1E-06 equates to approximately one excess cancer case in a population of 1,000,000 individuals due to exposure to the cancer- causing substance over a 70-year lifetime.

See response to General Comment 6 above.

19. Section 1, page 20, 1.4.2.2, last paragraph. An additional reference is needed for the following statement "USEPA and Cal EPA have both defined a range of acceptable risk as 1 x 10-6 to 1 x 10-4 in accordance with the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") [USEPA, 1990]." This is a true statement for USEPA but a reference is needed to document that a similar risk range has been promulgated at the State level. Please provide an additional reference for Cal EPA or revise the statement accordingly.

See response to General Comment 6 above.

20. Section 1, page 20, 1.4.2.3, 1st paragraph. Until the 1991 survey is updated and the privately owned wells water uses are reviewed it is not appropriate to indicate there is no unmonitored exposures (see EPA's October 28, 2003, Comment 72 on the PGOU BLRA).

See response to General Comment 6 above and Specific Comment 11 above.

21. Section 1, page 20, 1.4.2.3, 2nd paragraph. All volatile chemicals, not just TCE, should have been evaluated based on volatile migration from groundwater to indoor or outdoor air. Only evaluating TCE prevents an assessment of cumulative risk that needs to be presented in the BLRA. Revise the indoor air modeling to include all chemicals that are classified as volatile (see EPA's October 28, 2003, Comment 73 on the PGOU BLRA).

See response to General Comment 6 above.

22. Section 1, page 21, 1.4.2.3, Table. Since there is 630 µg/L of TCE at the property boundary in Zone 3, it would be expected that contamination exists beyond the property boundary vs. not detected contained in the table. Also, the TCE target risk level based on a groundwater depth of 30 feet as presented in the Table on page 21 should be 154 µg/l rather than 129 µg/L (based on a unit risk factor of 2E-06 and a cancer risk of 1E-06). The value of 129 µg/L is correct if you use a depth to groundwater of 25 feet. Was it intended to use 25 feet rather than 30 feet for depth to groundwater? This same comment was made previously on the initial review of the draft PGOU BLRA.

Use equations 4-7 and 4-8 in the EPA Region 9's PRGs User's Guide to calculate risks and hazard indices based on inhalation of volatile chemicals in indoor air rather than using the Johnson and Ettinger ("J&E") spreadsheet system. That is, use the J&E spreadsheet system to calculate the volatilization factor for groundwater to indoor air, and then apply this volatilization factor along with the groundwater EPC in the aforementioned equations.

In addition to calculating TCE risks based on OEHHA toxicity values, TCE risks should also be calculated using the EPA Region 9's recommended oral cancer slope factor of 0.4 $(mg/kg\text{-}day)^{-1}$ and a unit risk factor of 1.1E-4 $(\mu g/m^3)^{-1}$ (these are NCEA provisional values).

See response to General Comment 6 above.

23. Section 1, page 21, 1.4.2.3, Table. The term "ambient air" needs to be changed to "outdoor air" since "ambient air" could also refer to indoor air.

See response to General Comment 6 above.

24. Section 1, page 21, 1.4.2.3, 1st paragraph after Table. The BLRA indicates that "the maximum detected concentration of TCE in the uppermost layer in each zone/location is well below the indoor air screening levels based on a target risk level of 1×10^{-4}; the upper bound of the range of acceptable risk". Note that this upper bound risk range is based on cumulative risk, not the risk to a single chemical. To not mislead the reader, the above sentence needs to be revised to reflect that EPA may consider cumulative risks less than 1×10^{-4} as unacceptable. The EPA policy set in place for establishing remediation goals based on excess cancer risks follows the NCP. According to the NCP, excess cumulative cancer risks in the range of 1×10^{-6} to 1×10^{-4} may or may not be considered acceptable, depending on site-specific factors such as the potential for exposure, technical limitations of remediation, and data uncertainties.

See response to General Comment 6 above.

25. Section 1, page 21, 1.4.2.3, 2nd paragraph after Table. It is unclear what model was used to calculate the risk-based concentrations of TCE in groundwater based on migration to outdoor air. This was not specified in the BLRA and the results could not be verified. Additional information needs to be added to explain how the ambient air number was calculated.

See response to General Comment 6 above.

26. Section 1, page 21, 1.4.2.3, 3rd paragraph after Table. It is stated that TCE poses an unacceptable risk via exposures from volatile migration in groundwater to indoor air. Other volatile chemicals may be generating unacceptable risk from this pathway and need to be evaluated as discussed in comment 19 above.

See response to General Comment 6 above.

27. Section 1, page 22, 1.4.2.3, 1st paragraph. It is stated that the risk analysis is conservative since the highest reported pollutant concentration is used. However, it should also be noted that the maximum concentration detected is not necessarily the maximum concentration present in the aquifer or vadose zone. Only a limited number of points are sampled.

See response to General Comment 6 above.

28. Section 1, page 22, 1.4.2.3, 1st partial paragraph. The last sentence of this paragraph states that "The results of the screening level analysis indicate that further assessment of the potential migration of VOCs from groundwater to both indoor and ambient air, including the collection of additional soil vapor data, is needed." Aerojet needs to submit the data collection approach to the Agencies for review prior to conducting additional sampling.

See response to General Comment 6 above.

29. Section 1, page 22, 1.4.2.3, 2nd paragraph. 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 the 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.

See response to General Comment 6 above.

30. Section 1, page 23, 1.4.2.4, 1st Table. Specify in the table that the total lifetime cancer risk reflects exposure to the combined child and adult receptor. As presented in EPA's October 28, 2003, Comment 86 on the PGOU BLRA, in Tables 8.1c and 8.1d, the inhalation slope factor for vinyl chloride was used to estimate risks based on groundwater ingestion. Use the oral slope factor for vinyl chloride to estimate risks from groundwater ingestion. Update Table 9.1 based on the corrections made in Tables 8.1c and 8.1d. Based on this, the combined child/adult cancer risk for Layer D at the property boundary should be 6.2E-03, not 4.7E-03. This suggests that the comments provided on October 28, 2003 to the PGOU BLRA have not been addressed and/or incorporated into the BLRA. It is suspected that other numbers within this table, including tables for Zone 2 through Zone 4 have errors and need to be reviewed. Please see comments 85 through 93 made previously in EPA's October 28, 2003, PGOU BLRA letter.

See response to General Comment 6 above.

31. Section 1, page 26, 1.4.2.5, 1st Bullet. Until the 1991 survey is updated and the currently known privately owned wells water uses are reviewed it is not appropriate to indicate there is no current or future use of untreated groundwater (see EPA's October 28, 2003, Comment 72 on the PGOU BLRA). Indicate that the statement above will be confirmed when the 1991 survey is updated and the currently known

privately owned wells water uses are reviewed (see EPA's October 28, 2003, Comment 72 related to the PGOU BLRA).

See response to General Comment 6 above and Specific Comment 11 above.

32. Section 1, Figures 1-4 through 1-20. The maximum extent of contamination is not depicted on the figures, as it appears that a concentration of 5.0 µg/L for TCE was used in developing the extent line. A concentration of 0.8 µg/L (the California Public Health Goal ("PHG") for TCE) should have been used. As examples, for Figure 1-4 the plume would extend to Well Nos. 1557 and 1559, and for Figure 1-5 the plume would extend to Well 30186.

Analysis regarding the use of the MCL of 5 µg/L and the PHG of 0.8 µg/L for TCE is included in Section 7 of Part 1 of the RI/FS Report.

33. Section 1, Figures 1-4, 1-5 and 1-6. These figures do not include the extent of CoCs in areas upgradient of the PGOU boundary. This information would be useful and should be added.

Concentrations of chemicals in groundwater upgradient of the PGOU boundary were added to the plume maps in each zone as necessary to understand the migration of chemicals to and at the boundary.

34. Section 1, Figures 1-8 through 1-11 and 1-13 through 1-16. These figures need to depict all of the plumes in the area shown on the figures. The plumes should be differentiated by which operable unit (OU3 or PGOU) or other program (IRCTS or White Rock Road North Dump) the plume will be contained and cleaned up under. The information presented is not consistent among the figures. The only change should be the depiction of the pollutant plume, as each figure shows the plume for a given layer.

Some plumes originating on or migrating beneath the referenced source areas are not depicted on the composite plume maps for the PGOU. The plumes and the boundaries of these other source areas are shown on the individual chemical distribution maps included in Appendix A through Appendix D.

35. Section 1, Figure 1-8. The figure does not include exceedances of CoCs associated with wells 413 and 461. This information needs to be added.

Both wells are located near potential source sites, upgradient of the PGOU boundaries.

36. Section 1, Figure 1-9. The figure does not include exceedances of CoCs on IRCTS associated with a broad area between the Former Landfill extending westward to

well 1330. The figure does not include the extent of CoCs in areas upgradient of the PGOU boundary. The figure needs to be revised accordingly.

Comment noted. This figure has been revised.

37. Section 1, Figures 1-8 and 9. It does not appear that the groundwater contamination from Layers A and B will be prevented from flowing on to the IRCTS.

Groundwater in Layer B does appear to flow onto the IRCTS in this area. Layer A is unsaturated in this area.

38. Section 1, Figure 1-10. The figure needs to be revised to include exceedances of CoCs on IRCTS associated with a broad area between the Former Landfill, including GET E extending to the southwest towards well STSW-27B.

Comment noted. This figure has been revised.

39. Section 1, Figure 1-13. The figure does not include CoCs associated with wells 178 and WR8C/D and needs to be revised.

Well 178 is located within Zone 2. Well WR8C/D is located within the White Rock North Dump and is addressed separately under CAO96-150.

40. Section 1, Figures 1-14, 1-15 and 1-16. These figures needs to be revised to include the extent of CoCs in Area 39 and in areas upgradient of the PGOU boundary. This information would be useful and needs to be added.

Comment noted. These figures have been revised.

41. Section 1, Figure 1-18. The figure needs to include exceedances of CoCs associated with wells 3185 and 77.

CoCs were not detected in Wells 3185 and 77 at concentrations exceeding screening levels.

42. Section 1, Figure 1-19. Provide the justification for separating CoC exceedances associated with wells 3095 and 3188. According to CoC isoconcentration maps presented in the PGOU RI, these plumes are incorporated with the main plume associated with Areas 30 and 31.

The CoC exceedances in Wells 3095 and 3188 were not combined with other chemical plumes. There are surrounding wells that do not have CoC detections reported at concentrations exceeding screening levels.

43. Section 1, Figures 1-19 and 1-20 and Section 3.4.3. A review of the database indicates the ability to draw effective figures using the most recent data is limited by the lack of more recent sampling of many of the monitor wells. Recent NDMA results are severely lacking. It would appear that additional sampling will be warranted to provide sufficient information for developing the remedy. Containment of the plumes to the west of the GET A extraction wells may require more effort than presented.

Additional sampling was performed to aid in determining the extent of NDMA in Zone 4.

44. Section 2, page 27, 2.1, 2nd paragraph. It is stated that the future use of groundwater both at and beyond the property boundary is restricted. It should be noted that the reason for the restriction is the pollution attributed to Aerojet, among others, and that once the groundwater is restored to the appropriate degree, the restrictions can be removed.

So noted.

45. Section 2, page 28, 2.5.9. The transfer of Aerojet's water rights to the County needs to be discussed and the text needs to indicate that the agreement will provide for replacement of private wells if required.

A description of the agreement between Aerojet and the County has been added to the text.

46. Section 2, page 31, 2.4, 3rd paragraph. Jet grouting to form a vertical barrier should be discussed. This technology does not require excavation and can be completed deeper than slurry walls.

See text and tables in Section 2 of Part 1 of the RI/FS report.

47. Section 2, page 32, in Process Options Column and Figure 2-1, Sheet 1 of 4. One of the options listed on the table is well head treatment utilizing home carbon treatment units. Those units are not effective in removal of perchlorate or NDMA and so would not be appropriate in all instances. There should also be options for replacement of lost water supplies as a general response action.

See the Section 2 tables in Part 1 of the RI/FS report.

48. Section 2, page 43, 2.5.9, Groundwater Recharge. In general, hydrographs provided in the PGOU RI report indicate an overall decline in water levels and do not support the statement that "the groundwater resource underlying the region is replenished on an annual basis..". This section needs to be revised.

The text was revised to indicate that groundwater recharge does occur on an annual basis, although the current groundwater withdrawal exceeds the annual recharge amount.

49. Section 2, Figure 2-1. Deed restrictions will also be necessary that deal with recharge of groundwater via impoundments (i.e., storm water retention basins and decorative lagoons) and via direct recharge with recharge wells. See deed restrictions for the Aerojet Carve-out property.

The text has been revised to reflect that there would be deed restrictions on the recharge of groundwater via impoundments also. Figure 2-1 has also been modified to address the comment.

50. Section 3, page 46, Table. The GET E/F and ARGET effluent limits from National Pollution Discharge Elimination System permit need to be specified.

See text in Section 3 of Part 1 of the RI/FS report and Table F-3. A copy of the Adopted Revised NPDES permit no. CA0083861 is provided in Appendix G.

51. Section 3, page 46. There is no analysis or discussion of the historical removal effectiveness of the GETs or individual extraction wells. This information, including pumping and mass removal rates is needed for evaluating alternatives which include removing existing extraction wells.

This information has been previously provided in the GET Effectiveness reports and in the monthly transmittal of the Aerojet site database. Aerojet does not agree that this information is relevant to this submittal.

52. Section 3, page 48, 3.1.5 and Section 4, page 60, 4.3.1.3. The text asserts that GET D is unnecessary to achieve hydraulic containment because of the existence of ARGET. What is not adequately presented and needs to be provided in the FS is the potential for GET D to reduce the overall operation time and cost for the ARGET portion of the PGOU remedy and the Area 2 portion of the OU3 remedy. The GET D recharge field should help control the plumes and provide flushing of the CoCs to decrease the overall ARGET and Area 2 cleanup times. In the case of Zone 1, unlike the other zones in the PGOU, an inner barrier (GET D) already exists, as well as an outer barrier (ARGET). If it can be shown that the operation of the GET D extraction field does not appreciable reduce the overall ARGET and Area 2 remedy costs then Alternative Z1-3 needs to be modified to operate the three

highest mass removal extraction wells 4220 (estimated flow 192 gpm, TCE 280 ppb and perchlorate 770 ppb), 4320 (estimated flow 150 gpm, TCE 55 ppb and perchlorate 190 ppb) and 4035 (estimated flow 200 gpm, TCE 42 ppb and perchlorate 170 ppb).

See revised Alternatives Z1-2 and Z1-3 in Part 1 of the RI/FS report.

53. Section 3, page 49, 1st partial paragraph, first complete sentence. The text states "In addition, declining water levels in Layer B have reduced the yield at many of the shallow B/C extraction wells and hydraulic containment is no longer necessary.". Why is hydraulic containment no longer necessary because there are declining water levels? The extraction wells will still be pumping from the bottom part of Layer B and Layer C. Hydraulic containment of the pollutants in the Layer B is still required. Can containment be achieved for both Layers B and C by only pumping from Layer C?

The water levels in Layer B have declined to the point that many of the extraction wells screened only in Layer B cannot sustain flow rates above two gallons per minute. Remedial Alternative Z1-2 and Z1-3 includes pumping the existing and one new Layer C extraction well to complete containment in the absence of groundwater recharge at GET D.

54. Section 3, page 49, 1st complete paragraph. The third sentence states that the furthest downgradient extraction well recently began operating and there are insufficient data to assess long-term chemical concentration or water level trends. The most recently installed extraction wells are screened only in Layer E. The wells screened in Layers C and D have been in operation for some time and should be used to assess long-term chemical concentration and water level trends.

Comment noted. The text has been revised.

55. Section 3, page 49, 3.1.5. The statement is made that the evidence suggests that the ARGET extraction wells "appear to provide sufficient hydraulic containment of upgradient of CoCs". This statement needs to be revised to be consistent with the discussion of ARGET hydraulic containment in Appendix C and by the presence of uncontrolled CoCs upgradient of ARGET.

Comment noted. The subject text has been revised.

56. Section 3, page 49, 3.1.5, 1st full paragraph; Section 4, Page 60, 4.3.1.2, 1st paragraph; Section 5, page 83, 5.2.2.2 and Appendix C, page 7, 2nd paragraph. It is proposed that the TCE not contained to the northwest by ARGET be allowed to continue to migrate to water supply well 1049 with Alternatives Z1-2 and Z1-3

contemplating well head treatment. Current data would indicate water supply well 1049 is approximately 2,900 feet from the 5 ppb TCE contour line and only 1,300 feet from the 1.4 to 1.6 ppb TCE readings in monitoring wells 1556, 1557 and 1594 in Layers C and D. The FS needs to assess the cost to prevent further contamination of the Federal Cass IIA aquifer to the northwest and to protect water supply well 1049 in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") and ARARs. If containment is not technically feasible, a TI Waiver request needs to be included with the FS. Providing well head treatment at 1049 is a backup position if remediation is shown not to be technically feasible. An estimate of the time for CoCs to reach 1049 needs to be provided in the FS.

A better evaluation and presentation of the data needs to be in the FS to support the loss of additional aquifer and use of well head treatment at water supply well 1049. First, it must be demonstrated that the upgradient extraction field is effective in containing the remaining plume and will not allowing additional flux of CoC to the northwest to be released. Second, the volume and concentration of TCE that will not be captured must be delineated. Third, the migration and estimated attenuation of the TCE needs to be modeled and the results presented. Fourth, the cost of containing and remediating the plume that is past the existing extraction field needs to be evaluated. Fifth, the time to impact of the Fair Oaks water supply well by TCE needs to be provided. Sixth, the acceptability of the Fair Oaks Water District for CoC to enter their well and the application of well head treatment needs to be provided. Seventh, the requirements of the Department of Health Services need to be included in the evaluation. The evaluation need to keep in mind that the PHG for TCE is 0.8 µg/L and that value needs to be used and not the MCL of 5.0 µg/L.

Alternatives Z1-2 and Z1-3 have been revised. See text in Sections 4, 5, and 7 of the RI/FS report. Fate and transport modeling was not conducted as part of the RI/FS. The TCE concentrations near Well 1049 are relatively low, and attempting to estimate when, if ever, TCE concentrations would exceed the MCL of 5 µg/L would be subject to high levels of uncertainty.

57. Section 3, page 50, 3.2. It should be stated that there is no containment of the pollutant plumes to the east of the OU3 extraction wells associated with GET E/F. There is currently no containment of the Sector G plume(s). The GET F groundwater CoCs containment effectiveness needs to be demonstrated in Appendix C. It needs to be shown that GET F along with what is proposed in the FS for the Zone 2 PGOU remedy will establish an inner barrier to contain Aerojet's CoCs. The outer barrier systems GET H in OU3 and pending DTSC's IRCTS actions will allow for remediation of the drinking water aquifer between the inner and outer barrier systems.

Appendix H provides modeling to show the extent of capture associated with the remedial alternatives evaluated for Zone 2 of the PGOU. Separately Aerojet has prepared and submitted documents regarding the WGOU, which provide the extent of capture for that operable unit. Demonstrating the effectiveness of the containment at GET F (E/F) is a requirement of the Statement of Work and Administrative Order for OU-3. The groundwater flow simulations conducted for Zone 2 included continued operations at GET F. The Zone 2 remedial alternatives, in conjunction with GET F, are intended to provide the "inner hydraulic barrier".

58. Section 3, page 50, 3.3.1. Where was the disposal from the GET B Spray Field?

The GET F Sprayfield was essentially a sprinkler system that distributed the VOC-treated groundwater throughout the area designated as the GET F Sprayfield.

59. Section 3, page 51, 3.3.1. Indicate in this section that the GET B treatment facility's most recent modification for perchlorate treatment was completed in January 2004. Also, the third paragraph indicates that the UV/oxidation system is designed to achieve an effluent water quality of less than 1 µg/L NDMA yet the effluent limit specified by the Partial Consent Decree for the Remedial Investigation/Feasibility Study and contained in Section 3.1.1 on page 46 of the PGOU FS is 0.020 µg/L.

The text has been revised in response to this comment.

60. Section 3, page 52, 3.3.3. It would appear from Figure 3-7 that there is no containment on the east, west and south sides of the perchlorate plume.

Depictions of the hydraulic containment provided by the GET B extraction system are provided in Figures H4-3, H4-4, and H4-5 (Layers B, C, and D, respectively), which show the existing Zone 3 hydraulic containment zone derived from particle tracking analyses conducted in conjunction with groundwater modeling simulations (Appendix H) overlaid with an outline of the maximum extent of contamination in all layers. These data suggest that there are two general areas in Zone 3 that may require additional groundwater extraction to meet RAOs for hydraulic containment. Alternatives Z3-2 and 3-3 address this issue.

61. Section 3, page 53, 3.3.3, Section 4, page 66, 4.3.3.2 and Section 5 page 98, 5.2.7.2. The FS needs to contain as an appendix an evaluation of the TI for groundwater restoration in Layers A and B following EPA's latest TI guidance. The FS needs to demonstrate that the Area 39 soils/sources are not a threat to human health and the environment and are no longer contributing to groundwater contamination. If the latter is not the case, soil remediation need to be proposed in the FS. The TI waiver request will need to propose a containment boundary that will be established for CoCs associated with Area 39 and indicate the proposed monitoring wells to monitor that boundary indefinitely. If pumping from Layers A and B is not

feasible, the TI and Containment Zone contingency plans need to provide for pumping form Layer C if future monitoring shows a CoC reaching Layer C. Also, the groundwater flow from Area 40 into Zone 3 needs to be addressed to show that concentrations of CoCs will not adversely impact the FS for PGOU.

If a CoC were to enter Layer C, containment of the CoC prior to its reaching Well 1059 needs to be provided for in the Contingency Plan for a TI Waiver. The distance from the CoCs in Area 39 to the GET B extraction field is significant and the clean groundwater between should not be allowed to be polluted.

The RI/FS report does not present a groundwater restoration TI argument. In addition, as stated earlier, as agreed to with the Agencies, the RI/FS for Area 39 soils and shallow groundwater will be conducted under the RI/FS for a separate operable unit. Finally, groundwater in Area 40 is not expected to adversely impact the PGOU remedial alternatives evaluated for Zone 3.

62. Section 3, Figure 3-7. The White Rock North Dump remedy contribution to containment needs to be indicated (the five extraction wells are shown).

The contribution of the WRND extraction wells are not integral to hydraulic containment in Zone 3. Hydraulic containment from the WRND and other locations outside the PGOU were not evaluated for this RI/FS. The five extraction wells are shown as the flow from these wells is treated at the GET B facility.

63. Section 4, page 54, Zone 4. No justification is provided for excluding CoC in groundwater water located west of the main extraction well field as part of the main Zone 4 plume. The summation of CoC concentration contours presented in the RI report indicates that there is one continuous plume rather three disconnected plumes. In addition the water quality data suggests that GET A has not in the past and does not currently provide effective hydraulic containment of groundwater contamination.

See revised Alternatives Z4-2 and Z4-3. All CoCs present above drinking water standards were included in the maximum extent maps. The plumes appear to be disconnected as shown in the Report.

64. Section 4, page 56, 4.3. The evaluation and screening of alternatives does not include a discussion of the mass removal effectiveness of the alternatives. For example, GET D appears to be removing 450 lbs/year of perchlorate, whereas, ARGET is only removing 25 lbs/year. The impact of allowing a large quantity of contaminant mass to migrate to the downgradient extraction wells must be evaluated for all zones.

Estimated mass removal rates are provided in Tables 4-1 through 4-8, 6-3, 7-1 through 7-4, and 7-6.

65. Section 4, page 56, 4.1. The 1st paragraph states that the remedial alternatives were assembled from the process options and technologies retained in Section 2. Additional discussion is needed to demonstrate the rational for selecting the alternatives listed in Section 4.2. The general response actions in Section 2 should be combined to form a range of alternatives for each zone. Representative process options that were not screened out in Section 2 need to be included during the development and screening of alternatives. Section 4, page 57, 4.2.2. An Alternative Z2-3 needs to be provided or a good justification why that is not reasonable (FS page 60 in Section 4.3.1.3 made the point the National Contingency Plan ["NCP"] requires alternative consideration).

Media-specific GRAs in Section 2 were developed to satisfy the RAOs. All of the GRAs were used to develop the alternatives. Several process options were retained following the evaluation of groundwater remediation process options for effectiveness, implementability, and cost. While still applicable, some of the process options were not used in developing the alternatives because they were not necessary to meet ARARs or risk-based criteria or the combination of some process options with others did not make sense as a remedial alternative.

Alternative Z2-3 has been provided as requested.

66. Section 4, page 59, 4.3.1.2. The 1st paragraph should indicate ARGET includes 18 existing extraction wells (not considering extraction well1156). Extraction well 4580 is omitted from the list (see Appendix B for the complete list).

If the TI evaluation supports allowing CoC migration to the northwest in Zone 1, then the contingency plan for well head treatment would have to be formulated so that the treatment would have to be supplied prior to the concentrations in the well exceeding 0.8 µg/L of TCE. The Contingency Plan would likely be necessary even with attempting to contain the northwest plume in Fair Oaks, since it may not be captured in time. At Mather Field, California American Water Company was required to have a plan in place for treatment or non-use of the a specified well that was being threatened by pollutants at concentrations near the Public Health Goal.

Alternative Z1-2 has been revised.

67. Section 4, page 60, 4.3.1.2, 2nd paragraph. It needs to be demonstrated that the extraction wells necessary to provide containment of the plume extending from the PGOU into the OU3 in Gold River area are the same as those now planned to be provided by the OU3. If more extraction wells or treatment are required than

currently planned in the Remedial Design for OU3 to contain PGOU CoC, the PGOU FS needs to indicate what needs to be added to the OU3.

The Area 2 Final Remedial Design Submittal for the WGOU has addressed the CoCs extending from the PGOU into the WGOU.

68. Section 4, page 60, 4.3.1.3. In the first paragraph, wells 4205 and 4225 are listed as operating for additional mass removal but in Table 4-2 for Alternative Z1-3 the estimated flow for these wells is listed as zero which also disagrees with data provided in Appendix B. The FS needs revised to be consistent.

The RI/FS has been revised to be consistent.

69. Section 4, page 61, 4.3.1.3. In the first full paragraph, the text indicates that adequate air stripping capacity exists. To prevent confusion, it is suggest that in the capital cost estimate for Alternative Z1-3 in Appendix D that the text contained within the parentheses only list what capacity is being added.

Comment noted.

70. Section 4, pages 61 and 62, 4.3.2.1. See General Comment 4.

See the revised alternatives.

71. Section 4, page 62, 4.3.2.2. Expand the text to clarify how Layer A and B groundwater contamination shown in Figures 1-8 and 1-9 will be contained by the extraction wells shown on Figure 4-3.

The alternative presented is different than that presented at the January 2004 technical meeting. DTSC's letter of February 6, 2004, provided as Attachment 1 provides further input which needs to be accommodated.

The text in Appendix H has been clarified to discuss containment of Layers A and B by the Layer C extraction wells. See Alternative Z2-2.

72. Section 4, page 63, Section 4.3.2.2, 1st partial paragraph, 2nd sentence. Why would there be restraints on pipeline corridors and rights-of-way for a project that is proposed entirely on the Aerojet property?

See revised text.

73. Section 4, page 63, 4.3.2.2, 2nd full paragraph. Does discharge to Rebel Hill Ditch make sense? The water being discharged to Rebel Hill Ditch infiltrates and can result in additional extraction downgradient at GET F.

Comment noted. Water discharged to Rebel Hill Ditch may ultimately be extracted by GET F. However, it appears that much of the infiltration occurs south of Western Line 04 and south of Line 03. Surface discharge in this area may be beneficial if shallow groundwater from Lines 03 and 04 is prevented from migrating downgradient due to mounding from the ditch infiltrate.

74. Section 4, page 64, 4.3.3.2. In the first paragraph, Alternative Z3-2 lists operating only one existing extraction well (4570) yet Table 4-3 in Appendix C shows the need for 5 White Rock North Dump extraction wells (4505, 4510, 4515, 4520, and 4525) to be operating for containment on the west side. The text needs to be expanded to make this point clear. The estimate should indicate operation and maintenance costs for these five wells are in a State Order. This comment applies also to Alternative Z3-3.

The text has been revised in response to this comment. Electrical use and well maintenance O&M costs for WRND wells 4505, 4510, 4515, 4520, and 4525 are included in the cost estimates for Alternatives Z3-2 and 3-3.

75. Section 4, page 64, 4.3.3.2. The second indicates three new extraction wells each being installed in years 2005 and 2013 while Appendix C's containment extrapolations were based on two extraction wells being installed in 2004 and four in 2011 (Table 4-3). The Appendix C simulation and the Section 4 text need to be based on the earliest feasible installation of extraction wells to prevent further aquifer contamination.

This alternative has been revised.

76. Section 4, page 66, 4.3.3.2, 1st partial paragraph and 4.3.3.3. The contingency plan for well head treatment would have to be formulated so that the treatment would have to be supplied prior to the concentrations in the well exceeding 0.8 µg/L TCE, and any other more stringent health based criteria than MCLs.

Contingent wellhead treatment is no longer a component of any of the alternatives evaluated in this RI/FS.

77. Section 4, Table 4-1. Shouldn't the NDMA results be in terms of ng/L and not µg/L as the concentrations are listed as less than five? Well 4380 is listed as having a design flow of 1050 gpm, but an estimated flow of 39 gpm. Appendix B under Table 1 for ARGET lists extraction well capacity as 106 gpm. Table 4-1 needs to be corrected.

Estimated NDMA concentrations associated with extraction wells in Tables 4-1 through 4-8 are presented in ug/L. The results of the hydraulic simulations (Appendix H) for Alternatives Z1-2 and 1-3 indicate that as part of the hydraulic containment system for Zone 1, well 4380 would need to be pumped only at a rate of 40 gpm even though the aquifer pumping tests for the well indicate that the capacity of the well is higher.

78. Section 4, Table 4-2. Extraction wells 4205 and 4225 are listed with estimated flows of zero which then translates into zero mass removal. Appendix B table for GET D indicates the current actual flow is 10 gpm for extraction well 4205 and 37 gpm for 4225. One of the tables needs to be changed. The flow rate listed for well 4150 appears to be low. The concentrations for TCE for wells 4001 appear to represent data from 1998. Revise the tables accordingly.

Wells 4205, 4225, 4150, and 4001 are no longer included in Alternative Z1-3.

79. Section 5, page 83, 5.2.2.1, 2nd paragraph, 2nd sentence. How does ARGET without GET D or some future upgradient source control able to achieve aquifer restoration for Alternative Z1-2?

Sufficient justification for not capturing the plume currently past the outer-most ARGET extraction wells has not been provided. In addition, a more detailed evaluation needs to be performed for CoC moving past the ARGET extraction field to the east and into Fair Oaks – Monitor Wells 1538-40 and 1531-3.

Alternative Z1-2 has been revised. See discussions regarding this alternative in Sections 4 and 5 and Appendix H. The ARGET extraction wells at the Nimbus Fish hatchery, combined with the eventual depletion of chemicals in the source areas should enable eventual aquifer restoration. Additional extraction wells to address CoCs downgradient of the existing ARGET extraction wells has been added.

80. Section 5, page 83, Section 5.2.2.2. Compliance with ARARs is not achieved if the entire plume of contaminated groundwater is not fully contained. This would include evaluation of containing the plume that exceeds 0.8 µg/L TCE, and not just the MCL level of 5.0 µg/L. This comment applies to all of the alternatives that address TCE.

It is Aerojet's position that containment of the TCE plumes to 5 ug/L, the State of California and Federal Primary Maximum Contaminant Level (MCL) for drinking water, would provide that compliance with ARARs be achieved. However, as demanded by the Agencies, Section 7 of the report evaluates the impacts to the remedial alternatives in Zones 1 and 2 for containment of the TCE plume to 0.8 ug/L.

81. Section 5, page 83, 5.2.2, last paragraph. The inclusion of institutional controls (ICs) needs to be made firm not assumed. The last sentence of this description makes the assumption that they are in-place. These ICs are necessary based on the level of protection discussed in Section 5.2.2.1.

The text has been revised.

82. Section 5, page 83, 5.2.2.1. The first paragraph of this section makes it look like the ICs are the main alternative. The wording needs to be revised.

The text has been revised.

83. Section 5, page 84, 5.2.2.3. In the first paragraph, how is effective long-term control of CoC achieved if contamination to the northwest is allowed to continue to migrate?

Alternatives Z1-2 and 1-3 have been revised.

84. Section 5, page 84, 5.2.2.4. An estimate of the mass destruction and residuals as described in Section 5.1.4 is needed to enable the difference between alternatives to be quantified. This comment applies to similar sections in the remaining alternatives (Sections 5.2.3.4, 5.2.5.4, 5.2.7.4, 5.2.8.4, 5.2.10.4 and 5.2.11.4). The mass removal rates (lbs/day) provided in Tables 4-1 through 4-7 needs to be extrapolated over a period of time (i.e.; 1 year and 30 years) and presented in a table to enable the alternatives to be differentiated.

Mass removal rates are provided in Tables 4-1 through 4-8 and are summarized in Table 6-3 for comparison purposes.

85. Section 5, page 85, 5.2.2.4. The last sentence of this section needs to be quantified. Operating experience should be used to indicates whether off-gas will be below ARARs.

The text has been revised.

86. Section 5, page 85, 5.2.2.5. Here and in the similar sections in the remainder of Section 5, some text description needs to be provided to interpret the time projections for the alternatives. The values used to estimate the cleanup time (i.e.; initial chemical concentration, number of pore volumes, time per pore volume) needs to be provided in a table so the calculations can be verified. As presented it is hard to interpret the data. In Zones 2, 3 and 4 without upgradient source control, explain how the cleanup times can be obtained. There is inadequate discussion of the time projection derivations in Appendix C.

The text has been revised to include the requested information.

87. Section 5, page 87, 5.2.3.3. Alternative Z1-3 would achieve cleanup faster.

See revised text.

88. Section 5, page 91, 5.2.5.1. How do institutional controls work for existing private water supply wells? A contingency plan for those existing wells will need to be developed and implemented when needed. This comment also applies to Alternatives Z3-2 and Z3-3.

Based on the results of the updated private well survey, Aerojet is unaware of any existing private water supply wells that are being used for drinking water where chemicals are detected in those wells above their respective MCLs. In accordance with Exhibit IV of the PCD, Aerojet will continue to monitor private and public water supply wells and to prepare water supply alternative reports should such monitoring identify chemicals in those wells above the specified trigger levels. In addition, as part of the EPA remedy selection process, Aerojet assumes the Agency will specify a requirement for contingency planning, as necessary.

89. Section 5, page 98, 5.2.7.2. The Zone 3 alternatives do not comply with ARARs for Area 39 without containment (See comment 61 above).

See response to General Comment 1 above.

90. Section 6, page 114, 6.2.1. In the last paragraph and last sentence, for Zones 2, 3 and 4, without an upgradient barrier it is difficult to make remedy duration projections. However, in the case of Zone 1 an inner barrier exists and projections

can be made. Additionally, in the first sentence of the last paragraph change "o fmass" to "of mass".

Comment noted. See Section 5.1.5 regarding remedy duration projections.

91. Section 6, Table 6-1. Alternatives Z3-2 and Z3-3 need a foot note indicating 5 extraction wells that are part of White Rock North Dump are needed for containment on the west side. Under Z4-3 the number of existing wells needs to be changed from 7 to 10. A column needs to be added to the table to show the total remediation time for the impacted layers of each of the different alternatives.

In the Final FS, see descriptions of Alternatives Z3-2 and Z3-3 regarding the need for the WRND wells, Table 6-1 has been revised, and see Table 5-1 for estimated times until RAOs are achieved.

92. Section 6, Table 6-2. Estimated capital cost for Alternative Z1-2 should be $0.5 million instead of $0.05 million.

The table has been revised.

93. Appendix A, General Comment. The Agencies' comments provided on Appendix A are preliminary. The RWQCB will provide additional comments in a separate letter.

Comment noted.

94. Appendix A, A.1, page 1, 2nd paragraph. Change the first sentence after (CERCLA) to "...(CERCLA), 42 U.S.C. Section 9621, states...". In the next to last sentence in the paragraph replace "the situation" with "a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance...".

Comments 94. through 105. have been addressed in Appendix F.

95. Appendix A, A.1, page 1, 3rd paragraph. In the last sentence after "Title 40 to end of the sentence" replace with "... Title 40 of the Code of Federal Regulations (C.F.R.), 40 C.F.R. Section 300.400(g)(2).".

See response to Comment 94 above.

96. Appendix A, A.1, page 2, 1st paragraph. Change and divide the second sentence into two sentences "On-site" is defined as the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for the

implementation of the response action 40 C.F.R. § 300.5. On-site includes the groundwater plumes to be remediated."

See response to Comment 94 above.

97. Appendix A, A.1, page 2, 1st Bullet, 2nd sentence. Add "numerical" after "set" to read "generally set numerical health- or risk- based...".

See response to Comment 94 above.

98. Appendix A, A.1, page 2, 2nd Bullet, 4th sentence. Add "sensitive ecosystems and habitats," after "affect" to read "will affect sensitive ecosystems and habitats, historical resources,...".

See response to Comment 94 above.

99. Appendix A, A.1, page 3, last paragraph. Move this paragraph to the first page of A.1 after the third paragraph.

See response to Comment 94 above.

100. Appendix A, A.4.6, page 6. Delete Section A.4.6 as it is redundant to the other referenced ARARs.

See response to Comment 94 above.

101. Appendix A, Tables A-1, A-4 and A-5. The table format is requested to be landscape format following the column headings provided in Attachment 2 with Federal ARARs followed by State ARARs in each of the three ARARs classifications Chemical, Location and Action Specific ARARs. The Comments column is to indicate how and why the ARARs applies to the site.

See response to Comment 94 above.

102. Appendix A, Table A-1. The following comments are provided on the Table A-1:

a. Air quality standards and criteria need to be listed to address discharges from process treatment equipment such as air strippers.

b. Move "Safe Drinking Water Act" under the column headed "Standard, Requirement, Criterion, or Limitations" to the sample format column haded "Source of Authority" and change "(40 CFR 141)" to "42 U.S.C. Section 300(f),

et seq." place under the column heading "Requirement, Standard, or Criterion" as provided in the sample format example Attachment 2.

c. Move "CCR Title 22 Chapter 15, Section 64400 et seq." under the column headed "Standard, Requirement, Criterion, or Limitations" to the sample format column headed " Requirement, Standard, or Criterion" changing to "California Health and Safety Code Section 116365, 22 C.C.R. Section 64400 et seq." and under the sample format heading "Source of Authority" put "California Primary Drinking Water Standards" as provided in the sample format example Attachment 2.

d. Move "Water Quality Control Plan (Basin Plan) for the RWQCB, Central Valley Region (CBR) under the column headed "Standard, Requirement, Criterion, or Limitation" to the sample format column headed "Requirement, Standard, or Criterion" changing to "RWQCB Basin Plan Adopted in accordance with Sections 13240 and 13050" and under the sample format heading "Source of Authority" put "California Water Code". Consolidate "RWQCB, CVR Basin Plan "Antidegradation Implementation Policy"; RWQCB, CBR Basin Plan "Policy for Applications of Water Quality Objectives"; and RWQCB, CVR Basin Plan, "Policy for Investigation and Cleanup of Contaminated Sites" as part of "RWQCB Basin Plan Adopted in accordance with Sections 13240 and 13050".

e. Move "Title 23, CCR, Chapter 15, Section 2550.4" from the Table A-1 to Table A-5.

f. Delete "EPA Integrated Risk Information System (IRIS), EPA Drinking Water Health Advisories and NAS Suggested No Adverse Response Levels (SNARLs) from Table A-1.

See response to Comment 94 above. However, in response to 102a., due to the nature of the treatment processes currently employed by Aerojet at the various GET facilities and planned to be employed in the future (i.e., use of the advanced oxidation process to pretreat groundwater to remove VOCs and other organic compounds) and the results of previous air emissions modeling efforts, emissions from groundwater treatment facilities will be below *deminimis* thresholds.

103. Appendix A, Table A-2 page 1. The following comments, corrections and sources are provided below:

<u>General Comments</u>

Define all acronyms used in the table.

Using footnotes provide the citation for the specific source used in identifying the ARARs and TBCs.

Federal Primary MCL—Recommended changes to the table values are provided below.

Chloroform is 0.08 mg/L.
http://www.epa.gov/safewater/consumer/mcl.pdf

Federal MCLG—Recommended changes to the table values are provided below.

Total nitrate and nitrite is 10 mg/L, nitrate is 10 mg/L, and nitrite is 1 mg/L.
http://www.epa.gov/safewater/consumer/mcl.pdf

DHS Action Levels—Recommended changes to the table values are provided below.

Perchlorate is 0.006 mg/L.

http://www.dhs.cahwnet.gov/ps/ddwem/chemicals/perchl/perchlorateMCL.htm

California PHGs—Recommended changes to the table values are provided below.

1,1-Dichloroethane is 0.003 mg/L
1,1-Dichloroethene – Remove the footnote (d)
1,2-Dichloroethane is 0.0004 mg/L and remove the footnote (d)
Carbon tetrachloride is 0.0001 mg/L
Tetrachloroethene is 0.00006 mg/L
Trichloroethene – Remove footnote (d)
Vinyl chloride is 0.00005 mg/L
Perchlorate is 0.006 mg/L
Nitrate is 10 mg/L
Nitrite is 1 mg/L
Total nitrate and nitrite is 10 mg/L.
http://www.oehha.ca.gov/water/phg/allphgs.html

EPA Region 9 PRGs—Recommended changes to the table values are provided below.

1,1-Dichloroethene is 0.34 mg/L
Chloroform is 0.00053 (recommended CAL Modified value)
Tetrachloroethene is 0.00066 mg/L
Trichloroethene is 0.000028 mg/L
1,4-dioxane is 0.0061 mg/L

Perchlorate is 0.0036 mg/L
Nitrate is 10 mg/L
Nitrite is 1 mg/L.

http://www.epa.gov/region09/waste/sfund/prg/files/02table.pdf

See response to Comment 94 above. However, a Federal MCLG for total nitrate and nitrite of 10 mg/L could not be found. Also, the Region 9 PRG value for tetrachloroethene listed above could not be verified in the reference provided.

104. Appendix A, Table A-2, page 2.

General Comments

Define all acronyms used in the table.
Using footnotes provide the citation for the specific source used in identifying values.
Many of the numerical values could not be verified. Please provide references and how the numerical values were obtained.

The following questions, corrections, and sources are provided below:

IRIS RfD (as drinking water levels)— Are the values based on the most restrictive between adult and child water ingestion? Was IRIS the only source for oral RfDs? Did you calculate a value if the RfD was not from IRIS? If an IRIS RfD was not available, were other sources of toxicity information considered? If not, please explain in the table why toxicity data from other sources were not used if available. Are these values based on an HQ of 1? Using the exposure assumptions in the risk assessment, a concentration of 146 µg/L was calculated for 1,1,2-Trichloroethane for the adult, and 62.6 µg/L for the child based on a target HQ of 1. Ingestion rates of 2 L/day and 1 L/day were used for the adult and child receptor, respectively. An oral RfD of 0.004 mg/kg-day was used. The reviewer could not verify the numbers. Please provide the calculation for this.

IRIS 1E-06 (incremental risk)—Are these values based on risk for the combined child and adult receptor? Please specify in the table. Was IRIS the only source for the oral CSFs used in the calculation? Did you calculate a value if the CSF was not from IRIS? If an IRIS CSF was not available, were other sources of toxicity information considered? If not, please explain in the table why toxicity data from other sources were not used if available. Using the exposure assumptions in the risk assessment, a concentration of 0.93 µg/L was calculated for 1,1,2-Trichloroethane for the combined child and adult receptor based on a target risk of 1E-06. An oral CSF of 0.072 was used. The reviewer could not verify the numbers. Please provide the calculation for this.

EPA DWHA or SNARLs (noncancer)—Health Advisories are guidance values based on non-cancer health effects for different durations of exposure (e.g., one-day, ten-day, and lifetime). Specify which values were used in the table. Some were lifetime HAs and some appeared to be one-day or ten-day and/or DWELs. Did you use the minimum value from all?
The following are chemicals specific comments:

1,1-Dichloroethene should be 6 rather than 7 µg/L based on a lifetime HA.
1,2-Dichloroethane - Could not verify these values.
Carbon Tetrachloride - DWEL for carbon tet is 30 µg/L. Could not verify the numbers in the table.
Chloroform - 400 µg/L is a DWEL. Could not verify the value of 100 µg/L
PCE - Lifetime HA = 10 µg/L. Could not verify numbers in the table.
TCE - Lifetime HA = 200 µg/L.
Vinyl Chloride - DWEL = 100 µg/L. Could not verify the numbers in the table.
Nitrate and Nitrite - values in the table are based on one and ten-day exposure durations. Specify in the table.

EPA DWHA (cancer)—Specify that these are based on 1E-06 cancer risk. Chemical specific comments:

1,1,2-Trichloroethane - value should be 0.6 µg/L
1,1-Dichloroethene - value should be 0.06 µg/L
Chloroform - Could not confirm the value of 6 µg/L.
PCE - Could not confirm the value of 0.7 µg/L.

See response to Comment 94 above. However, the values of TCE - Lifetime HA = 200 µg/L and Vinyl Chloride - DWEL = 100 µg/L referenced in Comment 104 could not be verified in *A Compilation of Water Quality Goals*, Marshack, 2003 and 2004.

105. Appendix A, Tables A-4 and 5. Use format provided in Attachment 2.

See response to Comment 94 above.

106. Appendix B, General Comment. The evaluations in Appendix B do not include performance data including historical pumping rates average CoC concentrations and mass removal rates. This information is required in evaluating alternatives which propose removal of existing extraction wells.

See response to Comment 51 above.

107. Appendix B, page 1 of 1, Current Extraction and Recharge Well Information Table, ARGET. Under ARGET, confirm the design extraction rate for well 4350 is 310 gpm vs. 100 gpm as indicated in the Table 1 of the January 1998 ARGET Treatment Facility description contained in this section.

The 310 gpm design flowrate for 4350 is correct.

108. Appendix B, GET D Process Performance Data, page 2. It should be stated that monitor points in the far right table is for the effluent form the treatment plant and that the bottom table is between beds.

Sample point locations are shown on Figure 3-2.

109. Appendix B, ARGET Process Performance Data, page 1 of 2. Perchlorate removal presented in the upper right table is misleading. The comparison should be between 7068 and 7069. Using 7065 allows for dilution from the other pipeline and would show that there is perchlorate removal when in fact there is not.

Comment noted. However, samples from location 7068 were not analyzed for perchlorate.

110. Appendix B, ARGET Process Performance Data, page 2 of 2. What is the concentration for ND for the concentrations listed in the NDMA table?

The concentration for ND for those data was 0.0075 ug/L.

111. Appendix C, General Comments.

a. The modeling method used in evaluating the GETs does not address the issue of uncertainty in parameters in the model and how that uncertainty effects the predictions of hydraulic containment. Most engineering designs have a built in safety factor to prevent failure. There is no apparent safety factor built into the process used to recommend changes to existing or proposed GETs. Aerojet needs to evaluate the uncertainty in the predictions generated for evaluating capture of existing and future GETs. One possible solution is to establish a more aggressive water quality monitoring program to adequately evaluating the effectiveness of the GETs and provide sufficient early warning when the systems require adjustment.

b. The MODPATH input parameters for the particle tracking are not fully documented. For example, document whether the extraction wells were treated as sinks.

c. Specify the effective porosity used in each simulation.

d. The appendix includes figures depicting modeled interpretations of the capture zones for the existing GETs. Figures showing groundwater elevation contours need to be provided for each of the layers at each of the extraction fields.

a. The current modeling uncertainties are within the level of acceptability for the FS (i.e., within +50/-30 percent). Reducing the level of uncertainty will be addressed during the remedy design.
b. Text files explaining the input parameters have been included with the most recent modeling.
c. The effective porosity for all modeling was 15 percent.
d. Model-generated groundwater elevation contours have been added to the revised figures.

112. Appendix C, Section 2, page 5, 2nd paragraph. A statement is made that minimal changes were made to hydraulic conductivity. Document the changes made to hydraulic conductivity.

The hydraulic conductivities are shown on figures in the revised report.

113. Appendix C, Section 2, Zone 1, page 6, 1st paragraph. How is it known that the pollutants downgradient (northwest) of the ARSA extraction field were present prior to operation of the extraction wells? Could it be that leakage is occurring to the northeast of the extraction wells?

TCE was detected in monitor wells located northwest of the ARSA extraction field prior to when the extraction wells began operating. It is also possible that leakage is or has occurred in this area.

114. Appendix C, Section 2.3, page 7. The first paragraph needs clarification. The referenced Figures 2-12 and 2-13 Alterative Z1-2 (Layer C) and Z1-2 (Layer D) have some portions of GET D operating when Table 2-2 list them as not operating for Alternative Z1-2.

The text, tables, and figures have been revised in the current modeling report.

115. Appendix C, Section 2, page 7, 2nd paragraph. The statement "existing wells should prevent" needs to be removed. Water quality data indicates that full hydraulic containment of CoCs has not been achieved with the existing system. New extraction wells should be simulated to determine the pumping require to contain the plumes. Additionally, access is not a limitation of the model. It may be a

practical limitation but should not prevent simulation of the addition extraction wells to achieve full hydraulic containment of the CoCs.

Comment noted.

116. Appendix C, Section 2, Zone 1, page 7, 3rd Bullet. Treatment needs to be supplied for the water supply well if pollutants reach the well at concentrations that exceed appropriate health values, and not just MCLs.

Comment noted.

117. Appendix C, Section 2, Zone 1, page 7, 5th Bullet. The public concern over monitoring and extraction wells can be overcome and is not a legitimate reason for not fully addressing the plume.

Public and community concerns regarding the extraction and treatment of groundwater may be warranted and have previously prevented the preferred remedy from being implemented.

118. Appendix C, Section 2, Zone 1, Table 2-2. Why is extraction well 4370 pumped at 264 gpm in Z1-2 and not at all in Z1-3? Z1-3 is supposed to be alternative Z1-2 with additional mass removal.

The pumping schemes in the remedial alternatives have been revised.

119. Appendix C, Section 2, Zone 1, Figures 2-7 through 2-15. The flow lines to the extraction wells should be depicted to show how the hydraulic containment area is developed. This comment applies to the other similar figures for Zones 2 though 4.

Model-generated water level contours are included in the revised figures.

120. Appendix C, Section 2, Zone 2, Figure 2-10. Is the entire thickness of Layer F contained by the extraction wells screened in Layer E? It is difficult to ascertain how these three Layer E extraction wells will adequately control and expeditiously remediate the CoCs in Layer E. Where is the figure for hydraulic containment by the Layer E wells for Alternatives Z1-2 and Z1-3?

Assuming this comment refers to Zone 1, there are four extraction wells in Layer E in the revised modeling results.

121. Appendix C, Section 3, page 10. The documented simulations do not address contamination in the western part of the Zone 2.

Contamination in western Zone 1 is addressed by the remedy for the WGOU.

122. Appendix C, Section 3.1, page 11, 1st paragraph. It appears that the Zone 2 simulated was calibrated with 46 years data but simulations were performed over a 2 year period. Please clarify. Delete or modify the statement "previously reviewed by the agencies during the OU3 RI/FS". We understand that the regional model has changed with time and the changes in the regional model have not been formally approved or disproved by the agencies.

The subject text has been clarified.

The changes to the regional model were formally approved by the Agencies on April 21, 2004.

123. Appendix C, Section 3.2, Zone 2, page 11. Why are no extraction wells proposed to intercept the pollution in Layer B? The effectiveness of the proposal cannot be determined as the figures showing containment areas do not include the plume boundaries. In addition, evaluations involving placement of wells at other locations should be made, as it cannot be determined from the information supplied that the modeled locations are the optimum locations for extraction.

The saturated thickness of Layer B is very thin. Any meaningful extraction from this layer created dry cells during the model simulations. We're assuming that wells screened in C will dry out B, creating downward migration of water from B to C.

124. Appendix C, Figures 3-2 through 3-5. The figures are missing the extent of CoCs boundaries as specified in the figure legends.

The figures have been revised.

125. Appendix C, Section 4.1, Zone 3, page 14, 5th paragraph. An effective porosity (10%) seems rather low for the type of sediment present and is not consistent sand and silty sand. How would increasing porosity change the capture analysis?

The effective porosity was changed to 15 percent in the current report.

126. Appendix C, Section 4.1, Zone 3, page 14, last paragraph. As indicated in Specific Comment #4, there are other water supply wells in Zone 3. The text only lists 1059 as operating. Why were not the other wells included in the model evaluation? If the pending water supply well survey indicates there are additional water supply wells in the area they need to be included in the groundwater modeling.

Comment noted.

127. Appendix C, Section 4.3, Zone 3, page 15. This alternative is unacceptable if the extraction is postponed in Layers E and F.

The new alternatives do not postpone implementation and operation of wells in Layers E and F..

128. Appendix C, Zone 4, Figures 5-4 through 5-7. As indicated in prior comments above, the western Zone 4 plumes need better NDMA information to allow the plumes to be adequately defined. With the data provided it is difficult to judge the adequacy of the alternatives to address those plumes.

The most recent data were used to prepare the plume maps used in the groundwater modeling simulations.

129. Appendix C, Zone 4, Section 5.1, page 17, 2nd paragraph. Hydraulic conductivity values assigned to Layer 1 are not consistent with hydraulic conductivity values available from aquifer tests. For instance from pumping test data the hydraulic conductivity for wells 4100 and 4110 is estimate to range from 199 to 890 whereas the model assigned values in the vicinity of the wells range from half to an order of magnitude less.

Calibration of hydraulic conductivities in the vicinity of these wells was based primarily on recreating measured water levels and flow directions, using steady-state average flow rates, to estimate the containment area of the existing down-gradient GET D well field and operation. Changes to the operation of these wells was not planned, nor simulated in the alternatives. Therefore, the recreation of measured water levels, contours, and flow directions by the model is valid in determining containment, regardless of inconsistencies between assigned values of hydraulic conductivities in the model and pumping test data.

130. Appendix D, General Comment. I appears that all the remedy completion projections exceed 30 years. Supplemental non-discounted constant dollar cost estimates to remedy completion need to be provided as part of Appendix D to aid in evaluating the alternatives following EPA's guidance EPA 540-R-00-002 or latest revision. Based on the remedy completion times indicated in Section 5, the providing the supplemental non-discounted constant dollar cost estimates in Appendix D will aid in the presentation of the remedy alternative comparisons in Section 6.

Supplemental non-discounted constant dollar cost estimates have been provided in the Final FS.

131. Appendix D, Alternative Z4-2. The operation and maintenance estimate description for the new extraction wells Z4-a1 and Z4-a4 does not match the Appendix C description in Table 5-2. Also the estimate for Alternative Z4-3 operation and

maintenance lists 7 existing extractions wells vs. 10 listed in Appendix C in Table 5-2.

The alternatives for Zone 4 have been modified. See Sections 4 and 5 and Appendix I of the RI/FS report.

132. Appendix D, Estimated Annual Operation, Maintenance, and Monitoring Costs, Alternatives Z1-2 and Z1-3. It is unclear what the IX resin replacement unit costs represent. As shown for Alternative Z1-2, it appears that the unit will need 939 acre-feet (41 million cubic feet) of resin per year. This appears to be a treated water cost and should be clarified in the estimate line item.

IX resin replacement unit costs are $167 per acre-foot of groundwater treated.

133. Appendix D, Estimated Annual Operation, Maintenance, and Monitoring Costs. For each of the alternatives with equipment maintenance and replacement costs, the assumptions used for estimating these line items need to be clarified.

See text at the beginning of Appendix I.

134. Appendix D, Present Worth Cost Estimates. These estimates have no replacement costs for the treatment facilities and wells. Although the O&M costs have equipment repair costs, it may not be reasonable to assume a 30 year design life. A facility replacement cost at 20 years needs to be considered. This comment applies to each of the alternatives with capital costs.

See text at the beginning of Appendix I and in Section 5.1.7 of Final FS.