APPENDIX H

NASA'S RESPONSES TO COMMENTS FROM U.S. EPA AND DTSC ON THE DRAFT FINAL RECORD OF DECISION

Responses to Comments on the Draft Final Record of Decision (ROD)
and Remedial Action Plan for Operable Unit 2
March 7, 2002

No.	Comment	Response
U.S. Environmental Protection Agency (EPA) – Submitted February 28, 2002		
1	Page iii, last paragraph. Change "the" to "a" in the second sentence. "In addition, the EPA has designated SVE as a presumptive..."	The change has been made as requested.
2	Page iv, second paragraph of Statutory Determinations and also in Section 13.6. Please change this to match the statutory language, i.e., NASA intends to remediate VOCs in vadose zone soil at JPL to prevent, to the extent practicable, further migration of VOCs to groundwater. A Five-Year review will be conducted if hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. This site and remedy review will be conducted no later than five years after the start of the remedial action.	The text in the Declaration, Statutory Determinations (page iv) and Section 13.6 Five Year Review Requirements (page 35) has been modified as follows: "NASA intends to remediate VOCs in vadose zone soil at JPL to prevent, to the extent practicable, further migration of VOCs to groundwater. A Five-Year review will be conducted if hazardous substances, pollutants, or chemicals remain at the site above levels that allow for unlimited use and unrestricted exposure. This site and remedy review will be conducted no later than five years after the start of the remedial action (See, 42 USC 9621(c))."
3	Page 12, Section 5.2.2.5. Please add a sentence that provides a justification for not considering cyanide as a COC. Is it below PRGs, not mobile, an acceptable risk because it was only found at one location, etc.	The text in Section 5.2.2.5 Other Compounds has been modified as follows: "Cyanide was detected in three samples collected from one soil boring at concentrations ranging from 0.074 mg/kg to 0.085 mg/kg. These detections were limited to one location and were well below the residential soil PRG of 11 mg/kg (U.S. EPA, 1998)."
4	Page 19, top of the page. The first full sentence on this page should read, "HQs less than 1 are not..." The HQ reference in the next paragraph should also be an HQ of 1. All of EPA's guidance on ecological risk says that the screening level is 1. If the HQ is above 1, the site may still be acceptable for reasons including habitat, bioavailability, range, uptake assumptions, etc. Thus, this paragraph should also say that JPL is an industrial complex and does not provide quality habitat, in addition to the current discussion on diet, only one sample exceeded, etc.	Section 7.2 has been modified as follows: "The screening-level ERA in the OU-2 RI report (FWEC, 1999a) evaluated the potential risks to ecological receptors exposed to chemicals in on-facility soil at JPL. Chemical of potential concern for the ERA included chromium, lead, mercury, molybdenum, vanadium, and zinc. The ecological risks associated with exposure to these chemicals were quantitatively evaluated for the deer mouse and American kestrel through the calculation of HQs (FWEC, 1999a). The HQ for lead from one soil sample location exceeded 1 for both the deer mouse and the American kestrel. However, uncertainty regarding the form of lead in the sample, as well as the conservative exposure parameters used in the evaluation, likely overestimated the risk from the sample. Animals with large home ranges, such as the American kestrel, are not likely to be at risk because they would potentially obtain only a small fraction of their diet from this location. JPL is a developed, non-wilderness area, so it is not likely to provide high quality habitat for these species. In addition, lead concentrations found at JPL are within the range of background values for California and western U.S. soils. Thus, potential ecological risks from lead are likely to be lower than indicated by the estimated value. All other constituents had HQs less than 1 for

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		the American kestrel and less than 10 for the deer mouse. Constituents, which yielded an HQ above 1 for the deer mouse included chromium, molybdenum, and zinc. Since JPL is a developed industrial complex, these HQs represent an acceptable risk."
5	The response to comments contains several excellent explanations on how the SVE system works, but some of this should be in the remedy description in the main text of the ROD. Include language on the GAC similar to the second paragraph from NASA's response in Section 3.1. Also state what the Air Board monitoring requirements are (frequency, location of samples, etc.). Also state in the ROD that the off-site shipments for regeneration must comply with all DOT requirements (no need to list them).	The second paragraph of Section 11.2 has been modified as follows: "The soil vapor extracted from the subsurface will contain VOCs at levels that may require treatment before being discharged to the atmosphere. Several different options for vapor treatment of chlorinated VOCs are available, including granular activated carbon (GAC) adsorption, VOC-adsorbing resins, and catalytic oxidization. Currently, the preferred choice for off-gas treatment is GAC, which is a technology proven to be effective for VOC treatment. Once the GAC becomes saturated with VOCs, it will be removed and replaced with fresh GAC. The spent GAC will then be transported (in compliance with Department of Transportation [DOT] requirements) off-site to a permitted facility to be regenerated or disposed. The preferred method of VOC vapor treatment may be modified based on the concentrations of VOCs in extracted soil vapor. "The current SCAQMD air permit requires collection of daily SVE system influent and effluent (stack) vapor samples, which are analyzed for VOCs using a hand-held meter. In addition, every two weeks SVE system influent and effluent vapor samples are collected and analyzed by a laboratory for VOCs using EPA Method TO-14."
6	Page F-16, first Paragraph. Change sitting to siting.	The change has been made as requested.
7	Page F-19/20. Our attorneys believe that the SCAQMD rules must apply as ARARs. This shouldn't change your operations, since you were planning to comply anyway.	All SCAQMD Rules have been accepted as ARARs, except SCAQMD Rule 402, which prohibits the discharge of any air emissions in quantities that may cause injury, detriment, nuisance, or annoyance to the public. This was determined to be not an ARAR based on Department of the Navy Guidance.
8	ARARs. DOT requirements for off-site transport should also be listed as an action specific ARAR.	Based on further correspondence with the EPA "DOT does not have to be listed as an ARAR. However, still mention that all DOT requirements will be met in the remedy description." Please see response to comment number 5.
Department of Toxic Substances Control (DTSC) – Submitted February 28, 2002		
9	Could you double check the stated health based action level of 30 mg/kg for hex chrome (sec 5.2.2.1, page 11)? This value seems high to me.	The 30 mg/kg level for Chromium VI is the EPA Region 9 PRG and was incorporated into the ROD based on a comment on the Draft ROD from the EPA.

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10	Part III, sec 3.4, page 39, add the word "Federal" to EPA to differentiate it from CAL-EPA.	The change has been made as requested.
Ronald C. Palmer, Raymond Basin Management Board – Submitted February 28, 2002		
11	Based on our review, this is to advise you that we endorse adoption of the draft action plan for Operable Unit No. 2. During our evaluation, we noted that no implementation schedule for this process was provided. We request that we be furnished with the implementation schedule for this action plan as well as schedules for subsequent stages leading to groundwater cleanup. We look forward to cooperative efforts in bringing this cleanup process to successful completion.	The implementation schedule will be provided upon finalization during the remedial design phase of work.

August 8, 2002

United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105

NASA's Response to EPA's Request for Modification to the Record of Decision for Operable Unit 2 at NASA-JPL

Dear Mr. Ripperda

The National Aeronautics and Space Administration (NASA) has evaluated the modifications requested by the United States Environmental Protection Agency (EPA) and prepared responses (see attached table). Soil vapor extraction (SVE) is an EPA presumptive remedy for remediation of volatile organic compounds (VOCs) in soil[1] and the best available technology for VOC removal at NASA's Jet Propulsion Laboratory (JPL). As such, NASA has established performance objectives rather than numeric cleanup standards to utilize SVE to an economic and technical limit of feasibility appropriate for the site. NASA's goal is to utilize SVE as a tool to optimize cost effectiveness of the entire site remediation process. The flexibility provided by performance objectives, as opposed to numeric cleanup standards, is necessary for making wise remediation decisions at NASA-JPL.

The EPA made four major points in the cover letter to the requested Operable Unit 2 Record of Decision (ROD) modifications. NASA's response to each is provided as follows:

EPA Point No. 1. EPA believes that the soil vapor extraction system is an interim action with the ultimate goal being the final remediation of the groundwater aquifer.
NASA's Response. While NASA agrees that the purpose of SVE is to expedite and improve cost-effectiveness of groundwater remediation (i.e., removing VOCs from the vadose zone via SVE prevents having to treat the chemicals after they have migrated to groundwater), NASA considers SVE the remedy for Operable Unit 2.

EPA Point No. 2. The remedial goal of this action should be reevaluated once a final groundwater remediation goal has been selected in the future Record of Decision for OUs 1/3. At that time, final cleanup standards for the vadose zone should be established.
NASA's Response. As stated in NASA's response to EPA Point No. 1, the remediation objective in implementing a vadose zone remedy was to expedite and improve cost-effectiveness of the groundwater remediation process. Based on this objective, NASA established performance objectives for the SVE system, which better reflect the intent of the remedy (as opposed to developing numerical cleanup standards). The performance objectives ensure that the SVE system is operated only as long as it is cost-effective in achieving the remediation objective and apply as follows:

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[1] United States Environmental Protection Agency. 1993. *Presumptive Remedies: Site Characterization and Technology Selection for CERCLA Sites with Volatile Organic Compounds in Soils*. Quick Reference Fact Sheet. Office of Emergency and Remedial Rsponse, EPA 540-93/048. September.

- Performance Objective No. 1 – Protectiveness of groundwater is based on fate and transport modeling. This objective limits the use of cleanup standards since the standards would vary spatially (e.g., the cleanup goals would be different for VOCs located 20 feet above the water table than for those located 120 feet above the water table).
- Performance Objectives No. 2 and No. 3 – SVE system performance typically follows an asymptotic decline in concentrations. If cleanup standards are below the asymptote, the SVE system is likely not to be cost-effective once asymptotic conditions are achieved. NASA needs the flexibility to stop operation when the additional cost of continuing to operate the SVE system is not anticipated to significantly increase the cost of the groundwater remedy. This determination will be dependent on performance of both the soil and groundwater remedies and will vary with time.

EPA Point No. 3. A reevaluation [of vadose zone cleanup goals] will ensure that the SVE system can achieve standards that will be selected for groundwater, or that the system will run to a technical or economic limit of feasibility.
NASA Response. It is not practical to make the connection of attainment of groundwater standards and implementation of a vadose zone remedy, since SVE is not a groundwater remediation technology. In addition, the performance objectives documented in the ROD for Operable Unit 2 provide the framework necessary to run the system to its technical or economic limit of feasibility at NASA-JPL.

EPA Point No. 4. Final vadose zone remediation goals should not be determined until the final groundwater ROD is signed.
NASA Response. NASA intends to complete a final ROD for each operable unit.
Please feel free to contact me if you would like to discuss these items further.

Sincerely,

Peter Robles, Jr.

Responses to Comments on the Final Record of Decision (ROD)
and Remedial Action Plan for Operable Unit 2
August 2002

No.	Comment	Response
1	Section 8.0 Remedial Action Objectives. Add a footnote at the end of the second paragraph: "EPA's position is that final vadose zone cleanup standards will need to be determined when the final groundwater cleanup standards are set."	The remediation objective for implementing soil vapor extraction (SVE) is to expedite and improve cost-effectiveness of the groundwater remediation process. Based on this objective, NASA established performance objectives (see Section 11.4 of the Final Record of Decision (ROD) for Operable Unit 2) for the SVE system, which better reflect the intent of the remedy (as opposed to developing numerical cleanup standards). The performance objectives ensure that the SVE system is operated only as long as it is cost-effective in achieving the remediation objective and apply as follows: ❑ Performance Objective No. 1 – Protectiveness of groundwater is based on fate and transport modeling. This objective limits the use of cleanup standards since the standards would vary spatially (e.g., the cleanup goals would be different for VOCs located 20 feet above the water table than for those located 120 feet above the water table). ❑ Performance Objectives No. 2 and No. 3 – SVE system performance typically follows an asymptotic decline in concentrations. If cleanup standards are below the asymptote, the SVE system is likely not to be cost-effective once asymptotic conditions are achieved. NASA needs the flexibility to stop operation when the additional cost of continuing to operate the SVE system is not anticipated to significantly increase the cost of the groundwater remedy. This determination will be dependent on performance of both the soil and groundwater remedies and will vary with time.
2	Section 13.2. Compliance with Applicable or Relevant and Appropriate Requirements. Add a footnote at the end of the paragraph: "See footnote 1 under Section 8.0"	See response to comment No. 1.
3	Appendix F. Applicable or Relevant and Appropriate Requirements, Section F.2.1. [Chemical Specific] Groundwater ARARs and Conclusions. Add the following sentence: "The cleanup standards, including ARARs, for groundwater will be determined when the groundwater remedies are selected, and will be documented in later Records of Decision. At that time, NASA will use the groundwater cleanup standards to establish the final vadose zone cleanup standards."	See response to comment No. 1.

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4	Appendix F. Applicable or Relevant and Appropriate Requirements, Section F.2.1.2. State [Chemical-Specific Groundwater ARARs]: fourth bullet—add reference to "22 California Code of Regulations 66264.94"; also, under the heading State Water Resource Control Board Res. 92-49 and 68-16, last paragraph – change last sentence to read "Cal. Code Regs. Tit. 22 Section 66264.94 is not applicable but is relevant and appropriate under the circumstances. A final cleanup standard for the vadose zone will be established pursuant to this requirement when the final groundwater cleanup standards are set."	The text of the fourth bullet under Section F.2.1.2 has been modified as follows: "Cal. Code Regs. tit. 23, div. 3, ch. 15, § 2550(a), 2550.4(d), (e), and (f), and 2550.5; and tit. 22 § 66264.94." The paragraph under the heading State Water Resource Control Board Res. 92-49 and 68-16 has been amended with the following sentence: "Cal. Code Regs. Tit. 22 Section 66264.94 is not applicable but is relevant and appropriate." In addition the paragraph with the heading Cal. Code Regs. tit. 23, div. 3, ch. 15, § 2550 has been removed.
5	Appendix F. Applicable or Relevant and Appropriate Requirements, Section F.2.2. [Chemical Specific] Soil ARARs Conclusions. Add a sentence "Final vadose zone cleanup standards will be determined when final groundwater cleanup standards are set."	See response to comment No. 1.
6	Appendix F. Applicable or Relevant and Appropriate Requirements, Section F.2.2.1. Federal [Chemical Specific Soil ARARs], Third paragraph – add a sentence "Cal. Code Regs. Tit. 22 Section 66264.94 is not applicable, but is relevant and appropriate under the circumstances. A final cleanup standard for the vadose zone will be established pursuant to this requirement when the final groundwater cleanup standards are set."	The following sentence has been added to the third paragraph in Section F.2.2.1: "Cal. Code Regs. Tit. 22 Section 66264.94 is not applicable but is relevant and appropriate."
7	Appendix F. Applicable or Relevant and Appropriate Requirements, Table F-A Potential Chemical Specific ARARs. Under "California Department of Health Services", change the requirement entitled "Standards for Corrective Action of Waste Management Units" to read as follows: Requirement: Standards for cleanup of vadose zone at waste management units Prerequisites: Soil remediation Cititation: Title 22 CCR. Sec. 66264.94 ARAR Determination: Relevant and Appropriate Comments: A final cleanup standard for the vadose zone will be established pursuant to this requirement when the final groundwater cleanup standards are set."	Table F-A has been modified as by replacing "Title 23, CCR, Division 3, Chapter 15, Article 5, Section 2550" with "Title 22, CCR, Section 66264.94."

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 18, 2002

Peter Robles
NASA Management Office
JPL
4800 Oak Grove Drive, M/S 180-801
Pasadena, CA 91109

Re: EPA's concurrence on the Record of Decision for Operable Unit 2 at NASA-JPL

Dear Mr. Robles,

The U.S. EPA agrees with the soil vapor extraction remedy selected at NASA-JPL to remove volatile organic compounds from the vadose zone soils below JPL. This action is necessary and appropriate to help protect the underlying drinking water aquifer. We have signed the Record of Decision and have enclosed the signature page. However, we believe that the soil vapor extraction system is an interim action with the ultimate goal being the final remediation of the groundwater aquifer. Therefore, the remedial action goal for the SVE remedy must be re-evaluated once a final groundwater remedy has been selected in the future Record of Decision for OUs 1 and 3. Cleanup standards, including ARARs, for groundwater will be determined when the groundwater remedies are selected, and will be documented in these later Records of Decision. At that time, NASA will use the groundwater cleanup standards to establish the final vadose zone cleanup standards, including concentration limits for the contaminants of concern in the vadose zone soil.

EPA looks forward to working with NASA and the State of California in implementing this current remedy and in progressing towards a final groundwater remedy. Please call me at (415) 972-3133 or Mark Ripperda (415) 972-3028, or have your counsel call Karen Goldberg at (415) 972-3951 if you have any questions concerning this matter.

Sincerely,

Deborah Jordan
Chief, Federal Facility and Site Cleanup Branch

encl: ROD Signature Page

cc: Richard Gebert, DTSC
David Young, RWQCB