Final 2005 Five-Year Review Report

for
Rocky Mountain Arsenal
Commerce City
Adams County, Colorado

Review Period: April 1, 2000 – March 31, 2005

Response to Regulatory Agency Comments

Volume III of III

November 2007

PREPARED BY:

Department of the Army
Rocky Mountain Arsenal
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Volume III of III

Response to Regulatory Agency Comments

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Section

Remediation Venture Office's (RVO) Responses to
Colorado Department of Public Health and Environment's (CDPHE)
September 27, 2005 Technical Comments on the
Draft Final Five-Year Review Report (FYRR)

GENERAL COMMENTS

Comment 1. This Five-Year Review (FYR) document represents a significant level of effort and is a complex task for a massive project like the Rocky Mountain Arsenal. However, additional analysis of the protectiveness of the remedy should be performed and documented in this report. Further, although valuable information was obtained from the inspections as described in Volume II, most of the observations or findings were not incorporated into the recommendations or conclusions of this FYR. According to the Environmental Protection Agency's Comprehensive Five-Year Review Guidance (EPA, 2001), evaluation of the remedy and the protectiveness determination should be based on, and sufficiently supported by, data and observations. The Technical Assessment Section (Section 7) fails to fully evaluate the remedy's protectiveness and does not provide the necessary supporting information for the protectiveness determination. Please see specific comments including 118, 119, 139, 144 and 145.

Response: The RVO has incorporated additional discussion of the analysis of the protectiveness of the remedy in Section 7 as requested.

The RVO agrees that "most of the observations or findings were not incorporated into the recommendations or conclusions of this FYR." The RVO believes the purpose of the Five-Year Review (FYR) is to conduct a protectiveness level review to determine whether the remedy for Rocky Mountain Arsenal (RMA) defined in the Records of Decision (RODs): a) remains protective of human health and the environment as they were when they were agreed to; and b) is functioning as designed and necessary operations and maintenance (O&M) is being performed, considering the changes in laws, standards, Applicable or Relevant and Appropriate Requirements (ARARs) and items to be considered that occurred in the five-year period covered by this FYR.

The RVO believes that, in addition to such "protectiveness level inspection findings," the FYR inspection effort also identified findings with a much lower level of significance and higher level of detail than the "protectiveness level" that was intended under the FYR. Therefore, most of the findings, although important, are not of the significance to affect "protectiveness," and therefore, should not be included in Volume 1, the main body, of the FYRR.

The RVO has taken action to address these "less than protective level" findings that resulted from the FYR inspection effort under normal

housekeeping and other routine maintenance actions, but nas not included them in the Volume 1 of the FYRR.

Comment 2. The organization of Volume I, particularly Section 7.1, does not follow the format in EPA, 2001. Much of the language in Section 7.1 is a description of remedy implementation that might better fit in Section 4.3. There are also other descriptions such as health and safety, which although important, may not really add to the discussion. All of this tends to dilute the focus of Section 7.1, which is to directly answer Question A. This section should provide discussion of data and references (including references to the site inspection reports in Volume II) that support the responses to Question A. Further comments on this section are provided in the specific comments.

Response: The RVO prepared the draft 2005 FYR using the consensus on format that reached and used for the 2000 FYR. The 2000 FYR included both the status and assessment of projects in Section 7. In the Final 2005 FYRR project status is presented in Section 4 and the assessments are presented in Section 7.

Comment 3. Section 4 includes an extensive presentation of Record of Decision (ROD) remedy actions combined with explanations of the project status. This information, however, is not consistently formatted from section to section. It is unclear whether this section is intended to simply contain a description of the ROD requirements or is intended to provide a current summary of the projects. Many of the project descriptions are straight out of the ROD even though the project may be underway or completed (e.g., Basin A) while others have a progress report included (e.g., trust fund, biological advisory subcommittee, Lime Basins/Former Basin F). This lack of parallelism leads to confusion for the reader about the intent of this section. It would be helpful to summarize each project with the following information, in order: 1) The original ROD description; 2) Any significant administrative modifications (e.g., Explanations of Significant Difference [ESDs], ROD amendments, or Council Resolutions); 3) Any other significant remedy modifications and 4) Progress to date.

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 4. Volume I contains many uncommon acronyms that confuse the reader. Acronyms such as BA, CCL, cy, IAW, SFS, etc. would be easier to read and understand if they were spelled out.

Response: The acronym list has been significantly shortened in response to this comment.

Comment 5. Volume II would be easier to use with a table of contents and with tabs placed between inspection reports.

Response: The RVO has incorporated this change into the Final FYRR.

SPECIFIC COMMENTS – VOLUME I

Comment 1. Executive Summary, page xiii and Section 5.2.2, page 35 – Are the actions working? Are all well permit applicants receiving the notification?

Response: Consistent with examples in the EPA FYRR guidance, the Executive Summary has been streamlined to avoid redundancy with the EPA Summary Form. Off-Post institutional controls are discussed in Sections 4.2.1.3 and 5.2.2, assessed in Section 7.2.2.3, identified as an issue in Section 8.13 and followed-up in Section 9.11.

Comment 2. Executive Summary, page xii, fourth full paragraph – The CDPHE would like to discuss with the U.S. Environmental Protection Agency (EPA) and the U.S. Army (Army) this recommendation to discontinue the publication of ESDs or other ROD change documents. This recommendation should be evaluated for consistency with EPA guidance and for public notification adequacy. Also, the distinction provided for why an ESD was published following the first Five-Year Review but wouldn't be necessary in the future would benefit from additional clarification.

Response: Section 9.13 has been revised to reflect the RVO belief that the ARAR changes identified become effective upon approval of the Final 2005 FYRR and not further change documentation is required.

Comment 3. Acronyms List, page v – The acronym for the Landfill Wastewater Treatment Unit is listed as "LWTU" in the acronym list but referred to throughout the report, including the tables, as "LTWU". The acronym list and text should be consistent.

Response: The requested correction has been made in the Final FYRR.

Comment 4. Executive Summary, page xii, fourth full paragraph – The wording of the last sentence suggests that more than one ESD was published following the first Five-Year Review to correct errors and inconsistencies. Please clarify.

Response: The Executive Summary has been substantially revised in the Final FYRR.

Comment 5. Section 1.0, page 1, 3rd paragraph, second sentence – Please state the day, month, and year of the start and end of each Five-Year Review period. This information is likely more significant to the reader than the time period over which the reviews were conducted. Further, it may be instructive to state that environmental monitoring and analytical data results from September 30, 1999 through September 30, 2004 were considered in this Five-Year Review and new Applicable or Relevant and Appropriate Requirements (ARAR) and construction completion reports between March 31, 2000 through March 31,

2005 were included in this review. Providing this information to the reader may help to focus public comments on the period of interest.

Response: The requested correction has been made in the Final FYRR.

Comment 6. Section 2.0, page 3, 1st paragraph – The text indicates that Table 1 includes the chronology of events for the Rocky Mountain Arsenal (RMA) site. Table 1 appears to include significant ROD-related administrative milestones but not key implementation activities (e.g., the start of Hazardous Waste Landfill [HWL] operations). The text should explain the types of events included in the chronology.

Response: Table 2.0-1 now includes only significant ROD-related events (e.g., ROD Amendments and ESDs). The information on projects can be found in Table 2.0-2 and in the project status discussions in Section 4.

Comment 7. Section 3.0, page 3 – Please provide the area, in square miles, affected by the Off-Post Operable Unit.

Response: Information on the areal extent of the Off-Post Operable Unit has been included in the revised text in Section 3.0 of the FYRR.

Comment 8. Section 3.0, page 6, Table 2 – In the first column, Tetrachloroethylene is listed. In the fourth column, Tetrachloroethene is listed. The use of ethylene and ethene should be consistent.

Response: The requested correction has been made in Table 3.0-1 of the Final FYRR.

Comment 9. Section 4.1, general – This section would benefit from a careful technical editor's review. There are some tense inconsistencies in the descriptions between various projects and within individual project descriptions. For example, Ditches Drainage, Sanitary Landfills, and Sand Creek Lateral individual project descriptions contain a mixture of "will be" and "has been", even though the activities described have been completed. South Plants Ditches is described in the future tense, while South Plants Balance of Areas and Central Processing Area contains a mix of future and past. Toxic Storage Yard, a completed project, has actions described as "was to be", "was" and "are". For the Burial Trenches discussion, the text uses the positive past tense several times to indicate work completed. The phrase "was to be" is also used several times. It is unclear if the "was to be" items were completed or will be completed. Clear use of positive past, present, or future statements should be used here and throughout Section 4.1.

Response: Section 4.0 has been substantially revised to address this comment..

Comment 10. Figure 2 – The Bedrock Ridge extraction system is not visible on this figure.

Response: The Bedrock Ridge Extraction System is now depicted on Figure 4.0-3

Comment 11. Section 4.1, pages 9 and 11 – A description of the endrin ESD is included twice. It is described again in Section 4.2. Could this be simplified? Additionally, paragraph two, page 9 includes a sentence on the Irondale Containment System, a boundary system, which should be moved up to paragraph one.

Response: The Endrin ESD is now discussed once in Section 5.2.4.

As noted above, Section 4 has been substantially revised.

Comment 12. Section 4.1, page 11 – Include the status of the Monitoring Completion Report for South Lakes. Include the actual number of closed confined aquifer wells.

Response: During the preparation of and response to comments on the draft FYRR, it was determined that the MCR was not required. See the discussion in Sections 4.1.3.5 and 7.3.28 of the Final FYRR.

Comment 13. Section 4.1, page 12, 5th bullet – The discussion in this section is confusing. The reader may believe that the reference in the third sentence to "this proposed change" implies that the portion of the proposed amendment addressing Former Basin F remediation will "create additional space in the Enhanced Hazardous Waste Landfill (ELF)", which is incorrect. The disposal, instead of treatment, of principal threat soils from Former Basin F will *require* additional space in the ELF. Please clarify that it was the change to the Lime Basins remedy which freed landfill space.

Response: Section 4 has been substantially revised in a manner that addresses the above comment. The changes to the Lime Basins remedy and the impact on landfill capacity is also discussed in Section 6.3.14.

Comment 14. Section 4.1, page 12, last paragraph – The discussion on Basin A refers to the original ROD requirements for 6 inches of concrete in the cover system and a 4-foot soil cover. In order to be consistent with the other remedy descriptions, the design changes that resulted in an 18-inch thick biota barrier and a fully Resource Conservation and Recovery Act (RCRA) - Equivalent soil cover should be discussed.

Response: The discussion is provided in Section 4.3.2.3.

Comment 15. Section 4.1, page 13, South Plant Ditches – The previous and subsequent sections describe the deletion of a portion of the South Plants Balance of Areas cover. Is the statement that these ditches are contained under this cover accurate?

Response: Section 4 has been revised in a manner that addresses the above comment.

Comment 16. Section 4.1, page 13 – a) This page discusses the South Plants Central Processing Area, the South Plants Ditches, and the South Plants Balance of Areas. The corresponding descriptions for each subsection appear to be mixed up. For example, the South Plants Central Processing Section contains a description of the one-foot backfill area. If the South Plants Project is to be broken up into separate components, the description should be specific to the corresponding remedy. Please revise accordingly.

b) The October 2000 ESD did not result in RCRA Equivalent covers; it provided that the 4-foot covers would be designed and constructed using the same criteria that were used to build the RCRA-Equivalent cover test plots. A subsequent Council Resolution resulted in an agreement to make the South Plants Central Processing area cover fully "RCRA Equivalent", which entails performance monitoring.

Response: a) Section 4 has been revised in a manner that addresses the above comment.

b) The ESD discussion was corrected to eliminate reference to a RCRA-equivalent cover. The Council Resolution will be documented in the next FYRR in the context of cover construction.

Comment 17. Section 4.1, page 14, Section 36 Balance of Areas – The description of the ESD is incomplete because it only addresses changes to the chemical sewers. Significantly, this ESD removed more than 100 acres of 2-ft-thick and 1-ft-thick soil covers. Also, please remove the statement that CDPHE believes that the remedy outlined in the ESD is protective. CDPHE does not believe the ESD remedy is protective and therefore recommended changes to the ESD (*Recommendations for Revisions to the Explanation of Significant Differences for the Section 36 Balance of Areas Soil Remediation Project at the Rocky Mountain Arsenal*, CDPHE, June 1, 2004). The new information gathered during the implementation of the ESD led to the implementation of a revised remedy (in progress) and should be included somewhere in the Five-Year Review.

Response: The requested correction has been made in the Final FYRR in Sections 4.1.3.1 and 4.3.1.5. Specifically, information on actions taken since the ESD that address the concerns identified in the comment have been included in the FYRR.

Comment 18. Section 4.1, page 15, item 2 – This item is lacking a verb. What happened to 125,542 bank cubic yards of biota? Also, the statement that it was "ROD-defined" but "not included in the original ROD remedy" is confusing.

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 19. Section 4.1, page 15, Complex Trenches – Per general comment 3 above, please include the progress of the project (e.g. slurry wall and dewatering trench installed).

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 20. Section 4.1, page 15, Shell Trenches - The Shell cover system will be extended to incorporate the former drum storage area based on new information discovered during the implementation of the Section 36 Balance of Areas Soil Remediation Project. Although this ESD has not been finalized, the essential features of this change have been incorporated within current design documents. This ESD was based on information obtained since the last Five-Year Review and should be discussed.

Response: As noted in the response to Specific Comment 17, the topic is discussed in Sections 4.1.3.1 and 4.3.1.5.

Comment 21. Section 4.1, page 15 and 16, 1st paragraph – a) The reasons given for the ROD change should be more consistent with those outlined in the Proposed Plan. b) The RCRA-Equivalent cover will not contain a layer of clay as described here.

Response: The requested corrections have been made in the Final FYRR.

Comment 22. Section 4.1, page 16, Buried M-1 Pits – While the ROD provided for caustic washing and landfill of any agent-contaminated soil, this step was not "completed" as stated because none was found during implementation of this project.

Response: The requested correction has been made throughout the Final FYRR.

Comment 23. Section 4.1, page 17, 3rd paragraph – a) This is the only remedial action component in Section 4.1 where cost is discussed. If cost is appropriate, it should be consistently included in the discussion of each remedial action.

b) This description is a mixture of the North Plants Structure Demolition and Removal Project and the North Plants Soil Remediation Project. These projects should be described in two separate sections or paragraphs. The structures demolition, chemical sewers removal and potentially agent-contaminated equipment decontamination and destruction is lacking from this description (all associated with the Structure Project). Also, it was during the design and implementation of the North Plants Structure Demolition and Removal Project, not Soil Remediation Project, that new information emerged that led to the significant changes. The soil cover is part of the Soil Remediation Project.

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 24. Section 4.1, page 18, Lake Sediments – This description faithfully duplicates the ROD language but the construction completion report indicates that 16,322 bcy of human health exceedance (HHE) and biota soil were removed from Lower Derby Lake. Remedial activities in Lower Derby Lake should be included in this description.

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 25. Section 4.1, page 18, 5th bullet – This section implies a completed remedy for the Sand Creek Lateral. Please revise accordingly.

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 26. Section 4.1, page 19, second to last paragraph – The CDPHE suggests dropping this paragraph for consistency purposes. The other projects do not have a statement referring the reader to Section 7.1.3. Also, for clarity, the Medical Monitoring Advisory Group dissolved once it had completed its work in 1998. The CDPHE is implementing the advisory group's recommendations, which is called the "Medical Monitoring Program".

Response: Section 4 has been substantially revised in a manner that addresses the above comment. The Medical Monitoring Program is now discussed in Sections 4.5.1.4 and assessed in Section 7.2.3.9.

Comment 27. Section 4.1, page 21, first partial paragraph, last sentence – Please describe why Department of Army and/or Operation and Maintenance (O&M) funds are only "likely" to be requested. Is there another source of funding that would sustain O&M? This sentence and particularly the phrase "as follows:" are confusing. This suggests a link to the bullets listed after this sentence but this doesn't make any sense. Also there appears to be a formatting (margin width) problem. Please correct.

Response: Section 4 has been substantially revised in a manner that addresses the above comment.

Comment 28. Section 4.1, page 21, first sentence – a) It was not incumbent upon the Trust Fund Group to determine whether it had performed "good-faith best efforts". This was a Conceptual Agreement provision for the RMA parties to fulfill. The Trust Fund Group did not make this determination in any formal way. b) Also, the first Five-Year Review stated, "The Army and Shell will continue to meet with members of the Working Group to discuss additional strategies and

future prospects for establishing a Trust Fund." Please provide an update on these efforts.

Response: Section 4 has been substantially revised in a manner that addresses the above comment. The Trust Fund status is discussed in Section 4.5.2.2 and assessed in Section 7.3.25.

Comment 29. Section 4.1, page 23 – a) This page has a formatting problem. The three indented bullets suggest these ROD requirements are a subset of the Biological Advisory Group activities. Please rectify.

b) The text on page 23 appears out of place. The introduction to Section 4.1 (page 7) states that the remedial action components of the RMA remediation are to be described. The first bulleted list of items on page 23 does not appear to fit within the context of this section. Furthermore, the purpose for listing the 14 IRAs at the end of Section 4.1 is unclear. Please clarify.

Response: Section 4 has been substantially revised in a manner that addresses the above comment. Section 4.5.1.1 directs the reader to a data review in Section 6.4.3 and an assessment in Section 7.2.3.5.

Comment 30. Section 4.2, page 24 – a) The bulleted lists and explanation paragraphs in Section 4.2 should be similarly structured and should follow the same structure as Section 4.1.

b) Surface water monitoring is also a part of the Offpost remedy (see Section 5 of the Draft Final Implementation Plan for the Offpost Operable Unit, June 1996 and page 9-1 of the Offpost ROD, December 1995). Please add this component.

Response: Section 4 has been substantially revised in a manner that addresses the above comment. See Section 6.4.2 for the surface water data review.

Comment 31. Table 3- RMA Remedial Projects, page 29, number 34 – a) The South Plants section incorrectly states that the cover will be completed under Phase II, Part 2. The Construction Completion Report (CCR) was issued for Phase II, Part 1 and Part 2. Cover construction will be completed in Phase II, Part 3. Please revise accordingly.

Response: Table 3 has been renumbered as Table 2.0-2 and has been modified to address the above comment.

Comment 32. Table 3-RMA Remedial Projects, page 29, number 40 - The North Plants Soil Remediation forecast of the Final CCR date does not appear to be an appropriate section to introduce the proposed ESD to eliminate the two-foot cover requirements. Please revise.

Response: The requested correction has been made in Table 2.0-2 of the Final FYRR.

Comment 33. Table 3-RMA Remedial Project, page 30, number 54 – The EPA, in coordination with the CDPHE, is preparing a Trust Fund Closure Report. This report should be submitted to the Remediation Venture Office (RVO) this fall.

Response: Please see the response to Specific Comment 28.

Comment 34. Table 3, page 30, number 58 – The Motor Pool CCR has been postponed until 2006.

Response: The forecasted completion in mid-2007 was incorporated in the Final FYRR.

Comment 35. Table 3, page 31, number 60 – Please clarify why there is no CCR required for shut down of the CERCLA treatment facility.

Response: The revised information is now presented in Table 2.0-2, # 60.

Comment 36. Table 3, page 31, number 64 – The South Lakes Monitoring Completion Report (MCR, not CCR as listed in text) has been postponed until 2006.

Response: Please see the response to Specific Comment 12. The MCR is not longer mentioned in Table 2.0-2 number 64.

Comment 37. Section 5.2.1, page 34, 1st paragraph – The first paragraph apparently is a quote from the first FYRR and the second paragraph apparently is a summary of action taken since the first FYRR. However, the first paragraph includes information that should be in the second paragraph. Based on the structure of the subsection, the first paragraph should be limited to quoting the conclusion from the first FYRR and not include later information.

Response: The requested correction has been made in Section 5.2.1 of the Final FYRR.

Comment 38. Section 5.2.8, page 37, 2nd paragraph – For parallel structure, the second paragraph should begin with "Action Taken by RMA since the first FYR."

Response: The requested correction has been made in Section 5.2.8 of the Final FYRR.

Comment 39. Section 6.4, page 40 – Could the original estimate for the remediation (1995 dollars) be also provided as present value so that the reader can compare this figure to the current estimated final costs and the cost-to-date? This information would be helpful.

Response: Section 6.3.15 has been rewritten to provide the Baseline (FY95) Estimate in both 1995 dollars and escalated dollars. Additionally, the Final FYRR provides a current escalated estimate at completion along with the actual cost to date.

Comment 40. Section 6.4.1.1, page 41, fifth bullet under water level tracking – This bullet should be expanded to include discussion on recent US Geological Survey (USGS) water level efforts along the offpost portion of First Creek, particularly in response to the December 2004 detection of Diisopropylmethyl phosphonate (DIMP) (30 ug/L) at Highway 2. Also, RVO has recently cited increased groundwater levels on post near the North Plants/First Creek area with regard to thickness of fuel oil product found at North Plants.

Response: Although the data described in the comment is outside the FYRR data period, other in-period DIMP exceedances are discussed in Sections 6.4.2.1 and 6.4.2.2. The surface water data are included in the Annual Data Summary Report produced by the USGS. The water table information for the North Plants/First Creek area is also included in Section 6.4.1.1.

Comment 41. Section 6.4.1.2, page 42 – Perchlorate monitoring was not a specific requirement of the On-Post ROD.

Response: Perchlorate monitoring has been removed from the list of ROD requirements, but is discussed separately in the Section 6.4.1.7.

Comment 42. Section 6.4.1.2, page 43, third bullet – Please clarify that the F well is not in the Basin A neck area but water was pumped to the Basin A neck system for treatment. Per page 60, the F well was shut down in September 2000. Do the NDMA water quality data not show lower concentrations until 2002?

Response: The text has been corrected to reflect the proper location of the North of Basin F well. The NDMA concentrations decreased between 2000 and 2002.

Comment 43. Section 6.4.1.2, page 43, 5th bullet – For the Section 36 Bedrock Ridge intercept system, the text indicates the system has had an extended startup evaluation due to the difficult nature of completing and operating extraction wells in the variable Denver Formation sandstones and that a fourth extraction well has been installed. Please revise according to page 53, which clearly states that the reason for the fourth well was that the system was not able to achieve capture. The startup evaluation period was part of the approved design.

Response: The text in Section 4.1.1.1 has been revised to clarify that the fourth well was added to improve plume capture.

Comment 44. Section 6.4.1.2, page 43, 6th bullet – This section on North Plants should clarify that there was both fuel oil-contaminated soil and fuel oil free product discovered as part of the North Plants Structure Demolition and Removal Project (e.g. DCN-NPD-006 related to free product, January 2002). Since the topic is introduced here, the reader would benefit from further explanation.

Response: The North Plants fuel release is discussed in the status of the North Plants Demolition Project in Section 4.4.2.4 and in the data review in Section 6.4.1.2. The topic is then assessed in Section 7.3.2.3, identified as an issue in Section 8.10 and follow-up is prescribed in Section 9.8.

Comment 45. Section 6.4.1.2, page 43, 7th bullet – The RMA Lake Mary Fact Sheet (2003) should be mentioned here or elsewhere as appropriate since it documents a minor change to the On-Post ROD regarding elimination of lake level maintenance or plume control for Lake Mary.

Response: A reference to the Lake Mary Fact Sheet has been included in Section 6.4.1.2 of the revised text.

Comment 46. Section 6.4.3, page 48, third paragraph – This section includes a statement there were no instances of fugitive dust from on-site sources crossing the RMA fence line. The following excerpt is from the South Plants Soil Remediation Phase II Construction Completion Report currently in draft final form. "At 13:25 on January 3, 2002, during a period of strong, gusty winds, dust was observed crossing the RMA fence line along the eastern perimeter fence line near 7th Avenue. Airborne dust was a Denver Metropolitan area issue on that day, and dust was observed blowing onto as well as from RMA. Activities taking place at South Plants at the time included excavation, transport and placement of clean soil for the cover subgrade construction." Please modify the text.

Response: The text in Section 6.4.4.has been modified to reflect the Construction Completion Report (CCR) language noted above regarding fugitive dust crossing the RMA fenceline.

Comment 47. Section 6.4.4, page 49 and 50 – Collection and evaluation of on-post surface water data should be discussed (e.g. USGS Long-Term Monitoring Program, 2004 Water Year is the most recent). Given the December 2004 DIMP detection at Highway 2 (30 ug/L), please discuss this with regard to the statement about "positive effect on First Creek Water Quality" on page 50. While this sampling data was collected after the September 30, 2004 Five-Year Review data "cut-off" date, it could be considered qualitatively in characterizing contaminant trends. See above comment on Section 6.4.1.1.

Response: The statement regarding the positive effect on Fist Creek Water Quality is general in nature and based upon the language in Section 6.4.2.3 of the Final FYRR which states, "(d)uring this FYR the detection frequency for target analytes above CBSMSWs decreased compared to the past FYR period.

Comment 48. Section 7.1, pages 51 to 124 – The organization for Question A differs from the approach outlined in Section 4.1.1, Appendix E pages E-23 and E-24, and Appendix F pages F-24 and F-25 of EPA, 2001. EPA, 2001, suggests that Question A first consider remedial action implementation status. There are

three statuses; remedies under construction, operating remedies, and completed remedies. For remedies under construction the focus for Question A should be "*to determine if the remedy is being constructed in accordance with the requirements of the decision documents and design specifications, and if the remedy is expected to be protective when it is completed*" (page 4-3, EPA, 2001). Remedial actions that do not belong to the first status are either in one or the other statuses. For either of the other two statuses there are seven aspects to consider for every project that exists. These are (pages 4-3 and 4-4, EPA, 2001);

- Remedial action performance,
- System operations/operation and maintenance (O&M),
- Costs of system operations/O&M,
- Implementation of institutional controls and other measures,
- Monitoring activities,
- Opportunities for optimization, and
- Early indicators of potential remedy problems.

Examples of how these aspects are applied are provided in appendices E and F of EPA, 2001.

CDPHE expected this organization for the framing Question A; however, Section 7.1 of the draft Five-Year Review differs. Much of Section 7.1 is a description of remedies and seems more appropriate for Section 4.3. In addition, Section 7.1 seems to regard several of the seven aspects listed above as separate remedial actions. For example, system operation and maintenance (bullet two above) is considered as a separate set of projects (Operations and Maintenance Projects) in Section 7.1.5 of the draft Five-Year Review. CDPHE understands that it may be appropriate to discuss access and institutional controls in a separate section, as has been done in Section 7.1.6, because of their global nature; however, the other aspects should be discussed under each project.

One example of the difficulties of not following EPA, 2001 occurs with the Shell/Complex (Army) Trenches Slurry Wall. This is introduced in Section 7.1.2.2 as a completed project with a CCR. However, the discussion in Section 7.1.2.2 fails to address many of the seven aspects to answer Question A. Later, in Section 7.1.5, the Shell/Complex (Army) Trenches Slurry Walls Dewatering of Army Trenches is introduced as an Operations and Maintenance Project. This section discusses remedial action performance; however, this information is separated from the earlier slurry wall discussion

by 46 pages of solid text. The answer to Question A concerning the effectiveness of the slurry wall is dispersed in the text. The slurry wall and the dewatering are part of the same remedial action. Although these may be separate projects from a contractual perspective, they should be presented and assessed as a whole remedy from the remedy perspective. Separating the two makes it more difficult to assess Question A.

Response: The request to identify three categories of status in accordance with EPA FYR has been incorporated. The Army did separate the Shell Disposal Trenches Slurry Wall construction and the Complex (Army) Trenches Slurry Wall construction into separate projects in Section 4 and separately assessed them in Section 7. The Army did not revise the FYRR to place the construction discussions near the dewatering discussions because the assessment criteria for completed projects and projects under construction differ.

Comment 49. Section 7.1.1, general – The purpose of the confirmatory sampling program is described in two ways in this section, depending on the project. In most of the sections (e.g., Existing (Sanitary) Landfill Remediation Section 30) the purpose of the sampling is described as "to confirm that all contaminated soil has been excavated" or "to confirm that contaminated soil has been excavated". This objective is beyond the capability of the program. Please change this wording in all project descriptions to indicate simply the number of confirmatory samples collected or to state the purpose is to identify contingent soil for removal (see page 55 or 57 as an example).

Response: The request to simply state the number of confirmatory samples with the purpose of identifying contingent soil for removal has been made consistently through the Final FYRR.

Comment 50. Section 7.1.1, general – The M-1 Pits, Hex Pits, South Plants Balance of Areas and Central Processing Area descriptions all state that these projects do not require any long-term O&M. While the excavation portion of the work covered by these CCRs does not include O&M, all of these projects will be covered by a RCRA-Equivalent cover which will require O&M. To enhance public understanding, the CDPHE recommends the Army include language in these project descriptions similar to what is included in the draft South Plants Phase II CCR (i.e., "South Plants Soils has been broken into subparts for remediation and construction of the cover. South Plants Soils Phase 2, Parts 1 and 2 require no caps, covers, or treatment facilities. South Plants Soils Phase 2, Part 3 includes cover construction, however, this CCR is only for Phase 2, Part 1 and 2. Long-term operation and maintenance requirements for the covers will be discussed in the Phase 2, Part 3 CCR that will address construction of the South Plants soil covers.")

Response: The text for Section 4.3.1.4 of the FYRR has been revised to be consistent with the description from the South Plant Phase 2 CCR provided in the above

comment. As excavation projects, the language for Hex Pit in Section 4.3.3.14 and the Buried M-1 Pits in Section 4.3.3.13 have also been revised to address the above comment.

Comment 51. Section 7.1.1, *Construct Enhanced Hazardous Waste Landfill*, page 51 – This is a description of the construction activities. Please consider adding language that addresses whether the construction is conforming to design, that approved design changes have been made and documented, that construction quality control is in place, and that the remedy is still expected to be protective when completed.

Response: The status of the ELF construction is now presented in Section 4.3.1.1 and assessed in Section 7.1.1.

Comment 52. Section 7.1.1, *Existing (Sanitary) Landfills Remediation Section 30*, page 52 – This is a description of remedy objectives and construction activities, which seems more appropriate for Section 4. Please consider adding language that discusses how construction conforms to design and whether the remedy will still be protective. This might include a mention that all design changes were documented and that a construction quality control program was used.

Response: The status of the ESL Section 30 project is now presented in Section 4.3.1.2 and assessed in Section 7.1.2. .

Comment 53. Section 7.1.1, page 52, 5th paragraph – The HWL is one of several facilities in the Corrective Action Management Unit (CAMU). The terms HWL and CAMU are not synonymous, as implied. Please revise accordingly.

Response: The language in Section 4.3.3.2 has been revised to clarify that the Hazardous Waste Landfill (HWL) is one of several facilities in the Corrective Action Management Unit (CAMU) and that the HWL is not synonymous with the CAMU.

Comment 54. *Section 7.1.1, Munitions (Testing) Soil Remediation Part II, page 53* – a) Please clarify the description on whether the remedy is being constructed according to design objectives and criteria and whether the remedy is expected to be protective when completed. The language regarding flight path of 4.2-inch mortars and a Council resolution are introduced without much context. This section needs some language to connect the thoughts. b) If the Council resolution is cited, please include the date of the resolution agreement (1/6/04, amended 8/24/04).

Response: The status of the Munitions (Testing) Soil Remediation Part II project is now presented in Section 4.3.1.3 and assessed in Section 7.1.3 In addition, context will be added for the 4.2-inch mortar flight path to connect it to the Council resolution and complete references will be provided.

Comment 55. Section 7.1.1, Bedrock Ridge, page 53 - The fourth well is operational and the pump test was completed in May-June 2005. The DCN for the 4th well installation was signed in November 2004 and another DCN was signed in June 2005 for final well hookup.

Response: The status of the Bedrock Ridge project is now presented in Section 4.1.1.1 and assessed in Section 7.1.4. The text has been revised to reflect the addition of another well to the system.

Comment 56. Section 7.1.1, page 56, 3rd paragraph - This paragraph incorrectly contains language pertinent to South Plants Central Processing Area; the discussion should focus on South Plants Balance of Areas. Please remove the reference to the five foot criteria, which was relevant only to the previous paragraph addressing the South Plants Central Processing Area.

Response: The reference to the five-foot criteria was removed from the Final FYRR.

Comment 57. Section 7.1.1, page 56 – The description does not include the completed South Plants ESD, which modified the ROD requirements.

Response: The status of the South Plants Balance of Areas and Central Processing Area project is now presented in Section 4.3.1.4 and assessed in Section 7.1.6. Section 4.3.1.4 includes discussion of the completed South Plants ESD.

Comment 58. Section 7.1.1, page 57, fourth paragraph – Please insert the word "soil" after "Biota" in the second to last sentence.

Response: The word soil was inserted as requested in the text of the Final FYRR.

Comment 59. Section 7.1.1, page 58, first partial paragraph – The statement that there were no action levels exceeded requiring PPE upgrade is inconsistent with the draft final CCR, Section 6.2. Please revise.

Response: The text in Section 4.3.1.4 of the Final FYRR has been revised consistent with the draft final CCR.

Comment 60. Section 7.1.1, page 59, last paragraph – The title refers to the Basin A Neck (as does the Table 3 identifying number) and the F Well Hydrogen Release Compound (HRC). The use of HRC in the title and the use of "OGTIS" in the text are not appropriate to this section. Additionally, there needs to be discussion of the construction and associated design change notices (DCNs) for new recharge trenches at the Basin A Neck System (BANS). As a follow up to the BANS trench installation, an RVO Memorandum on Basin A Neck as a Contaminant Reduction System was prepared and needs to be cited. Please revise this section accordingly.

Response: The text in Section has been corrected and the requested references have been added to the Final FYRR.

Comment 61. Section 7.1.2.1, page 61, fourth full paragraph – Please check whether the regulatory agencies inspected these IRA actions, as described. CDPHE staff does not recall participating in an inspection.

Response: According to letter correspondence with CDPHE dating back to 1989, CDPHE participated in the inspections.

Comment 62. Section 7.1.2.2, general – Many of the project descriptions (e.g., HWL Cell 1 and Cell 2, Shell/Complex (Army) Trenches Slurry Wall, Toxic Storage Yard) state that no adverse results from the remedial action or construction activity were indicated by biota monitoring. Please explain what biota monitoring was performed in the area of these projects that would be capable of detecting adverse results. The CDPHE is not aware of any monitoring activity conducted under the Biological Advisory Subcommittee with the goal of monitoring recent remedial project impacts to wildlife. If the US Fish and Wildlife Service (USFWS) conducts monitoring with this objective, please include a description under Section 6.4.2.

Response: CDPHE is correct and the statements regarding adverse effects have been eliminated from the revised text.

Comment 63. Section 7.1.2.2, general – Many of the project descriptions state that the remedial actions are "fully functional". Is this terminology appropriate if the remedial action does not require any O&M and if EPA has not made a determination about whether the remedy is "operational and functional"?

Response: Question A inquires whether "...the remedy is functioning as intended by the decision documents". As such the "fully functional" description applies to all assessments, not just projects that require O&M.

Comment 64. Section 7.1.2.2, *Existing (Sanitary) Landfills Remediation Section 36*, pages 72 to 73 – Please include language that specifically answers the seven aspects previously discussed. Some of the language regarding remedy objectives and construction activities could be moved to Section 4.3. to highlight answers to Question A in this section.

Response: The status of the ESL Section 36 project is now presented in Section 4.3.3.7 and assessed in Section 7.3.10. .

Comment 65. Section 7.1.2.2, page 73, second and third paragraph – These paragraphs contain redundant sentences concerning confirmatory sample volume (CSV) and confirmatory samples.

Response: The redundant sentences have been removed from the Final FYRR.

Comment 66. Section 7.1.2.2, page 74, last full paragraph – This paragraph should include an explanation that the ROD did not require excavation of human health exceedance (HHE) sediment in the deep portion Lower Derby Lake and that some type of institutional controls will be required to assure no future human contact with this sediment. Two areas of sediment (almost 20,000 cy in Aldrin and Chromium HHE volume) in excess of human health criteria were left in place in deep areas of the lake.

Response: The requested explanation of remaining contamination in Lower Derby Lake, consistent with the ROD, has been included Section 4.3.3.8 of the Final FYRR.

Comment 67. Section 7.1.2.2, page 64, last paragraph – Please add an explanation for why the HWL will not require any O&M. This comment also applies to the HWL Cell 2 description, page 67.

Response: This RDIS project addresses only construction which was clarified in the text in Sections 4.3.3.2 and 4,3,3,4..

Comment 68. Section 7.1.2.2, *Shell/Complex (Army) Trenches Slurry Wall*, pages 67 to 69 – The discussion in this section and Section 7.1.5 on page 117 should be related. The following comments relate to both sections. It is not clear that this remedy has been completed. Is this remedy fully protective as designed if the RCRA-1 Equivalent cover has not yet been placed? What has been the effect on protectiveness of the design change to not fully encompass the Complex Army trenches? Why have water levels in one of the Complex Army trench compliance well failed to meet target elevations? Is this an indication of poor remedial action performance or an early indicator of potential remedy problems? Do the dry, damaged, and destroyed monitoring wells at Shell trenches indicate problems with operations and maintenance and monitoring activities? Have these been replaced or repaired?

The monitoring wells are designed to assess the protectiveness of the remedy. The number of wells installed is presumably optimized on the basis of a careful balance of cost and coverage. How many of the wells are expendable before the monitoring well system is compromised? The loss of wells with no replacement or repair, a relatively easy fix, could also raise suspicions concerning whether the remedy itself is faltering. Is this an early indicator of potential remedy problems?

This discussion should also reference the inspection report provided in Volume II. The information and follow-up actions requested in the inspection report should be presented and discussed to support the statements concerning the assessment of the remedy.

Please provide a basis or reference for the statement that the upper safe limit for the hydraulic gradient across the slurry wall is 10 ft/ft. Where is this performance criterion documented?

The first full paragraph on page 69 should clarify the reason (and appropriate RVO documentation) to not construct a closed wall around the Complex Army trenches. Discussion should include the lower hydraulic conductivity of the Denver Formation bedrock on the eastern side and the related installation of the Bedrock Ridge system.

Response: The construction of the slurry walls is complete. The RVO did separate the Shell Disposal Trenches Slurry Wall construction and the Complex (Army) Trenches Slurry Wall construction into separate projects (Sections 4.1.3.1 and 4.1.3.2 respectively) and separately assessed them in Sections 7.3.5 and 7.3.6.

Water Levels/Target Elevations (dewatering) for the Shell Disposal Trenches and Complex (Army) Trenches are under construction and are discussed in Sections 4.1.2.1 and 4.1.2.2, in the revised text. The RVO has attempted to maximize pumping from the Complex Trenches dewatering system as much as possible to attain the dewatering goals. These goals are based on target water levels, but meeting the goals within a specific time frame is not a requirement. Estimates of how long it might take to meet the dewatering goals were made in the Design Document and in the Complex Trenches Groundwater Extraction System Operational and Functional Report (OFR) (RVO 2002), but these were only estimates, not commitments or requirements. For example, in the OFR it states, "(i)n order to ensure that the dewatering goal of lowering the water table below the bottom of the disposal trenches could be achieved in a reasonable amount of time (e.g., 5 to 10 years, or less), a conservatively high design flow rate of 3 gallons per minute (gpm) was selected." Since the dewatering system did not begin operation until 2001, it is unrealistic to expect the dewatering goals to be met by 2005. Consequently, this is not a reflection of remedy problems. In addition, it is not reasonable to expect the system to meet expected goals before the cover is installed preventing surface infiltration. Response to surface infiltration was especially noticeable after the March 2003 blizzard.

The Program Management Contractor and RVO take steps to protect wells designated to be retained in the Long-Term Monitoring Plan (LTMP) and to make them highly visible. When large earthmoving equipment is used in soil grading programs, monitoring wells sometimes are damaged despite our efforts. When that occurs, the wells are repaired as soon as possible or replaced, if necessary. When the Shell Trenches slurry wall was constructed, ten existing monitoring wells adjacent to the slurry wall alignment were cut off and capped prior to construction of the slurry wall working bench. Nine of the ten wells were rehabilitated. Monitoring well 36534, which had been dry historically, was damaged beyond repair, and with Regulatory Agency

approval, will not be replaced. The revised text explains the upper limit for the hydraulic gradient and the reason for the selected design.

Comment 69. Section 7.1.2.2, *Existing (Sanitary) Landfills Remediation Section 4*, pages 71 to 72 – Please include language that specifically answers the seven aspects previously discussed. For example, the modification to allow exploratory trenching during remediation and subsequent reduction in the volume of disturbed soils might be a good example of opportunities for optimization and cost reduction. Some of the language regarding remedy objectives and construction activities, could also be moved to Section 4.3 to further highlight answers to Question A.

Response: The status of the ESL Section 4 project is now presented in Section 4.3.3.6 and assessed in Section 7.3.9. The noted opportunity for optimization has been included in Section 7.3.9 of the Final FYRR.

Comment 70. Section 7.1.2.2, page 72, second paragraph – It may help to clarify by stating that the soil, rather than the area, was amended.

Response: The requested clarification has been made in the Final FYRR.

Comment 71. Section 7.1.2.2, *Existing (Sanitary) Landfills Remediation Section 36*, pages 72 to 73 – Please include language that specifically answers the seven aspects previously discussed. Some of the language regarding remedy objectives and construction activities could be moved to Section 4.3. to highlight answers to Question A in this section.

Response: Please refer to the response to Specific Comment 64.

Comment 72. Section 7.1.2.2, *Burial Trenches Soil Remediation Part 1 and 2*, pages 74 to 76 – Seventeen additional sites were added to this remedy in part as a result of Summary Team work. Has identification of additional contamination beyond what was envisioned in the ROD made the remedy less protective? Will this exceed landfill capacity? Is this an early indicator of potential remedy problems? These questions should be considered and addressed.

Response: The status of the Burial Trenches project is now presented in Section 4.3.3.9 and assessed in Section 7.3.12. The Final FYRR makes the requested assessment.

Comment 73. Section 7.1.2.2, page 77, fifth paragraph – The last sentence of this paragraph about surveys is unclear since no CSV soil was removed.

Response: The sentence has been removed from the text in Section 7.3.13 of the Final FYRR.

Comment 74. Section 7.1.2.2, page 80, third paragraph – a) The CDPHE disagrees that this project has achieved the intent of the ROD to be protective of human health, is fully functional and that there are no early indicators of potential remedy failure. The discovery of human health exceedance soil following completion of the CCR and National Priorities List (NPL) deletion and subsequent transfer of land containing a portion of this soil indicates that the ROD remedy was not fully protective. The report should discuss this finding in more detail and the corresponding response actions that will assure protectiveness upon completion.

b) The statement that remedial actions under this project have been completed appears to be in conflict with the previous paragraph describing the new information that led to reopening this project.

c) This section should acknowledge the additional institutional controls established for SSA-3b, beyond the Federal Facility Agreement land use controls (see Final Interim Institutional Control Plan, Feb. 2003, page 4).

Response:

a) The RVO believes that the portions completed to date are protective and achieve the intent of the ROD. The RVO also believes that the overall remedy remains protective, and that these discoveries were related to a contaminant dispersion mechanism not contemplated during the Remedial Investigation. Since the discovery, this contaminant dispersion mechanism is being fully evaluated. The language has been clarified accordingly in both the project status in Section 4.3.3.12 and the assessment in Section 7.3.15 of the Final FYRR.

b) See response to CDPHE Specific Comment #74 a., above.

c) The additional institutional control for Site SSA-3b is noted in Section 6.3.11.

Comment 75. Section 7.1.2.2, page 86, third full paragraph – a) While the statement "no documented odor action levels were ever reached at the fence line during work execution" may be technically accurate, the subsequent description of September 13, 2001 offsite odors seems to undermine this assertion. A Montbello citizen reported these odors to CDPHE and Recycled Materials, Inc. employees reported the odors to the RVO. CDPHE recommends qualifying this statement for the benefit of readers who may not appreciate the significance of whether the Program Management Contractor documented an otherwise well-documented odor excess.

Response: The statement in Section 4.3.3.13 of the Final FYRR has been revised to reflect the odor reports from off-site sources.

Comment 76. Section 7.1.2.2, page 86, fifth full paragraph – a) While this paragraph is directly from the approved CCR, the Army may wish to consider whether it

may unintentionally convey a lack of responsibility for the incident to the layperson reader. In presentations to citizen advisory groups following the incident, the RVO indicated that the blue haze was directly related to the M-1 Pits remedial activities. Chemists from Shell Oil Company, the manufacturer of Dicyclopentadiene and Bicycloheptadiene, suggested that the blue haze may have been produced by adsorption of water molecules to cyclodienes. The blue haze has not been observed since M-1 project completion.

b) The Army may wish to consider adding some narrative about the M-1 Pits lessons-learned process (see Section 5.4 of the CCR), in order to be responsive to public comments about the blue haze event.

Response: The RVO has discussed the information received from the Shell Oil Company chemists and a discussion of the lessons learned process in Section 4.3.3.13 of the Final FYRR.

Comment 77. Section 7.1.2.2, page 87, first full paragraph – The paragraph describing personal health and safety sampling and analysis should include information about the September 13, 2001 short term nuisance effects that caused some personnel to go home (see Sections 6.2 and 7.1 of the CCR).

Response: The requested text has been added in Section 4.3.3.13 of the Final FYRR.

Comment 78. Section 7.1.2.2, *Hex Pit Soil Remediation*, pages 87 to 90 – Although this section provides an extensive history of the remediation activities, most of the discussion belongs in Section 4.3. In addition, there is no explanation as to why the ROD contingency of solidification/stabilization was not performed. Also the ROD amendment that was needed to address this remedy is only mentioned indirectly. The section is not focused on the seven aspects asked for under Question A.

Response: The revised text has been moved to Section 4.3.3.14 of the FYRR and now more fully discusses the ROD amendment and why the ROD contingency was not performed. The assessment is provided in Section 7.3.19.

Comment 79. Section 7.1.2.2, page 92, first full paragraph – This section includes a statement that biota exceedance soil was used as backfill beneath the South Plants Covers. This statement would benefit from additional explanation that this soil was used as grade fill beneath future soil covers that will be constructed over the South Plants Central Processing and portions of the South Plants Balance of Areas.

Response: The text of Section 4.3.3.15 in the Final FYRR has been revised to clarify that biota soil was used as gradefill beneath future soil covers.

Comment 80. Section 7.1.2.2, page 92, third full paragraph – Please remove "or Phase 2" from the last sentence since this description does not include Phase 2.

Response: As requested, "Phase 2" was removed from the discussion in Section 4.3.3.15 of the Final FYRR.

Comment 81. Section 7.1.2.2, *Secondary Basins Soil Remediation*, pages 92 to 95 – This section again provides a history of the construction activities. Although the seven aspects of Question A are mostly addressed in the section, they are obscure. For example, why was an ESD developed to delete the requirement for a 2-foot cover by excavating biota soil and placing it in Basin A? Is this an example of optimization? Is it more protective? Is the decision to collect 224 soil samples an example of monitoring activities that demonstrated increased protectiveness of the remedy?

Response: The Secondary Basins project has been revised to discuss the ESD and the required sampling in Section 4.3.3.16 and the assessment is performed in Section 7.3.21.

Comment 82. Section 7.1.2.2, *Section 35 Soil Remediation*, pages 95 to 96 – a) This section mentions the remediation work in Sand Creek Lateral (NCSA-5c). Portions of the Sand Creek Lateral and former banks are currently being resampled because HHE soil was discovered in areas of the lateral that had previously undergone remedy action. The additional volume of HHE and biota soil that will need to be removed is still being assessed. The additional volume of contaminated soil may significantly influence on-post landfill capacity. This is an opportunity to assess whether there are early indicators of remedy problems and, if so, how they can be addressed.

Response: The Sand Creek Lateral issue is discussed in Section 4.3.3.17 and in the context of other affected projects. The capacity of the ELF was assessed as part of the ROD Amendment (see Section 6.3.14) and assessed in the context of the ELF in Section 7.1.1.

Comment 83. Section 7.1.2.2, page 97, first paragraph - The statement that the Demolition and Destruction of Equipment Projects took place on "one site" is confusing. Please clarify.

Response: The "one site" language has been deleted from Section 4.4.2.4 of the Final FYRR.

Comment 84. Section 7.1.2.2, page 98, first full paragraph – a) Please change "diesel" to "fuel oil", consistent with the current understanding of the historical spill. b) As noted in the above comment on Section 6.4.1.2, there needs to be a clear discussion of both the fuel oil impacted soil and the fuel oil free product on the water table as presented in the North Plants Soil Remediation 30 Percent Design Analysis. The discovery and existence of the free product remains an issue for this site.

Response:

a. The text in Section 4.4.2.4 of the Final FYRR has been changed to "fuel oil."

b. The plan for addressing the North Plants Free Product issue had not been resolved. As noted in Table 2.0-2, the issue is currently being addressed under the North Plants Soil remediation project.

Comment 85. Section 7.1.2.2, page 98, fourth paragraph – Please explain the nature of the Category 2 anomaly. This terminology is unlikely to be familiar to the layperson reviewer.

Response: The nature of a Category 2 anomaly is defined as an unknown liquid in Section 4.4.2.4 of the Final FYRR.

Comment 86. Section 7.1.2.2, page 98, 2nd to last paragraph – Please add a sentence identifying the assessment report for the anomalous GB detection "Assessment of Anomalous Detections in VCS Perimeter DAAMS Tubes" (2003).

Response: Both a discussion and a reference to the subject report have been added to Section 4.4.2.4 of the Final FYRR.

Comment 87. Section 7.1.2.2, page 98, last paragraph – Since the proposed ESD to eliminate the two-foot cover requirement for the North Plants has not been drafted, please remove or revise the statement "no long term O&M is required at the completion of the North Plants Soil Remediation Project."

Response: The proposed ESD is noted in Section 4.4.2.4 and the language regarding no long-term maintenance has been corrected in the Final FYRR.

Comment 88. Section 7.1.2.2, page 99, 4th and 5th paragraphs – The text indicates "of the more than 800 wells identified as completed in the CFS, these 51 wells..." Please delete the word "these" in this sentence. Also note that in addition to the 51 CFS wells closed under this project, CDPHE identified an additional CFS well (36182) that required closure and this was accomplished by RVO in May 2000.

Response: The word "these" was deleted.

Comment 89. Section 7.1.2.2, page 100 – The third paragraph provides the On Post ROD language for shut down of wells within internal containment systems. The Irondale Containment System (ICS) as noted in the text above is a boundary system, therefore the first bullet paragraph on page 9-2 of the On Post ROD is the appropriate language for shut down monitoring of the ICS.

Response: The shut-down criteria are now presented in Section 4.1 of the Final FYRR, and have been removed from the revised Section 4.1.3.4..

Comment 90. Section 7.1.2.2, page 101, second paragraph – The last sentence of this paragraph refers to "CCRs". Shouldn't this be singular?

Response: The text has been corrected to use the singular term in Section 4.1.3.4 of the Final FYRR.

Comment 91. Section 7.1.2.3, Page 101, *Western Tier Parcel* – A section describing the Western Tier Parcel deletion and transfer is included under "Other Completed Projects". Shouldn't a description of the Perimeter Deletion and Transfer and Surface Deletion and Transfer be included?

Response: As noted in Section 4.5.2.1, although the Western Tier Parcel (Deletion) is not a project tracked in the RDIS, due to its importance at that time, it was included as an "Other Project" in the 2000 FYRR. To avoid confusion and to ensure items in the 2000 FYRR are closed out, a discussion was provided. In response to this comment, Section 2.1 now discusses the RMA deletions.

Comment 92. Section 7.1.2.3, Page 102, last paragraph – Please modify the third sentence to indicate that the group met "approximately monthly through September 1999". This provides a better sense of the time devoted to this effort by the Trust Fund Group.

Response: The revised discussion of the Trust Fund activities is presented in Section 4.5.2.2 of the Final FYRR.

Comment 93. Section 7.1.2.3, Page 103, third paragraph – a) third sentence: This sentence should be modified to state the meetings were held with former Deputy Assistant Secretary of the Army Ray Fatz. b) fourth sentence: Please change this sentence to state that "It was the position of the Department of Army that the second option was legally unacceptable." This was not a position adopted by the Trust Fund Group, in fact, the Group tried to convince the Army otherwise. c) It should be noted here that the Army, Shell Oil Company and Commerce City did not support seeking legislation because these entities were concerned that this action might endanger the Schroeder account.

Response:

a. The language in the Final FYRR has been modified in accordance with the EPA/CDPHE documentation of the subject.

b. Please refer to response to CDPHE Specific Comment #93 a., above.

c. Please refer to response to CDPHE Specific Comment #93 a., above.

Comment 94. Section 7.1.3, page 106, *Revegetation Program* – a) The vegetation of landfill caps and soil covers will occur on land retained by the Army. Therefore, the introductory sentence is incorrect. b) The figure of 500 acres of landfill caps and covers appears to be an underestimate. Please check. The CDPHE calculated over 800 acres.

Response:

a. The corresponding sentence in Section 6.3.12 of the Final FYRR has been corrected.

b. The estimate in the Final FYRR has been corrected to between 600 and 700 acres based upon design estimates in the fall of 2006.

Comment 95. Section 7.1.3, page 108, first full paragraph – In addition to HWL/ELF caps and RCRA-Equivalent cover areas, 3 ft-thick covers will be vegetated and subject to the same revegetation criteria.

Response: The text of Section 6.3.12 of the Final FYRR has been changed to reflect that both 2- and 3-ft-thick covers will be subject to the same revegetation criteria.

Comment 96. Section 7.1.3, page 108 – There is no section to discuss the Off Post ROD-required surface water monitoring (see above comment on Section 4.2) or the ongoing surface water monitoring program (see above comment on Section 6.4.4). CDPHE has asked the RVO at Water Team meetings about incorporation of the surface water program into the LTMP. This Five-Year Review is an opportunity to discuss this process.

Response: The Surface Water Monitoring Program results are discussed in Section 6.4.2 of the Final FYRR. The text has also been revised to reflect that the surface water monitoring program will be reviewed and evaluated during the development of the revised LTMP in 2006.

Comment 97. Section 7.1.3, Groundwater Monitoring, page 108 - This section may be the appropriate place to discuss the volatile organic compound (VOC) preservation policy adopted by the RMA lab in October 2001. In addition to helping to comply with the CDPHE VOC preservation policy, use of non-acidified VOC sample containers helped eliminate problems with anomalous detections of 1,2-dichloroethane at many ground water sampling locations (e.g. HWL).

Response: The requested discussion has been included in Section 4.1.2.3 of the Final FYYR.

Comment 98. Section 7.1.3, South Lakes, page 111 – This section should include discussion of the Lake Mary fact sheet (see above comment on Section 6.4.1.2) as it modified the monitoring program. The use of the phrase "in Lake Ladora" in

the next to last sentence on South Lakes implies surface water monitoring (see above comment on page 108). Please discuss. Also note the Monitoring Completion Report is not yet approved by the regulatory agencies.

Response: The text in Section 4.1.3.5 has been revised to include the ROD language for the South Lakes groundwater monitoring program.. The text has also been revised to clarify that the described Lake Ladora monitoring refers to groundwater monitoring. Please refer to response to CDPHE Specific Comment #36 regarding the Monitoring Completion Report.

Comment 99. Section 7.1.4, *Operation of Hazardous Waste Landfill*, pages 111 to 113 – This section discusses operations of the HWL and notes that there are approximately 47,610 cubic yards of remaining capacity. There is no discussion regarding whether the capacity is sufficient to meet projected demand. The Five-Year Review inspection report is not discussed or referenced. There is no mention of the ongoing detections of DIMP in the HWL Leak Detection System (LDS) 3 starting in 2000 and LDS 4 starting in 2001, the associated investigation, and the implications regarding early indications of potential remedy failure. Please clarify these incidents with the statement that there are no early indications of potential remedy failure

The capacity of the ELF was assessed as part of the ROD Amendment (see Section 6.3.14) and assessed in the context of the ELF in Section 7.1.1. Please see the Specific Response to Comment 82. The DIMP investigation is discussed in Section 6.3.7 and assessed in the context of HWL operation in Section 7.2.3.1.

Comment 100. Section 7.1.4, page 113 - As a means of addressing whether the HWL continues to be operating and functioning as designed, the Action Leakage Rate, the Leak Detection System, and the groundwater detection monitoring program should be discussed and the design performance of the HWL evaluated.

Response: The status of the HWL operations are now discussed in Section 4.3.2.1. A data review of HWL groundwater monitoring is presented in Section 6.4.1.8.

Comment 101. Section 7.1.4, *Operation of Basin A Consolidation and Remediation Area*, pages 114 to 116 – This section discusses operations at Basin A. Please discuss any monitoring activities that provide the basis for the statement that there are no early indications of potential remedy failure.

Response: Compliance with the Basin A Operation Manual requirements related to storm water erosion control and dust and odor control monitoring is provided in Section 4.3.2.3 as the basis for the statement that there are no early indication of potential remedy failure..

Comment 102. Section 7.1.4, *Basin F Wastepile Operations and Maintenance*, page 116 – As stated in this section "ongoing O&M of this wastepile is critical to the successful implementation of the remedy." Please discuss the actions taken and evidence collected since the last Five-Year Review to demonstrate that ongoing O&M activities have addressed the potential leak problems identified in the first Five-Year Review.

Response: Data collected over the last five years support the conclusions of the 2000 FYRR and no modifications are indicated as the Wastepile remediation has begun..

Comment 103. Section 7.1.5, *Shell/Complex Army Trenches Slurry Wall Dewatering of Army Trenches*, pages 117 to 118 – Discussions in this section are related to those in Section 7.1.2.2 on page 67 as part of the Shell/Complex Army Trenches remedy. Please consider combining or cross-referencing these two sections. Comments provided on Section 7.1.2.2, pages 67 to 69 above also apply to this section.

Response: The Shell Disposal Trenches and Complex (Army) Trenches slurry wall projects have been separated and the construction and dewatering sections of each have been cross-referenced.

Comment 104. Section 7.1.5, page 118, 3rd paragraph – The text indicates that sediment in the southwest corner well should be cleaned out to confirm the conclusion. However, this action item does not appear in Sections 8 or 9. Please clarify.

Response: This action item was completed when the well was cleaned out in July, 2005. The conclusion in Section 4.1.2.1 of the Final FYRR has been updated based on the new information.

Comment 105. Section 7.1.5, page 118, 7th paragraph – The text indicates that Operational Assessment Reports for fiscal year (fy) 2003 and fy 2004 are completed. These reports are still in RVO preparation and review and have not yet been provided to the agencies. Please revise (also see pages 119 and 120).

Response: The Operational Assessment Reports (OARs) were completed and distributed to the Regulatory Agencies in early December 2005.

Comment 106. Section 7.1.5, Basin A Neck, page 119 – The use of the acronym "HRC" after "North Boundary Enhancement" is not correct. "NBE" should be used and defined under the Acronyms section. The final two sentences about Basin A Neck are redundant and should be eliminated. Also see above comments on Section 7.1.1, page 59.

Response: The discussion has been significantly revised and is now presented in Section 4.1.2.5 of the Final FYRR. Acronym usage has been corrected.

Comment 107. Section 7.1.5, page 119, Northwest Boundary Containment System (NWBCS)– a) Please clarify the use of "potentially" in the first sentence on the NWBCS (and the North Boundary Containment System).

b) Second-to-last sentence: It isn't clear how the trend in decreasing influent (upgradient) concentrations indicates a "well functioning system, performing as intended." The influent concentrations are independent of the boundary containment systems. Please clarify. This comment also applies to the NBCS description.

Response:

a. The statement was intended to refer to the Containment System Remediation Goal (CSRG) list of analytes upgradient of the Northwest Boundary Containment System (NWBCS) and the text in Section 4.1.2.7 has been revised to reflect this.

b. The text has been revised to clarify that decreasing influent concentrations likely result from a combination of the effects of cessation of RMA production activities in the early 1980s, implementation of IRAs in the late 1980s and early 1990s, implementation of the remedy thus far, and natural attenuation. The Operational Assessment Reports for the NWBCS provide the detailed information of how capture was achieved and the goals of the system met. The text has been revised for clarification.

Comment 108. Section 7.1.5, North Boundary Containment System (NBCS), page 120 – The RVO NBCS Fact Sheet (March 2005) should be cited as reference to discussion regarding the two new extraction wells (South Channel wells) and the North Boundary Enhancement (NBE) HRC project. Also note that the fact sheet states an additional reason for the new extraction wells is to help maintain a reverse hydraulic gradient. The sentence in the final paragraph starting with "Biodegradation-enhancing compounds" should clarify that this compound was HRC and the HRC injections were completed in May 2005. Additional unconfined flow system Denver-monitoring wells have been added in the past to evaluate underflow on the western side of the NBCS. Please discuss.

Response: A reference to the North Boundary Containment System (NBCS) Fact Sheet and a clarification of the stated purpose for the South Channel wells have been added to the revised text in Section 4.1.2.8.

Specific information regarding Hydrogen Release Compound (HRC) has been added as requested.

A summary evaluation of past studies of the underflow on the western part of the NBCS has been added to the text.

Comment 109. Section 7.1.5, OGTIS, page 120 – The shutdown of 4 extraction wells in the Northern Pathway of the OGTIS should be discussed and include the monitoring program for these wells. The Northern Pathway redesign documents dating back to August 2003 should also be discussed.

Response: The requested shutdown information has been included in the revised text in Section 4.2.1.1 and references to the redesign documents have been added.

Comment 110. Section 7.1.6, page 121 – a) Since the first FYR was conducted, several access and institutional controls have been modified or eliminated including the establishment of unmanned perimeter access gates and Central Remediation Area (CRA) changes (i.e., eliminating guard access points and modification of CRA boundaries). Any modifications to the site that potentially alter the access and institutional controls should be discussed in detail and an evaluation of the potential impacts to public safety/remedy protectiveness should be presented. Furthermore, this section should not only describe and evaluate on-post institutional controls, but the use of institutional controls in off-site areas as well.

b) The Five-Year Review should recommend a process for preventing changes in institutional controls that are mandated by the Institutional Control Plan (Interim, 2003), without formal revision of the plan and review by the parties. For example, the USFWS Public Use Plan (2004) included public access provisions (i.e., unmanned gates) that was inconsistent with provisions in the approved Institutional Control Plan. The Five-Year Review is an opportunity to institute a process to better coordinate any such changes in the future.

Response:

a) The use of the unmanned perimeter access gates and elimination of the guards at access points has been noted in Section 6.3.11. In addition, the off-post institutional controls are assessed in Section 7.2.2.3.

b) The Interim Institutional Control Plan was been revised and concurred upon by CDPHE and EPA in March 2006. The RVO believes the issue presented in the comment has been addressed.

Comment 111. Section 7.1.6, page 121, last paragraph – The significant changes to the Public Use Program (2004) should be highlighted here (e.g., adding weekday programs, access points).

Response: The text related to the Public Use Program is provided in Section 6.3.11.

Comment 112. Section 7.1.6, page 122, first paragraph – a) While the RMA's access restrictions have been largely effective over the Five-Year Review period, the second sentence of this paragraph ("effectively prevented individuals...")

seems inconsistent with the incident involving the pedestrian who wandered into the Section 36 Balance of Areas Soil Remediation Project unexploded ordnance and contaminated soil exclusion areas. This person was not attired in appropriate personal protective equipment to prevent contact with contaminated soil, did not have proper training and underwent a dry decontamination process. While fortunately the pedestrian was not harmed, the CDPHE suggests a revision to this sentence.

b) In addition, the trespass incident involving the pedestrian is not discussed in terms of adequate security. Was it determined whether the trespass was deliberate or accidental? If accidental, could that indicate a weakness in access control?

Response:

a) The text in now presented in Section 6.3.11 of the FYRR.

b) The trespass appeared to be deliberate. The perimeter fence was scaled to cut the walking distance to Wal-Mart. It does not indicate a weakness in access control.

Comment 113. Section 7.1.7.1, page 122, *Cost Reductions* – The first sentence does not identify "this initiative". Also, it is not clear why the word "Another" is used in the second sentence.

Response: Consistent with EPA FYR guidance, Section 7.1.7 has been deleted. Opportunities for Optimization and Cost Reduction have been identified, as appropriate, when evaluating Question A for each of the RDIS projects.

Comment 114. Section 7.1.7.1, page 122 – The second paragraph in this section describes a major leak occurring in double-contained pipe in the First Creek area. The pipe was replaced with single-wall pipe because it was less expensive and contaminant levels were low. Were contaminant levels below cleanup criteria? If not, please clarify how a single-wall pipe will be as protective as double-contained pipe and why the double-contained pipe failed. Was the entire pipe replaced for a single leak and, if so, how was this less expensive then replacing the leaking section with new double-contained pipe?

Response: Consistent with EPA FYRR guidance, Section 7.1.7 has been deleted. Opportunities for Optimization and Cost Reduction have been identified, as appropriate, when evaluating Question A for each of the RDIS projects.

As described in Design Change Notice (DCN) 1 "Modifications to Groundwater Intercept and Treatment System, North of Rocky Mountain Arsenal," dated 4/23/03, "secondary containment was not required" per the original design document. The DCN explains how the single wall piping would be pressure tested to ensure that leaks had not developed. The DCN

also indicates that multiple leaks developed over a large area requiring long lengths of piping to be replaced. As discussed in status meetings, the existing double-containment piping system was no longer manufactured and replacement parts could not be obtained. The text has been revised to clarify that the change in piping did not adversely affect remedy protectiveness.

Comment 115. Section 7.1.7.2, page 123 - Please discuss how closing 1,325 wells and installing 71 new wells still provides adequate monitoring to ensure that the remedies remain protective and that no early indicators of potential remedy problems are occurring. Please provide specific examples within each remedy where specific opportunities for optimization are identified. For example, using HRC as an enhancement to the North Boundary Containment System should be moved to the paragraph on the South Channel wells as the NBE was separated from the shut down of the F well.

Response: Consistent with EPA guidance, Section 7.1.7 has been deleted. Opportunities for Optimization and Cost Reduction have been identified, as appropriate, when evaluating Question A for each of the RDIS projects.

Well closures were implemented in response to changing monitoring needs during remedy execution and did not result in any adverse effects on the ability to monitor the remedy effectiveness.

Optimization information has been included where applicable and the North Boundary Enhancement (NBE) text has been moved as requested.

Comment 116. Section 7.1.8, page 124 – This section states that no evidence was uncovered that would lead to a conclusion that there is a potential for failure of the remedy. This statement should be supported by discussions that consider and explain conditions that have occurred at several of the remedies. Some of these include:

- Dewatering at Complex (Army) trenches have not met all criteria;
- Monitoring wells at Shell trenches are damaged or destroyed;
- Discovery of unexpected contamination, for example sarin bomblets in the Bone Yard, the North Plants fuel oil free product and Section 36 Balance of Areas soil contamination;
- Discovery of unexpected contamination on property that has been deleted and transferred (i.e., Sand Creek Lateral)
- Larger than expected areas of contamination, for example ESA-4a;
- Large reduction in the number of wells;
- Remaining capacity of on-post landfills;

- Changes to engineering controls specified in the Interim Institutional Control Plan without prior modification of the plan (i.e., unmanned gates)
- Unsuccessful revegetation efforts at five remediation sites (see Volume II inspection report)
- Discovery of DIMP in HWL leachate; and
- Damaged and unlocked monitoring wells.

Do any of these factors singularly or in combination point to potential future problems and, if so, what are the corrective actions? For example, can damaged wells that are not repaired and cannot be used signal an early indicator of remedy problems? Without monitoring data the performance of remedies is unknown. If the monitoring system is failing, what does that say about the remedy?

Response: To be consistent with EPA guidance, Section 7.1.8 has been deleted. These early indicators of remedy failure have been identified, where appropriate, when evaluating Question A for each of the RDIS projects.

Comment 117. Section 7.2, page 124, 1st paragraph – Section 7.2 is intended to address the question: "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?" The text indicates no significant changes to the assumptions used at the time of remedy selection that would call into question the protectiveness of the remedy and that any changes that have been identified to date are minor. The EPA's Comprehensive Five-Year Review Guidance document (EPA, 2001) recommends that changes in exposure pathways, changes in land use, and new contaminants and/or contaminants sources should be evaluated as part of the Five Year Review. Some RMA-specific modifications that should be further evaluated in the FYR are listed below:

a. The text should acknowledge any land use changes during the past five years (e.g. the Western Tier Parcel deletion and transfer, the formal establishment of the refuge) and state that the On-Post Integrated Endangerment Assessment/Risk Characterization considered these land uses and receptors (e.g., biological worker, refuge visitor, commercial worker).

b. The text should describe and evaluate newly identified contamination: North Plants (fuel oil), potential contamination within Borrow area 5 (DIMP), more extensive contamination discovered at the Section 36 Balance of Areas Soil Remediation project and additional contamination along the Sand Creek Lateral.

c. The human health risk due to vapor intrusion into homes from underlying contaminated groundwater in the offpost operable unit was quantitatively

assessed during this Five-Year Review period. This exposure pathway was evaluated qualitatively in the off-post exposure assessment. The new detailed evaluation should be described even though no change to the remedy was recommended based on the results of the evaluation.

Response:

a. The text in Section 7.4.6 of the Final FYRR was revised to acknowledge that residential land development has occurred north of RMA, but these exposure scenarios were contemplated by the ROD.

b. The newly identified contamination and the absence of new exposure pathways not considered by the ROD have been highlighted in the context of project-specific discussions in the revised text.

c. A summary of the vapor intrusion evaluation has been added in Section 7.4.6 of the Final FYRR.

Comment 118. Section 7.2, page 124 – The structures and soils portion of the ROD remedy depends in part upon demolition of structures and excavation of contaminated soils. Depending on the level of contamination, the removed structures and soils are either placed in the on-post hazardous waste landfills or the Basin A consolidation area. The landfill capacity was designed on the basis of a waste volume calculated from data existing up until the ROD. Since then and during the past five years, additional contamination has been identified. Please address landfill capacity and the current estimated volume of waste in terms of whether the assumptions used to design landfill capacity are still valid. What steps are envisioned if landfill capacity is exceeded?

Response: Please see the response to comment #82.

Comment 119. Section 7.2.1.1, page 126 - The first paragraph (and paragraph 4) on page 126 contains a statement that when the term practical quantification limit (PQL) is used in the On-Post ROD Tables 9.1-1 and 9.1-3, it is interpreted to mean the State of Colorado PQL. Since many of the PQLs listed in these tables do not correspond to State of Colorado PQLs, this assumption isn't obvious. Also, the footnote associated with the ROD tables states "...practical quantification limit readily available from a certified commercial laboratory", without any mention of the State of Colorado. Please note the Colorado Water Quality Control Division PQL Guidance cited on page 125 is under revision, but it allows site specific PQLs other than the "Colorado PQL" to be used. Please clarify.

Response: The statement has been corrected to clarify that there were two different Practical Quantitation Limits (PQLs) included for the CSRGs in the On-Post ROD. In addition to the State of Colorado PQL, the "current certified reporting limit or practical quantitation limit readily available from a certified

commercial laboratory" was listed for compounds for which the RVO is working to achieve the lower CSRGs. It should be noted that a new RVO procedure will define how PQLs for groundwater are established in the future.

Comment 120. General Comments, Tables 5 through 14 –

a) The Army should adopt the Colorado Basic Standard for Groundwater (CBSG) as the Containment System Remediation Goals (CSRG) when it is more conservative than the CSRG. In accordance with the ROD, Chapter 10, Section 10.1.2.1, Chemical-Specific ARARs, the ARARs cited should include any state provision that is equivalent or more stringent than federal requirements. However, there are many CBSG for which the quantification is higher than the CBSG and, therefore, the quantification is effectively the treatment goal. Regardless, the CSRG should be revised to reflect the CBSG even if the quantification limit is the effective value that would be attained in treatment. In a few cases, the CSRG is more conservative than the CBSG because it represents a risk-based value and in those cases the CSRG should be retained.

b) It may be helpful to the reader to note that the CSRGs are generally tied to the Colorado Basic Standards for Groundwater (CBSG) while the CSRGs for the Landfill Wastewater Treatment Unit are tied to the Colorado Basic Standards and Methodologies for Surface Water.

Response:

a) The RVO is taking the suggested approach..

b) The relationship is apparent in the text and on the Tables.

Comment 121. Table 5, Updated Quantitation Limits – a) The CSBG for NDMA is 0.00069 ug/L, the RMA PQL remains 0.033 ug/L, but this may change once Lockheed Martin releases new method (the RMA Water Team is aware of this process).

b) Why is the Army proposing to raise the PQL for NDMA ten-fold to 10 ug/L at the Landfill Wastewater Treatment Unit? The ROD required that the boundary remediation goals should be based upon a certified analytical detection level readily available at a certified commercial laboratory (i.e., 33 ppt). Since the RMA is achieving this quantification limit for groundwater treatment, why should the PQL for First Creek discharge be established at 10 ug/L? The ROD boundary remediation goal (33 ppt) should be considered for the LWTS because this surface water may not pass through a boundary containment system to be further treated to meet the boundary remediation goal prior to leaving the RMA.

Response:

a) Comment noted. The RMA analytical program continues to work to lower the Method Reporting Limits (MRLs) for compounds for which the MRLs exceed the CBSGs by using commercially available methods.

b) Due to the complex contaminant matrix at the Landfill Wastewater Treatment System (LWTS) and its surface water discharge, the higher (Colorado PQL) PQL is applied to the effluent from this internal treatment system. As of March 10, 2006, this has been approved by the EPA as part of the LWTS Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Compliance Document (March 2006).

Comment 122. Table 6, NWBCS – The promulgation date for NDMA is December 30, 2001.

Response: Comment noted. The correction has been made to the Final FYRR .

Comment 123. Table 7, NBCS – The promulgation dates for Carbon Tetrachloride, 1,2-Dichloroethane, Methylene Chloride, and NDMA are all December 30, 2001.

Response: Comment noted. The correction has been made to the Final FYRR.

Comment 124. Table 8, OGTIS - The promulgation dates for Carbon Tetrachloride, 1,2-Dichloroethane, and NDMA are all December 30, 2001.

Response: Comment noted. The correction has been made to the Final FYRR.

Comment 125. Table 9, BANCS - The promulgation dates for Carbon Tetrachloride and 1,2-Dichloroethane are all December 30, 2001.

Response: Comment noted. The correction has been made to the Final FYRR.

Comment 126. CERCLA Wastewater Treatment Unit and Table 10 – a) In the introductory paragraph clarify that the change from the discharge from the sewage plant to the BANCS system resulted in an ARAR change from surface water standards to groundwater standards. b) The promulgation dates for Aldrin, Carbon Tetrachloride, Chlorobenzene, 1,2-Dichloroethane, and Methylene Chloride are all December 30, 2001. The promulgation dates for trans-1,2-Dichloroethane, 1,2-Dichloropropane, Tetrachloroethene, and Toluene all date back to at least March 2, 1999 or before.

Response:

a. The change in ARARs related to the switch from surface water to groundwater discharge has been explained in the Final FYRR.

b. Comment noted. The promulgation dates have been corrected in the Final FYRR.

Comment 127. Landfill Wastewater Treatment Unit and Table 11 – a) The text in the introductory paragraph refers to the CERCLA WWTU. Please revise.

b) The title for Table 11 indicates 30-day Average (Chronic) limits but a note should be added that these are also Human Health Based for water and fish consumption. These standards are cited in the table with the acronym "CBSSW" while the acronym table correctly identifies these as the Colorado Basic Standards and Methodologies for Surface Water (CBSMSW). Please revise citations in Table 11.

Response:

a. The text has been corrected in the Final FYRR.

b. The requested clarification is included in the Final FYRR.

Comment 128. Section 7.2.2, page 133 - This section indicates that eleven ARARs or To-Be-Considered Criteria (TBC) were deemed to affect the protectiveness of workers at RMA; mandatory changes were immediately adopted and non-mandatory changes were considered and adopted *where appropriate* (emphasis added). Tables 12 and 13 list changes for eleven chemicals. CDPHE assumes that all of these changes were adopted since they are included in this document. Please clarify this point in the text.

Response: Nonmandatory changes are analogous to relevant and appropriate requirements. They are not independently enforceable and are considered when developing project-specific Health and Safety Plans. At RMA, wherever a nonmandatory requirement is more stringent than the mandatory requirement, it has been adopted.

Comment 129. Table 12, ARAR changes for worker exposure standards, general –

a) Please clarify that new exposure limits for arsenic are for inorganic arsenic. No values have been assigned for organic arsenic.

b) Please list the OSHA PEL-STEL of 5.0 ppm for vinyl chloride.

Response:

a) The inorganic arsenic values listed in the ROD have been clarified in Table 7.4.2-1.

b) The table only list changes; the Permissible Exposure Limits (PELs) for vinyl chloride are unchanged from the original ROD values.

Comment 130. Table 13, ARAR changes for worker exposure standards for chemical agent constituents –

a) For many of the chemicals listed, the ROD adopted different categories of exposure limits (e.g., PEL, STEL, AEL). Will the exposure limits unaffected by the change continue to be effective (i.e., most of the changes are for AELs)? Please clarify in a footnote.

b) This table appears to contain a typo (i.e., SEL vs. STEL).

c) Instead of using Army's LCt_{50} =11000 mg-min/m3 for adamsite, it would be more appropriate to use EPA's new draft Acute Exposure Guideline Level (AEGL) values for adamsite (EPA, 2004). For example, AEGL 1 for 8 hr exposure period is 0.00084 mg/m3.

d) Please include CDC's STEL (15-minute) of 0.0001 mg/m3 for sarin (GB).

e) Please include CDC's ceiling limit (≤ 15 minutes) of 0.003 mg/m3 for H and HT.

f) For mustard-lewisite mixture, it would be more appropriate to use exposure limits for mustard instead of lewisite.

g) Please include CDC's STEL (15-minute) of 0.00001 mg/m3 for VX.

Response:

a) The exposure limits unaffected by change continue to be effective. This will be noted in a footnote to the table.

b) An SEL is different from and STEL.

c) The requested AEGL is draft and has not been included.

d) The requested information has been included Table 7.4.2.2 of the Final FYRR.

e) The requested information has been included Table 7.4.2.2 of the Final FYRR.

f) The table has been revised to refer the reader to the individual exposure limits for L and HD.

g) The STEL was not included.

Comment 131. Table 14, TBC changes for AIR-Chronic –

a) Please use CDPHE's inhalation Reference concentration (RfC) of 5 ug/m3 for 1,1-dichloroethylene because CDPHE did not adopt EPA's new RfC of 200 ug/m3 due to the uncertainties in the available toxicity database for 1,1-dichloroethylene.

b) Changes in trichloroethylene toxicity values are not included. In accordance with EPA Region 3 risk-based concentration table as well as CDPHE policy on trichloroethylene, the cancer and noncancer risk-based concentrations for trichloroethylene should be calculated using the EPA-NCEA new provisional toxicity values.

Response:

a. The EPA's Integrated Risk Information System (IRIS) is at the top of the hierarchy selected to develop air quality criteria. As such, the language in Table 7.4.3-1 is unchanged.

The RVO has adhered to the protocol previously agreed to by the Parties to develop air pathway health risk criteria for RMA using EPA guidelines. The order of preference in guideline use is to use the IRIS database as first preference, followed by National Center of Environmental Assessment (NCEA) second, and guidance from other sources as the last preference. For 1,1-DCE, the previous RfC of 32 ug/m3 has been replaced in the IRIS database with the 200 ug/m3 value for the chronic noncarcinogenic RfC. This new value has been adopted for RMA's air pathway risk assessment.

b. For trichloroethylene (TCE), IRIS contains no chronic health criteria. Using NCEA as the next preferred source, we find NCEA is not making a recommendation at this time for changing the TCE RfD or cancer slope factor since TCE criteria are still in the process of being revised. The EPA Region III Risk-Based Concentration (RBC) tables were updated but are considered "Provisional" and have not been adopted on a national basis. Changes to TCE criteria will not be included as an ARAR change until EPA guidance is finalized. A future focus item should be to continue to track developments concerning TCE criteria revisions, and make appropriate changes in future Air Pathway Analyses as changes are finalized.

Comment 132. Section 7.2.4, page 137 - The statement that no changes to risk-based chemical specific TBCs is unclear to the CDPHE since there are changes in several oral and inhalation toxicity values. Please clarify.

Response: Please see response to CDPHE Specific Comment #131.

Comment 133. Section 7.2.3.1, page 136 and 137 - In this section, the Army contends that the National Ambient Air Quality Standards (NAAQS) were incorrectly identified as an ARAR. Because of this assumed ARAR identification issue, Army recommends phasing out RMA NAAQS-related monitoring and states that the submittal of an Air Pollution Emissions Notice constitutes substantive compliance with the State Implementation Plan-related provisions for dust emissions in the Denver Metro airshed. In section 9.4, the Army states that the ACG will revise the program plans to phase out NAAQs monitoring.

Thus, there are two issues here: (1) The correct determination of the ARARs for air emissions, and (2) Changing the remedy to delete monitoring for priority pollutants during the remaining remediation.

NAAQS have been identified and used as an ARARs at many Superfund and Uranium Mill Tailings Remediation Act sites in Colorado. EPA guidance recognizes that the NAAQs are at least a "to be considered (TBC)". Even if NAAQs are not ARARs, the State regulations that govern the required attainment and maintenance of the NAAQs are ARARs. The CDPHE has required NAAQS monitoring to be conducted at sites where large, earth-moving activities occur. Exceptions have only occurred when the site is located in a remote area, far from human populations.

Revision of NAAQs from an ARAR to a TBC does not, in and of itself, allow air monitoring for priority pollutants to be phased out. Such a determination would have to be made by the CDPHE based upon the current and projected remediation plans and site related circumstances.

Response: The Final FYRR discusses an agreement to use TSP as a surrogate to confirm acceptable PM-10 levels in Section 7.4.3.1.

Comment 134. Section 7.2.4.2, page 139, second paragraph – This section, which includes a description of the Committee Agreement, should include a statement that for areas that are tilled, demonstration of risk reduction will be conducted. Most of this sampling has been completed and will be described in the completion document.

Response: The requested information is included in the revised text in Section 6.3.3.

Comment 135. Section 7.2.6, page 139, 1st paragraph – The following comment apply to this section:

This section includes a statement that the site's physical characteristics (including surface water and vegetation) have remained "relatively unchanged". The residential development south of the site has produced significant impacts with regard to storm water being managed on RMA and impacts to First Creek flow rates. Hasn't this resulted in new wetlands on RMA (e.g., Parkfield wetland and Upper Derby Lake) and increased First Creek flow rates (previously only intermittent flow)? Also, Section 7.1.3 states that hundreds of acres are being revegetated on RMA annually. Please consider revising this statement.

The text indicates the physical characteristics of the site have remained relatively unchanged, with exceptions discussed in Section 6.3. Section 6.3 is a single sentence section regarding "Documentation Reviewed." The appropriate section should be referenced.

The statement that populations on or near the site have not changed could use additional explanation with regard to the NPL deletions that have occurred during the FYR period and how the current exposure assessment embodies these land uses.

Response: The RVO believes that the existing and anticipated land uses for the transferred parcels and perimeter deletions are consistent with the Refuge Act and the exposure scenarios considered in the Integrated Endangerment Assessment/Risk Characterization (IEA/RC), so risks continue to be acceptable.

Comment 136. Section 7.2.6, page 140, first paragraph – a) The phrase "As noted" at the beginning of the third paragraph appears to be a typo. b) It is also significant that EPA evaluated the offpost vapor intrusion pathway for volatile and semivolatile organic compounds in 2004 and evaluated the offpost vapor intrusion pathway for DIMP in 2000.

Response:

a. Agreed, the "as noted" has been removed from the Final FYRR.

b. The vapor pathway evaluations are described in Section 7.4.6 of the Final FYRR.

Comment 137. Section 7.3, page 140, 1st paragraph – According to this section, no new information has come to light during this FYR that calls into question the protectiveness of the remedy. This section should be expanded to truly evaluate any new information obtained since the last FYR. For example, identification of additional contamination along the Sand Creek Lateral should be evaluated against earlier assumptions made at the time of the ROD. The ROD was based on the assumption that contamination in the Sand Creek Lateral was limited to the creek channel. This assumption resulted in some contaminated soil to be de-listed from the NPL earlier this year. As previously commented on, the discovery of fuel oil soil contamination and free product at North Plants is also new information. This information should be addressed in this section.

Response: As noted in the response to EPA Specific Comment #119, RVO does not agree with this interpretation of the FYRR guidance. Specifically, Section 4.3 of the guidance states:

> *(y)ou should consider any other information that comes to light that could call into question the protectiveness of the remedy.* ***It is expected that most considerations related to the protectiveness of the remedy will be addressed by Questions A and B.*** *However, in some instances, there may be other factors about the remedy or the site that you should consider during the review* (emphasis added).

In simple terms, Question C is not a place to reiterate every new issue encountered over the past five years. All of the topics listed by CDPHE have been extensively discussed and evaluated elsewhere in the FYRR.

Comment 138. Section 8.1.1, page 140 – Please discuss here, or in Section 7.1.4, the evidence that indicates leachate collected in the secondary containment system is not impacting groundwater. Is it assumed that leachate volume currently being generated is "dramatically less" than in the past due to waste dewatering alone or could there be leaks in the secondary system?

Response: Groundwater monitoring data do indicate that groundwater impacts are unlikely. For example, groundwater elevations in wells near the Basin F Wastepile have declined and remained relatively stable since the Interim Response Action (IRA) was implemented. Additionally, concentrations of wastepile leachate constituents with relatively high concentrations in the leachate, such as 4-chlorophenylmethyl sulfoxide, (CPMSO) p-chlorophenylmethyl sulfone, diisopropyl methylphosphonate and chloride have declined in groundwater in downgradient wells with few exceptions since the IRA was implemented. However, an upgradient well has not been sampled since 1999 when the monitoring program was revised under the Long-Term Monitoring Plan (LTMP). Consequently, the ability to draw definitive conclusions is limited. Therefore, the RVO has deleted the language regarding no impacts to groundwater

Comment 139. Table 15, page 142 – Per the above comment on Table 5, CDPHE does not agree with using the 10 ug/L quantitation limit for NDMA at the Landfill Wastewater Treatment Unit. The ROD boundary remediation goal (33 ppt) should be considered for the LWTU because this surface water may not pass through a boundary containment system to be further treated to meet the boundary remediation goal prior to leaving the RMA.

Response: As of March 10, 2006, the PQL 10 of ug/l for NDMA has been approved by the EPA. Please refer to the LWTS CERCLA Compliance Document (RVO 2006).

Comment 140. Section 9.3, page 143 – This section states that four monitoring wells will be either repaired and locked or properly abandoned. Please indicate a schedule for this effort and, if wells are abandoned, a schedule and plans for their replacement.

Response: The two wells that were not part of the monitoring well network were closed by the RVO. The two wells that were part of the monitoring well network were repaired. These activities were completed in September 2005. Locks were added to the wells in the spring of 2006.

Comment 141. Section 9.4, page 143 – Please see previous CDPHE comment regarding NAAQS and revise the last sentence.

Response: The text has been revised consistent with the response to Specific Comment 133.

SPECIFIC COMMENTS - VOLUME II, INSPECTION AND INTERVIEW CHECKLISTS

Comment 142. Revegetation Inspection – a) This section provides a very good evaluation of revegetation success. It would benefit from a brief description of the type of sites evaluated (i.e., disturbed sites due to ROD-required remediation activities with no engineered soil cover requirement) and the inspection methodology. b) This section contains a recommendation for follow-up action (five sites should receive additional seeding treatments). This recommendation needs to be addressed in Volume I.

Response: The issues are being addressed in the context of the Vegetation Management Plan discussed in Section 6.3.12..

Comment 143. Interim Institutional Control Plan Inspection – The EPA recommendation concerning actions to prevent worker or public access to the Sand Creek Lateral should be addressed in Volume I. .

Response: The same protocol will be used for the Sand Creek Lateral Project as with all other RMA remedy projects to limit access to the work site during active remediation (i.e., establishing exclusion zones, signs, hazard tape, etc.). In addition, the U.S. Fish and Wildlife Service will relocate some of the weekday visitor service activity during portions of the project. Although these actions will be taken, this information does not need to be included in the FYRR.

Comment 144. Off-Post Private Wells Inspection – Barb Nabors, CDPHE, is listed as an attendee. Please remove her name because she did not participate in this inspection.

Response: The EPA document is not in the control of the RVO.

REFERENCE

United States Environmental Protection Agency, 2001, *Comprehensive Five-Year Review Guidance*, EPA 540-R-01-007, Washington, D.C., June 2001

Remediation Venture Office's (RVO) Responses to
Colorado Department of Public Health and Environment's (CDPHE)
December 5, 2006 Technical Comments on the
Final Five-Year Review Report (FYRR)

GENERAL COMMENTS

Comment 1. Overall, the revised Five-Year Review is a greatly improved document over the previous version. CDPHE's comments are largely editorial in nature. One specific issue that was noted in a few places in the document is that some of the items discussed transpired after the Five-Year Review cutoff date of 2005, and to avoid confusion, those need to be left for the next Five Year Review.

Response: In cases where a document issued after the cut-off date addresses a concern raised or change that occurred during the review period, the reference is included in the document. The cut-off dates for data and ARARs remain the same.

SPECIFIC COMMENTS

Comment 1. Section 4.1.1.1, Bedrock Ridge, page 8 – This section should include the date of the 100% design and the timeframe of the first three extraction wells installation and the design required assessment period. Delays to the project (such as the bomblets discovery nearby) need to be included.

Response: The text has been revised as requested.

Comment 2. Section 4.1.2.1, Shell Trenches, page 10, paragraph three and Figure 4.1.2.1-2 – The text discusses well 36087, but it is not shown on Figure 4.1.2.1-2.

Response: The Figure has been revised as requested. Well 36087 was also added to Figure 4.1.2.1-1.

Comment 3. Section 4.1.2.2, Complex Army Trenches, page 10 – There needs to be text on the installation of the dewatering system before starting the discussion about dewatering goals on page 11.

Response: The text has been revised as requested.

Comment 4. Section 4.1.2.2, Complex Army Trenches, page 12 – The "treatment capacity limitations" should be clarified with respect to reduced flows in 2001. The BANCS Tech Memo should also be cited here with regard to "supplemental recharge trenches" (see page 15).

Response: The text has been revised in response to CDPHE's request. Also, as agreed in meeting with the regulatory agencies on 01/23/07, additional documentation on the Complex Army Trenches has been provided as a separate Appendix (the new Appendix B).

Comment 5. Section 4.1.2.3, Groundwater Monitoring, page 13 – a) Bullet three says conformance well data is collected annually and trends will be reported in the Five Year Review. These are also discussed in the Annual OARs. b) The final paragraph discusses changes to VOC sample preservation. CDPHE raised this issue as a result of the CDPHE Groundwater VOC Sample Preservation Policy (CDPHE, 1998) and the RMA lab agreed (13 October 2000 letter to Elijah G. Jones from Steven L. Baca). One of the benefits was subsequent discovery and elimination of the cross contamination of 12DCLE. This process also simplified sample collection in many cases with likely cost savings. Please clarify.

Response: This bullet reflects the reporting requirements as outlined in the 1999 LTMP. Sample preservation is discussed in Section 6.4.1.2 of the revised document.

Comment 6. Section 4.1.2.5, BANCS, page 16 – The NDMA discussion should cite the PQL for comparison to NDMA detections.

Response: No PQL for NDMA has been established for BANCS as it is not a CSRG list analyte for the system, but the PQL for NWBCS, NBCS, and OGITS has been added to the discussion.

Comment 7. Section 4.1.2.6, F Well, page 16 and Section 7.2.3.10, page 164 – The final paragraph in Section 4.1.2.6 states the F Well CCR approval is forecast for early 2007. The CCR was issued and approved in September 2005. While the September 2005 date is beyond the timelines of this Five Year Review, Section 1.0, page 1, paragraph four notes "information was updated beyond the deadlines… to make the FYRR more understandable." CDPHE believes this topic meets this criterion.

Response: The requested CCR reference has been included in Section 4.1.2.6.

Comment 8. Section 4.1.2.8, NBCS, page 18, 19, and 20 – The final paragraph on page 18 could easily be merged into the discussion at the top of page 19 (or deleted). Please clarify that the two new extraction wells are the "South Channel Wells" as stated on page 20. On page 20, clarify the well numbers for the South Channel Wells for comparison to well 24316.

Response: The requested well numbers have been added. The performance discussion has been revised and moved to Section 7.

Comment 9. Section 4.1.3.2, Complex Army Trenches, page 23 – As requested in our August 2005 comments (#68), clarify the reason (and appropriate RVO documentation – 1997 Fact Sheet) to not construct a fully enclosed wall around the Complex Army Trenches.

Response: Please refer to the Fact Sheet for the required information. This information predates the FYRR and is not required for making the protectiveness determinations.

Comment 10. Section 4.1.3.3, CFS Well Closures, page 23-24 - As requested in our August 2005 comments (#88), also note that in addition to the 51 CFS wells closed under this project, CDPHE identified an additional CFS well (36182) that required closure and this was accomplished by RVO in May 2000. This CFS well was highly contaminated (e.g. Figure 45, Ground-Water Monitoring Program Evaluation Report for Water Year 1994 dated April 1997) and its closure enhanced the protectiveness of the remedy required by this project.

Response: The requested well information has been added.

Comment 11. Section 4.2.1.1, OGITS, page 27 - The last sentence in paragraph three says that Amber Homes submitted a proposal in August 2004. This first proposal was "Proposed Modifications to the Northern Pathway Portion of the Offpost Groundwater Treatment and Intercept System" by Amber Homes and is dated August 2003. The May 2004 date in this paragraph should also be clarified.

Response: The text has been revised for clarification.

Comment 12. Section 4.3.1.4, page 39, 1st paragraph – This section discusses remedial components of the South Plants Balance of Areas and Central Remediation Process Soil Remediation Phase 1 and 2. In a recent meeting to discuss the South Plants Phase 2 Construction Completion Report (CCR), the Remediation Venture Office (RVO) informed the Regulatory Agencies that the placement of Priority 1 and Priority 2 soils from Borrow Area 11 scope of work was to be removed from the South Plants CCR and documented under the Section 36 Complex Army Disposal Trenches scope of work. If this is still the intent of the RVO, please consider removing this task from the South Plants discussion.

Response: As requested, the text was removed from the South Plants Balance of Areas and Central Remediation Process Soil Remediation Phase 1 and 2 discussion. The information will be evaluated in the FYRR in the context of the Complex Army Disposal Trenches Subgrade Construction CCR (#38).

Comment 13. Section 4.3.1.6, page 46, 1st full paragraph, last sentence – This sentence states that the Drying Facility will be demolished following completion of the Basin F Wastepile project. With the addition of the 2005 Amendment to the Record of Decision, Section 36 Lime Basins Remediation, Basin F Principal Threat Soil Remediation, the Drying Facility will be retained until completion of the Former Basin F Principal Threat Project. Please revise.

Response: The text was modified as requested.

Comment 14. Section 4.2.1.3, Off-Post Institutional Controls #98, page 30 – It might be better to modify "no new contaminated drinking water wells were installed" to something like "no new drinking water wells were installed in a plume" or "no newly installed drinking water wells showed contamination in water samples from the well" or something more precise than a "new contaminated drinking water well." Also, the reference should be to Section 6.4.1.6 not 6.4.1.5.

Response: The text has been revised.

Comment 15. Section 6.2, page 116, last paragraph – Please include the month and date the document was/will be made available for public comment, as required.

Response: This information will be provided when the final document is published.

Comment 16. Section 6.3.14, ROD Amendment, page 132 – In conjunction with the ROD Amendment (October 2005), the March 2005 Council (?) Resolution Agreement for Groundwater Extraction/ Contaminant Mass Removal Systems should be introduced (and will require follow up in the next 5 Year Review). Discussions for this project began at least as early as August 31, 2004 (RVO agenda, Lime Basins Groundwater Treatment System, Meeting #1) and since the finalization of the ROD Amendment post dates this 5 Year Review timeline, the resolution should be included as well. Note that the March 2006 ESD on Groundwater Remediation and Revegetation Requirements (Table 2.0-1) also addressed this project. Section 1.0, page 1, paragraph four notes "information was updated beyond the deadlines… to make the FYRR more understandable." CDPHE believes this topic meets this criterion.

Response: The Council Resolution Agreement was one step towards the ROD Amendment and does not warrant a separate discussion. The inclusion of post-dated information is appropriate for projects underway during the FYR period. For the groundwater contaminant reduction the ESD, design and construction all occurred after the close of the FYR period.

Comment 17. Section 6.4.1.2, Water Quality Tracking, page 137 – The three CFS wells (23161, 23200, and 24171) are not shown on Figure 6.4.1.2-1 that is used for this section. These wells (and any wells in this section's discussion not on a figure) should be displayed on a figure for clarity.

Response: The wells have been added to Figure 6.4.1.2-1 as requested.

Comment 18. Section 6.4.1.3, Confined Flow System, page 140 – In the third paragraph, the last sentence provides a list of wells. The last well should be 36183. In the fourth paragraph, add "Table" before "6.4.1.3-1".

Response: The text has been corrected as requested.

Comment 19. Section 6.4.1.3, Confined Flow System, page 142 – In several paragraphs, the text correctly notes that the CFS network will be one issue evaluated in the LTMP revision. The conclusion at the end of the section that no CFS monitoring changes are proposed at this time should include the same qualifier that is included in the earlier paragraph that "however, the CFS network will be re-evaluated during the LTMP revision." .

Response: The statement regarding "no CFS monitoring changes" has been removed. The CFS network will be evaluated as part of the LTMP revision.

Comment 20. Section 6.4.1.5, Off-Post Exceedance Monitoring, page 145 – Another reason for reviewing and revising the LTMP that should be included is due to damaged wells or wells lost to development.

Response: Comment noted. Justification for revising the exceedance network is provided in the revised text.

Comment 21. Section 6.4.2, Surface Water, page 146 – The RVO Draft Final Letter Technical Report, Offpost Surface-Water Data Evaluation dated January 2003 was prepared in support of this topic for the 2000 Five Year Review. Due to the date of publication by RVO, it should be discussed here and why it was never issued as final.

Response: As indicated by CDPHE, the 2003 Surface Water report presented information for the previous FYR period that was presented in the 2000 FYRR. Since the conclusions were consistent with those presented and approved in the 2000 FYRR, the RVO decided that further revisions were not necessary. The report is not referenced because it applies to the first FYR period.

Comment 22. Section 6.4.2.2, Offpost-Post Areas, page 149 - There needs to be some discussion on the mechanism of groundwater recharge to First Creek ("gaining stream"); this is when DIMP (and other contaminants) may be detected in First Creek. There is also an incomplete sentence "The Area is."

Response: The requested revision has been made.

Comment 23. Section 6.4.4, page 151, 2nd paragraph – Please revise the reference to the Site Wide Air Quality Monitoring Program Plan (SWAQMP) as the 2006 revision was approved after this five year review period.

Response: The 2006 revision was finalized during the evaluation and will remain unchanged.

Comment 24. Section 7.2.1.6, North Boundary Containment System #62, page 160 – It might be better to modify the conclusion that the "contaminant plumes migrating toward the NBCS met the containment objective of the On-Post ROD" to something more precise such as the "NBCS met the On-Post ROD objective of containment of the contaminant plumes migrating toward the north boundary."

Response: The text has been revised.

Comment 25. Five-Year Review Summary Form, Basin F Wastepile, page 1 of 5 and Section 7.2.2.12, page 165 – The RVO, in response to EPA comment 36 b on Section 5.2.1, Basin F Wastepile, states "The RVO has deleted the language regarding no impacts to groundwater." However, the above noted sections contain the statement "do not appear to be impacting groundwater" with regard to leachate from the Basin F Wastepile. The 2005 Five Year review should be consistent on this topic.

Response: The requested revision has been made.

Comment 26. Section 7.3.22, page 173 – This section should include a discussion, similar to the one found in section 7.3.15 of the Sand Creek Lateral soil contamination.

Response: NCSA-5c is not within the Miscellaneous Northern Tier Soil Remediation Project scope. There is no reason to mention the Sand Creek Lateral efforts in this project discussion.

Comment 27. Section 8.0, Issues, page 185 – It is more appropriate in the last line to reference regulatory agencies instead of support agencies.

Response: The requested revision has been made.

Comment 28. Five-Year Review Summary Form, Northern Pathway Systems Modification, page 2 of 5; Section 4.2.1.1, page 27; and Section 8.9, page 188 – The sentences containing "the modified system will expedite cleanup of alluvial groundwater under the Amber Homes property" should be changed to "expedite cleanup of alluvial groundwater between the old extraction system and new extraction system (installed by Amber Homes) and expedite shut down of remaining original (old) extraction wells."

Response: Based upon comments received from other regulatory agencies the topic will not be elaborated.

Comment 29. Five-Year Review Summary Form, Shell Disposal Trenches Dewatering Goals, page 2 of 5 and page 4 of 5; Section 8.6, page 187; and Section 9.5, page 190 – These sections appear to mistakenly refer to the Shell Disposal Trenches; they should be referring to the Complex Army Trenches dewatering system and goals. Please revise.

Response: The comment is incorrect. The text is referring to the Shell Disposal Trenches.

Comment 30. Five-Year Review Summary Form, North Plants Fuel Release, page 4 of 5; Section 6.4.1.2, page 139; and Section 9.8, page 191 – These sections state that the free product will be addressed under the North Plants Soil Remediation project. During project meetings in September 2005 there was discussion and an RVO request to regulators to decouple the free product issue from the Soil Remediation Project. This issue is now to be addressed by the RMA Water Team upon completion of the Five Year Review. While the September 2005 date is beyond the timelines of this Five Year Review, Section 1.0, page 1, paragraph four notes "information was updated beyond the deadlines… to make the FYRR more understandable." CDPHE believes this topic meets this criterion.

Response: This topic is best addressed in the annual RDIS update. For that reason the discussion of project assignment has been removed.

Comment 31. Section 9.9, Recommendations, Changes in Monitoring Networks, page 191 – This section states that the Army plans to issue a revised LTMP in 2007. The following recommendations need to be included and clarified with regard to revising the LTMP. a) Page 150 states that surface water monitoring will be included in the

revised LTMP. It is important to include this in the recommendations section. For example, the December 2004 DIMP detection in First Creek at Highway 2 (30 ug/L) is past the cutoff date for the 2005 Five Year Review; this data is collected in accordance with the Off Post ROD-required surface water monitoring and needs continued evaluation with regard to the statement about "positive effect on First Creek water quality" in Section 6.4.2.3 on page 149. b) The entire onpost and offpost groundwater-monitoring network will be reviewed and likely revised as part of the 2007 LTMP and this should be clarified here. Additionally, the USGS Long-Term Monitoring Program for Water Year 2004 dated May 2005 (but the data precedes the September 30, 2004 Five Year Review data cut off) and other USGS reports for previous water years during the current Five Year Review period state, "Data in this presentation precedes interpretive evaluation reports for the LTMP program..." However, no LTMP interpretive evaluation reports were produced during the past 5 years as a result. This needs to be recommended for follow up action.

Response: Surface water has been added to the LTMP recommendations in Section 9.1.1.

Comment 32. Five-Year Summary Form, Off-Post OU, page 5 of 5 and Section 10.2, page 193 – The next to last sentence states "Administrative controls... have been effective in their implementation." This sentence should be qualified in light of problems with the well notification program noted elsewhere in this document and in the 2000 Five Year Review.

Response: As noted in Section 8.13 "The inconsistency in notification has not resulted in the use of contaminated drinking water wells in the notification area" As such, the administrative control has been effectively implemented..

Comment 33. Table 2.0-1 – The table text for March 2006 ESD on Groundwater Remediation and Revegetation Requirements should clarify what groundwater remediation projects (i.e. the South Lakes, the Groundwater Mass Removal Project at the South Tank Farm and Lime Basins – see comment on Section 6.3.14) were included.

Response: That level of detail is inappropriate to a table of this type and inconsistent with overall lever of detail.

Comment 34. Appendix A, page A-1 – This appendix should include the responses to public comments received prior to initiating the Five-Year Review process. Furthermore, this appendix should be expanded to include public comments on the Final 2005 Five Year Review Document, once available.

Response: Agreed.

Remediation Venture Office's (RVO) Responses to U.S. Environmental Protection Agency's (EPA) September 26, 2005 Technical Comments on the Draft Final Five-Year Review Report (FYRR)

GENERAL COMMENTS

Comment 1. During the first meeting of the Five-Year Review (FYR) Team on February 23, 2005, the U.S. Environmental Protection Agency (EPA) notified the other Parties that the EPA *Comprehensive Five-Year Review Guidance* (*Guidance*) had been finalized in 2001 and noted the changes in format from the 2000 FYRR that would need to be made (RVO 2005a). All Parties agreed that the 2005 FYR Report (FYRR) would follow the exact format of the current *Guidance*. However, the draft 2005 FYRR differs from the *Guidance* in several areas, and the process outlined in the *Guidance* for conducting an FYR was not consistently followed (e.g., conducting a technical assessment of the remedy and identification of "Issues" as outlined in the *Guidance*, Appendix E) (EPA 2001). In addition to deviating from the FYR process outlined in the *Guidance*, the draft 2005 FYRR for the Rocky Mountain Arsenal (RMA) is not formatted consistently with the *Guidance* and many of the subsections do not accurately reflect the intended content as presented in Exhibit 3-3 of the *Guidance*. For example, the two subsections in Section 8.0 of the FYRR, entitled "8.1 Deficiencies" and "8.2 Conclusions Related to Optimization of the Remedy", are not equivalent to the intended content in the *Guidance*. As shown in Exhibit 3-3 of the *Guidance*, Section 8.0 is intended to be a summary of Issues identified during the technical assessment, a determination of whether each identified Issue affects current or future protectiveness, and a discussion of unresolved concerns or items raised by support agencies and the community (EPA 2001). The FYR process and report format should be revised to follow the *Guidance* as required by CERCLA.

Response: The requested change to the format in the current Guidance has been made in the Final FYRR.

Comment 2. The FYRR does not include several required elements of an FYR, as specified in the *Guidance* at the locations indicated below. The FYRR should be revised to address each of the following elements of the remedy:

- Summary of community interview Issues (page 3-7)
- Summary of site inspections (page E-26)
- Summary of technical assessment (pages 3-7 and 4-10)
- Issues identification (pages 3-10 and 4-10 through 4-14)
- A discussion of concerns or items raised by support agencies and the community (page 3-7)

Response: Community involvement and public notification is discussed in Section 6.2 and Appendix A. A summary of site inspections in not required by the guidance at page E-26. Page E-26 is a checklist "that may assist you in developing text...." A summary of the technical assessment is provided in Section 7.6. Issues have been identified in Section 8.0 As noted in response to the first bullet, community involvement and public notification is discussed in Section 6.2 and Appendix A

Comment 3. The FYRR does not include a complete list of project completion documentation. Table 3, RMA Remedial Projects, appears to be an attempt to provide information on this documentation, but the information in Table 3 is often inaccurate. A thorough list of accurate project completion documentation should be provided.

Response: Consistent with EPA specific comments, Table 2.0-2 has been revised to include complete, accurate project completion documentation.

Comment 4. The document does not include figures to support discussions on the status of each remediation project in Sections 4.0 and 7.0 of the draft FYRR. Figures showing the location of the remediation work, Study Area Report (SAR) site numbers, sample locations, etc. would greatly aid in understanding the scope of the remediation work completed during the past five years, and should be added to the report.

Response: Figures 4.0-1 through 4.0-5 have been added to show the status and location of the remedy work. SAR Sites and sample locations are a level of detail unnecessary to understanding the basis for the protectiveness determinations.

Comment 5. Sections 4.0 and 7.0 of the FYRR are very difficult to understand as currently organized. The remedy identified in the On-Post or Off-Post Record of Decision (ROD), and the current status of the remedy, are often difficult to differentiate. The change of verb tense from future to past tense is particularly confusing. As a result, the exact ROD requirements are difficult to differentiate from the current status of the remedial design/remedial action in completing those ROD requirements. In addition, Section 7.0, which should consist of the technical assessment of the remedy, repeats much of the information from Section 4.0, and consists primarily of the remedial action status, rather than providing an assessment of the protectiveness of the remedy. Furthermore, Section 4.0 contains no information on the originally estimated annual Operation and Maintenance (O&M) costs and actual costs over the review period.

Section 4.0 of the FYRR should be restructured to follow the *Guidance* and "...include discussions of the remedy selection, remedy implementation, remedy performance, and system operations/O&M" as outlined in Exhibit 3-3 (EPA 2001). Section 4.0 should be restructured to:

- Simply restate the exact ROD requirement, as a quote.
- Describe approved changes to the remedy and identify appropriate documentation (e.g., ROD Amendments, Explanations of Significant Difference (ESDs), Fact Sheets, Design Documents).
- Describe the status of the remedial action to date.
- Describe implementation of the remedy and systems operations/O&M.

Section 7.0 of the FYRR should also be restructured to follow the *Guidance* and "discuss how each of the three questions asked in the technical assessment were answered", and explain the conclusions of the review, based on the information in the previous sections. Specifically, each project should have a discussion for each subheading under each question on pages 4-1 through 4-9 and E-26 through E-29 of the *Guidance*.

Section 7.0 currently includes a summary of the ROD remedy and the remedial action. Per the *Guidance (EPA 2001, pages 3-6 and 3-7)*, this information should be in Section 4.0, so that Section 7.0 consists of the technical assessment of the remedy. Specific comments on Section 7.0 provided below should be incorporated, and then the summary of the ROD remedy and the remedial action should be moved to Section 4.0.

Response: Section 4.0 and Section 7.0 have been reorganized to address this comment..

Comment 6. The FYRR includes a significant amount of information regarding the progress of the remedy at RMA over the past five years. As a result, it is often difficult to find some basic information. For this reason, EPA recommends including a summary table of key information such as the following:

a. Significant and fundamental ROD changes (ESDs, ROD Amendments) that have been issued during the FYR period. This table should include the document title, date of issue, date of signature, and author. In addition, all ESD dates in the FYRR should be checked and revised, as necessary, to correspond to the dates when the ESDs were signed.

b. A summary of innovative technologies applied through the EPA Superfund Innovative Technology Evaluation (SITE) program. This table should include a description of the technology, dates of implementation, name of the related implementation project, and reference documents.

c. Operating facilities that are a component of the overall remedy at RMA. This table should include the name of the facility, location, description of function, and dates of operation.

d. Construction completion reports (CCRs), including the name of the implementation project, date of construction completion, and reference information.

e. Site-wide programs, including the purpose, scope, status, and responsible entity conducting each program.

f. A summary of monitoring that is conducted at RMA, such as biomonitoring, air monitoring, groundwater monitoring, surface water monitoring, etc

Response: The suggested information is a combination of topics that would be difficult to effectively present in a table without proper context. For that reason, the topics have been addressed in the body of the report..

Comment 7. The FYRR includes many general statements such as "all controls are in place to adequately minimize risk" and "contaminant migration is being adequately controlled." However, the report does not include information, data, data analysis, or references to documents that support these statements. Without supporting documents, data, or references to this information, it is not possible to validate the conclusions. The FYRR should be revised to either provide data and information that support these statements in appendices or attachments, or to provide references to data and supporting information for evaluation.

Response: Additional information, data, data analysis and references have been added to the report..

Comment 8. The FYRR does not directly address Question A in the *Guidance*, "Is the remedy functioning as intended by the decision documents?" (EPA 2001, page 4-2). Specifically, each of the projects in Section 7.1.2 indicates that "remedial actions completed under this project have been completed, have achieved the intent of the ROD to be protective of human health and the environment and, having been inspected by RMA officials and Regulatory Agencies, are fully functional." However, determination of whether the remedy was protective of human health and the environment is to be based on review of answers to Questions A, B, and C in the *Guidance*. In addition, Section 7.1.8 discusses early indicators of potential remedy failure. However, neither of these sections addresses whether the remedy is functioning as intended. One of the purposes of a FYR is to assess the remedy, identify Issues, and determine if modifications are needed, to attempt to avoid a remedy failure or risk to human health and the environment. The *Guidance* states, "The purpose of a five-year review is to evaluate the implementation and performance of a remedy ..." (EPA 2001, page 1-1). The FYRR should be revised to specifically address Question A and aid in identifying modifications or remedy changes that may be necessary to avoid remedy failure or risk to human health and the environment.

Response: The FYRR has been revised to be more consistent with current guidance.

Comment 9. EPA requires identification of Issues, as outlined in the EPA *Guidance*. An "Issues" section should be prepared to replace the current Section 8.0, entitled "Conclusions." The *Guidance* requires that this "Issues" section include "a determination of whether issues affect current or future protectiveness", and a discussion of unresolved concerns or items raised by support agencies and the community ..." (EPA 2001, Exhibit 3-3). Based on EPA's review of the FYRR, EPA has identified the following key Issues regarding the remedy that are not reflected in the FYRR. These, and other Issues identified by a complete technical evaluation of the remedy, and any Issues identified within the specific comments, must be addressed in the FYRR:

a. **Groundwater Monitoring Program:** The FYRR lacks data presentation and evaluation to validate that the groundwater-monitoring program is being conducted in a manner that is protective of human health and the environment.

b. **Off-Post and Boundary Groundwater Treatment Systems:** The FYRR lacks data presentation and evaluation to validate that the boundary and off-post groundwater treatment systems are operating in a manner that is protective of human health and the environment. The FYRR references annual Operational Assessment Reports (OARs) as supporting documentation that the treatment systems are operating as designed and in compliance with the ROD. However, only a portion of the OARs have been produced for the previous five years, while data extracted from the RMA Environmental Database (RMAED) indicate that both the North Boundary Containment System (NBCS) and the Off-Post Groundwater Intercept and Treatment System (OGITS) are not achieving the containment requirements of the ROD. Examples of containment system remediation goal (CSRG) exceedances are provided in the Specific Comments.

c. **Extraction Wells Shutdown Criteria:** The Remediation Venture Office (RVO) stated in a Water Team Meeting held on July 21, 2005 that the five-year shutdown monitoring requirement applies only when the entire system is shut down, and does not apply to individual extraction wells shutdown before that time. As a result, the five-year shutdown monitoring required by the RODs is not performed to validate the removal of individual wells from the extraction system.

d. **Treatment Effectiveness:** Several of the groundwater treatment systems at RMA cannot treat all of the applicable contaminants of concern (COCs) identified in the ROD. Examples of this are arsenic and fluoride at the OGITS and NBCS where there have been exceedances of the CSRGs for arsenic and fluoride in treatment plant effluent.

e. **CSRGs and Practical Quantitation Limits (PQLs):** The FYRR lacks data and/or evaluation to support that lower quantitation limits are not

available for those compounds for which the PQLs exceed the CSRGs at the RMA boundary and Off-Post treatment systems, the internal treatment systems, and the Landfill Wastewater Treatment Unit (LWTU) facility. Use of PQLs that are greater than the CSRGs, particularly when lower PQLs are achievable; reduces the likelihood that the treatment facilities will be protective of human health and the environment. In addition, because they are used as de facto remediation goals, these high PQLs adversely affect accurate delineation of the extent of boundary and off-post plumes, as well as decisions regarding when extraction wells and treatment plants may be shutdown.

f. **Bomblets Discovery**. The FYRR lacks discussion regarding the discovery of M139 bomblets containing the nerve agent Sarin (GB) in the context of visitor access and/or presence on site. Therefore, EPA cannot validate that the safety of visitors was assured during characterization and evaluation of the bomblets.

Response: In response to the first part of comment 9, Section 8 has been re-titled "Issues." The RVO does not agree that all of the items identified in Comment 9 are key issues that require identification in Section 8. The appropriate topics are now included in Section 8.

a. The Final FYRR includes evaluation summaries with references to supporting data, and a water level comparison map for the FYR period. However, the inclusion of actual data and summaries of data in the FYRR is limited to only what is appropriate and necessary for supporting the interpretations made in the report in the limited instances when such information is not provided in the Operational Assessment Reports (OARs) and other documents. OARs have been reviewed as part of the FYR process and are now referenced in the FYRR.

b. The remaining OARs (through FY2004) for North Boundary Containment System (NBCS) and Off-Post Groundwater Intercept and Treatment System (OGITS) were issued in early December 2005 and have been referenced in the final version of the FYRR. The RVO conclusion that the groundwater systems are performing as intended in the Records of Decision (RODs) was not affected by the delayed completion date. Had the RVO found the systems to not be performing adequately, EPA would have been notified in the monthly Water Team Status Meetings held throughout the five-year review period. RVO disagrees with the EPA conclusion about the NBCS and OGITS not meeting ROD requirements. The specific exceedance issues raised by EPA are addressed in responses to the specific comments provided below.

c. The RVO and EPA have interpreted the application of the ROD five-year shutoff monitoring differently. In an effort to develop a consensus for future shutoff monitoring, the RVO is in the process of developing two new shutoff monitoring procedures that will provide detailed guidelines

for operational shutoff monitoring, establish the starting point and develop the approach for ROD shutoff monitoring.

d. While it is true that the OGITS and NBCS were not designed to treat inorganic compounds such as arsenic and fluoride, they have been operated such that the ROD requirement for meeting Containment System Remediation Goals (CSRGs) for these constituents in the treatment plant effluents have generally been met, with exceptions traceable to analytical method difficulties. Arsenic and fluoride are discussed in the 2003 and 2004 OARs, which were provided to all of the Regulatory Agencies in December 2005. Further details of these analytical problems are provided in the responses to specific comments.

e. The FYRR has been revised to include a discussion of the current Method Reporting Limits (MRLs) and Practical Quantitation Limits (PQLs), how these are established in accordance with the Rocky Mountain Arsenal (RMA) procedures and certification programs, and a description of the processes that will be followed to lower MRLs and establish PQLs in the future.

f. At no time during the discovery, characterization, evaluation and destruction of the sarin bomblets on RMA in 2000 and 2001 were workers or visitors exposed to unsafe conditions. There is no evidence to suggest that any visitor to RMA has been subjected to unusual or unacceptable risk at any time. This topic is addressed in the project-specific context in Section 4.4.2.3, in the context of the resulting Summary Team Evaluation in Section 6.3.1 and in the context of the specific report written to document the bomblet destruction in Section 6.3.13..

Comment 10. Several Human Health Exceedance (HHE) excavation sites were not backfilled despite the ROD requirement to backfill (DOI 2002). The FYRR should summarize the backfill change to the ROD and provide citations to references that document the change, and include an assessment that demonstrates that the remedy is still protective.

Response: The information on changes to backfilling at Human Health Exceedance (HHE) excavation sites has been included in both the context of the affected projects and in a summary of the characterization effort in Section 6.3.8.

Comment 11. In 2002, the Biological Advisory Subcommittee (BAS) sampled un-backfilled HHE excavation areas to determine risk to the small bird, and identified one site (SAR Site NCSA-8b) that exceeded biota criteria. As a result, in 2004, approximately 1,500 bank cubic yards (bcy) of soil that was believed to be Biota soil were disposed in Basin A from SAR Site NCSA-8b. However, upon further review, the concentrations of organochlorine pesticides (OCPs) in the BAS samples were determined to exceed acute HHE levels as well as biota criteria, and approximately 4,000 bcy of soil previously disposed in

Basin A were excavated and placed in the Hazardous Waste Landfill (HWL). Two Issues are evident from this series of events. First, eliminating the ROD requirement for backfill through the design process also eliminated creation of a "break" in the exposure pathway to the small bird. Second, analytical data obtained from soil sampling conducted by the BAS were only being evaluated for biota risks, and were not being evaluated for human health risk. EPA understands that a procedural change was made within the RVO to assure that all soil sample data is reviewed for both HHE and biota risk. The FYRR should provide a chronology of the project events, describe both the short-term and long-term corrective actions that were initiated, and assess whether this component of the remedy is protective.

Response: See the response to Comment 10, immediately above. This topic is assessed in the context of the affected projects in Section 7.0.

Comment 12. Earlier in the FYR process, EPA requested that the FYRR include a summary of projects that have proposed remedial design changes that modify the exact ROD requirement for covers, but that have not yet been documented in a formal decision document such as a Fact Sheet, ESD, or ROD Amendment. However, the FYRR does not include this information. The *Guidance* indicates that Section 9.0 of the FYRR should consist of "Recommendations and Follow-Up Actions" (EPA 2001, Exhibit 3-3 and page E-30). Therefore, Section 9.0 should be revised to identify the need for the preparation of formal decision documents such as Fact Sheets, ESDs, or ROD Amendments, as appropriate, for proposed remedy changes. Some proposed changes that should be addressed in Section 9.0 of the FYRR include:

a. Basin A Consolidation and Remediation Project: 18-inch thick biota barrier consisting of crushed concrete or rock instead of a "6-inch-thick layer of concrete" and Resource Conservation and Recovery Act (RCRA)-Equivalent cover instead of a "4-ft-thick soil/vegetation layer"

b. Complex (Army) Trenches Remediation Project: 18-inch thick biota barrier consisting of crushed concrete or rock instead of a "6-inch-thick layer of concrete"

c. South Plants Central Processing Area (SPCPA) Soil Remediation Project: RCRA-Equivalent cover instead of a "4-ft-thick soil/vegetation layer"

Response: The RVO agrees that these changes should be documented in a formal document, ie., a Fact Sheet. Since these are a routine part of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) administrative process, identification in Section 9 for follow-up is not required.

Comment 13. The Miscellaneous Structures Demolition and Removal Project is being conducted in three separate phases with some structures being removed as part of other projects in which the structures are located. Because of this logical

approach to removing structures, it has become very difficult to accurately track the status of the hundreds of structures identified in the ROD. Therefore, EPA recommends the development and inclusion of a table in the FYRR that provides the demolition status of all ROD and design structures to aid in confirmation that each structure with no future use has either been demolished, or is included in an implementation project for future demolition and removal. This tracking system should also document the implementation project under which the demolition took or will take place, and the associated CCR that will document demolition of each structure.

Response: The requested tracking system has been developed for use by the RVO for remedy projects that document structure demolition and/or other administrative changes to the classification of ROD structures. The system is used to ensure structures are accounted for in the CCRs referenced by the FYRR. While the requested level of detail might aid in confirmation of structures with no future use, adding it to the FYRR would increase the already lengthy nature of the report. For that reason, the RVO does not consider the tracking system necessary for the FYRR.

SPECIFIC COMMENTS

Comment 1. **Table of Contents, Page i to iii.** During the first meeting of the Five-Year Review (FYR) Team on February 23, 2005, EPA notified the other Parties that the EPA *Comprehensive Five-Year Review Guidance* (*Guidance*) had been finalized in 2001 and noted the changes in format from the 2000 FYRR that would need to be made (RVO 2005). All Parties agreed that the 2005 FYR Report (FYRR) would follow the exact format of the current *Guidance*. However, the draft 2005 FYRR differs from the *Guidance* in several areas, and the process outlined in the *Guidance* for conducting a FYR was not consistently followed (e.g., conducting a technical assessment of the remedy and identification of Issues as outlined in the *Guidance*, Appendix E) (EPA 2001). In addition to deviating from the FYR process outlined in the *Guidance*, the draft 2005 FYRR for RMA is not formatted consistently with the *Guidance* and many of the subsections do not accurately reflect the intended content as presented in Exhibit 3-3 of the *Guidance*. For example, the two subsections in Section 8.0 of the FYRR, entitled "8.1 Deficiencies" and "8.2 Conclusions Related to Optimization of the Remedy", are not equivalent to the intended content in the *Guidance*. As shown in Exhibit 3-3 of the *Guidance*, Section 8.0 is intended to be a summary of Issues identified during the technical assessment, a determination of whether each identified Issue affects current or future protectiveness, and a discussion of unresolved concerns or items raised by support agencies and the community (EPA 2001). The FYR process and report format should be revised to follow the *Guidance* as required by CERCLA.

In addition, it is very difficult to locate details of the FYR in the report because the report does not sufficiently subdivide sections using section

numbers, and the Table of Contents does not list all subsections of the report. The FYRR should be revised to include subsection numbers and to reference each subsection in the Table of Contents to facilitate locating specific information in the report.

Response: Section 8 is now entitled "Issues". The table of contents is now revised to include subsection numbers.

Comment 2. **Executive Summary, Page ix through xv.** The Executive Summary will need to be revised to reflect any revisions to the main body of the FYRR based upon the comments provided.

Response: Consistent with the example in Appendix F of the guidance the executive summary has been shortened and now avoids redundancy with the EPA Summary Form.

Comment 3. **Section 1.0, Introduction, Page 1, Paragraph 5.** The introduction states in Paragraph 5 that due to the size and complexity of RMA, other documents are referenced for more information. However, no references are included in the FYRR. EPA needs to review this list of references for accuracy and completeness. For example, the FYRR makes general statements (e.g., Section 6.4.1.2, Page 43, first bullet, Page 44, first bullet; and elsewhere) about the performance of groundwater extraction and treatment systems. These results are unsubstantiated because the fiscal year 2003 (FY03) and FY04 OARs have not been published (i.e., the data are not available for the public or the Regulatory Agencies to review). Also, RVO has not consistently provided the Regulatory Agencies with reports about ecosystem issues that they have committed to produce. For example, a 2005 report documenting aquatic surveys for the RMA National Wildlife Refuge has not been submitted. RVO also committed to preparing annual wetlands mitigation reports in March of each year, but the 2005 report has not been submitted as required by the *Letter of Agreement for Protection of Wetland Resources* (GFI 2002). RVO committed to preparing a Wildlife Management Plan for covers in the Basin A Dispute Resolution (RMA Council 1998), and in an April 2001 update to Council on Institutional Controls (ICs), it was reported that a Wildlife Management Plan would be submitted to the agencies in June 2001 (RMA Council 2001). However, only a one-page summary was submitted at the time that the draft FYRR was released in July 2005. The FYRR should be revised to include the appropriate documentation and references necessary to satisfy the requirements of the *Guidance.*

Response: Comment noted. Citations to required documents have been provided in the revised FYRR along with a comprehensive reference list.

Comment 4. **Section 1.0, Introduction, Page 2.** This section describes the contents of the FYRR. The description of the contents of Section 6.0, Five-Year Review Process, includes material that is not provided in the body of the report; i.e.,

documents and data reviewed, interviews conducted, and a summary of annual remedy costs. The main body of the FYRR should be revised to include these materials.

In addition, the description of the contents of Section 7.3, Question C, includes material that is not provided in the body of the report (e.g., other new information about land use changes). The main body of the FYRR should be revised to include these materials.

Response: The revised FYRR includes additional documents and data review. As noted on page 3-4 of the FYR guidance, "(i)nterviews should be conducted, if necessary, to provide additional information about a site's status." The guidance is written to address a broad spectrum of sites with wide variation in regulatory oversight. Given the ongoing, continuous presence of the Regulatory Agencies at RMA and the extensive documentation available, interviews were deemed unnecessary. In fact, Regulatory Agency personnel accompanied key RVO personnel during site inspections which afforded many opportunities to raise questions in lieu of formal interviews. The RVO basis for not using O&M cost in the evaluation is discussed in Section 4.0. The RVO believes, consistent with guidance, that trends in remedy costs are very poor quality data when comprehensive oversight and current documentation is available.

Land use information, in the context of reasonable maximum exposure scenarios contemplated by the ROD, is discussed in Section 7.4.6.

Comment 5. **Section 2.0, Site Chronology, Page 3.** This section consists of a table (Table 1 –Chronology of Events) listing a chronology of events in the contamination and cleanup history of RMA. However, it does not include a chronology of events for remedial designs or remedial actions. Exhibit 3-3 of the *Guidance* indicates that the site chronology should include start and completion dates of remedial and removal actions and construction completions dates (EPA 2001). Because there are multiple remedial implementation projects at RMA, this section should refer to the *Remediation Design and Implementation Schedule* (RDIS), the *Remediation Scope and Schedule,* and the annual updates. Applicable schedules from the RDIS that reflect the chronology of events over the past five years should be included as an attachment to the FYRR, in **addition to Table 1.**

Response: Additional, significant ROD-related events have been added to Table 2.0-1. Project completion dates and forecasts of project completion dates are provided in Table 2.0-2., which is based upon the Remediation Design and Implementation Schedule. An RDIS reference is provided in Section 12.

Comment 6. **Section 4.1, Remedy Selection - On Post OU, Pages 7 through 23.** This section indicates that it will describe the remedy for the On-Post Operable Unit (OU) in the On-Post ROD. However, it is difficult to differentiate

between the actual ROD requirements and the current status of the remedial actions throughout the discussions in this section. The information throughout this section should be revised to quote the actual ROD requirements, and then to provide a status describing the remedy implementation, performance, and systems operations/O&M as required by page E-23 of the *Guidance* (EPA 2001). As described in our general comments, Sections 4.0 and 7.0 should be combined to minimize redundancy and comply with the guidance

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment.

Comment 7. **Section 4.1, Water, Page 11, Bullets 2 and 3.** This subsection describes the On-Post ROD remedy and these bullets specifically describe requirements for maintaining lake levels. The following are comments on these bullets:

a. The On-Post ROD requires that, "Water levels in Lake Ladora, Lake Mary, and Lower Derby Lake will be maintained to support aquatic ecosystems" (FWENC 1996). The second bullet indicates that water levels are being maintained, but does not provide any information explaining how this task is implemented. Documentation that supports implementation of this action should be referenced, such as information explaining who is responsible for monitoring lake levels, how this task is implemented, what documents specify procedures for this task, references to lake level monitoring data, and decision making criteria. The discussion in this bullet should distinguish between lake level maintenance that is required to support aquatic ecosystems and that required to cover HHE soil that has been left in place. These requirements apply during implementation of the remedy (e.g., for dust suppression), and after completion of the remedy in Lower Derby Lake. This discussion should also address periods of time when lake levels were not maintained, such as during drought years and in early 2003, and what actions were taken to fulfill the On-Post ROD requirements for protection at those times.

b. The On-Post ROD requires that, "The biological health of the ecosystems will continue to be monitored" (FWENC 1996). The second bullet also indicates that this task is being conducted; however, reference to supporting documentation and data or an explanation of how this task is conducted is not provided. The biological monitoring program should be briefly described, including information explaining who is responsible, how and when this task is implemented, and referenced to documentation that demonstrates and provides further information on the biological monitoring. This bullet should also distinguish between biological monitoring that is required during implementation of the remedy and long-term biological monitoring associated with soil left in place such as the HHE soil in Lower Derby Lake.

c. The On-Post ROD requires that, "Lake level maintenance or other means of hydraulic containment or plume control will be used to prevent South

Plants plumes from migrating into the lakes at concentrations exceeding (CBSGs) [Colorado Basic Standards for Groundwater] in groundwater at the point of discharge. Groundwater monitoring will be used to demonstrate compliance" (FWENC 1996). The third bullet indicates that groundwater monitoring has demonstrated that lake level maintenance is not required to control the plume migration into the lakes. However, a reference to documentation and monitoring well data that supports this conclusion is not provided. This section should describe the monitoring program results and reference supporting documentation for this conclusion. This bullet should also identify any groundwater monitoring being conducted to validate this conclusion.

Response: a) A discussion of lake level maintenance related to supporting aquatic ecosystems is provided in Section 6.4.3.1, and a discussion of lake level maintenance related to cover HHE soil that is left in place is addressed in Section 6.3.11. b) Please see response to comment 7a and note that additional discussion of biota monitoring is provided in Section 6.4.3. c) The discussion of requested information is provided in Section 4.1.3.5.

Comment 8. **Section 4.1, Structures, Pages 11 and 12.** This subsection describes the On-Post ROD remedy for structures. The following are comments on this subsection:

a. Each of the bullets in this subsection confuses the On-Post ROD requirement with the status of the structure remedy. For example, the first bullet under "Structures" on Page 11 inaccurately states, "All No Future Use structures, other than those identified for demolition and removal under Phase 3, have been demolished." However, the ROD requirement is, "All no future use structures will be demolished" and should be clearly identified and differentiated from the provided status information which also requires clarification. For example, there is no information provided to explain what "Phase 3" comprises. Nor is there a reference to documentation that supports the statement that some of the "No Future Use" structures have been demolished. This bullet should be revised to state the exact ROD requirement, to explain the number of "No Future Use Structures" that have been demolished to date and the number remaining to be demolished, to describe the implementation projects that included building demolition in their scope over the past five years, and to reference supporting documents (such as CCRs) for the structures that have been demolished. These same comments apply to each of the remaining bullets in the Structures subsection.

b. The first bullet on Page 12 states, "Other Contamination History [OCH] Group structural debris has been used as grade fill in Basin A, which will subsequently be covered as part of the soil remediation." However, OCH structural debris has also been used for gradefill under the South Plants covers as allowed in the ROD, and there are still OCH structures

remaining that have not been demolished, and therefore, have not (or not yet) been used for gradefill in Basin A. These facts should be stated; and this bullet revised to state the exact ROD requirement.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. The RVO does not believe that an detailed presentation, on a building by building basis, of structure demolition status is required or important as a basis for the protectiveness findings.. b) The use of structure foundations as gradefill in South Plants has been discussed in Section 4.3.1.4.

Comment 9. **Section 4.1, Soil, Former Basin F, Page 12.** This subsection describes the remedies that were selected for the Former Basin F (FBF) Project. The "original remedy" that was selected for the FBF is described as, "...stabilize the waste, leaving it in place, and construct a protective cover over the site." The On-Post ROD describes the FBF remedy as treatment of principal threat (PT) soil using in situ solidification/stabilization and construction of a RCRA-Equivalent cap over the site. Not all of the FBF waste is PT soil. The description of the FBF remedy should be changed to quote the actual language used in the On-Post ROD.

In addition, this subsection includes a statement that a proposed amendment to the On-Post ROD for the FBF remedy "...will create additional space in the Enhanced Hazardous Waste Landfill (ELF) to accept other RMA waste." The proposed remedy change does not create additional space in the ELF; rather existing space is made available because the Lime Basins waste material would not be placed in the ELF. This description of the proposed remedy should be re-written to clarify the potential uses of available space (commonly referred to as air space) within the ELF.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. In addition, a discussion of the approved ROD amendment is provided in Section 6.3.14..

Comment 10. **Section 4.1, Soil, Basin A, Page 12.** Discussions regarding significant changes to the ROD remedy for Basin A are not included in this subsection. While formal documentation has not yet been prepared to adopt these ROD changes, this discussion should be revised to include a description of the potential modifications being considered. For example, RVO has proposed that the On-Post ROD requirement for a 4-foot-thick soil cover with a 6-inch thick layer of concrete be replaced with a RCRA-Equivalent cover consisting of a 4-foot-thick soil layer and an 18-inch-thick crushed former Stapleton Airport runway-concrete biota barrier. A formal decision document (i.e., ROD change) has not yet been issued for these proposed changes, but will be prepared in the future. This subsection should be revised to make this distinction.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. In addition, a discussion of the biota barrier design process in provided in Section 4.3.2.3.

Comment 11. **Section 4.1, Soil, South Plants Central Processing Area, Page 13.** This subsection describes the On-Post ROD remedy for the South Plants Central Processing Area (SPCPA) Project. The information provided is different than many other descriptions in Section 4.1, because the discussion begins with the actual ROD remedy (first three sentences), although not identified as such. This subsection should be identified as the actual ROD-remedy.

The second part of the discussion in this subsection describes the ESD that was prepared for South Plants in 2000. However, the description of the ESD for the SPCPA portion of the remedy is not accurate and needs to be revised. The sixth sentence in this subsection states, "The first change to this project was that a RCRA-equivalent cover will be constructed over the South Plants Central Processing Area." The ESD did not change the 4-foot soil cover over SPCPA to a RCRA-equivalent cover. In fact, the ESD states, "The cover will be designed and constructed to meet the same criteria as that used for the RCRA-Equivalent Cover Demonstration Project at RMA" (RVO 2000). Discussions regarding a change to the SPCPA soil cover to a full RCRA-Equivalent cover did not occur until 2002 (RMA Committee 2002), and formal documentation has not yet been prepared to adopt this ROD change. Finally, this subsection describes modification of the ROD documented in the 2000 ESD to the South Plants Balance of Areas (SPBA). These changes are not applicable to the SPCPA and should not be included in this particular subsection.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. In addition, revisions to clarify the South Plants Central Processing Area descriptions consistent with Comment 68g have been incorporated in Section 4.3.1.4.

Comment 12. **Section 4.1, Soil, South Plants Ditches, Page 13.** This subsection describes the ROD remedy for the South Plants Ditches Project. However, no information is provided on the status of the remedy. This subsection should be revised to include the status of the implementation of this remedy, including references to applicable reports and data that document the remedy status.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment..

Comment 13. **Section 4.1, Soil, South Plants Balance of Areas, Pages 13 and 14.** This subsection describes the ROD remedy for the SPBA Project. This discussion is not clear, because it appears to be a combination of the required ROD remedy and the status of the remedy. This subsection should be revised to

clearly quote the ROD remedy, and then provide the remediation status including references to applicable reports and data that document the remedy status.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment.

Comment 14. **Section 4.1, Soil, Section 36 Balance of Areas, Page 14.** This subsection describes the remedy for the Section 36 Balance of Areas (BOA) Project. However, the discussion is not clear because it mixes and combines the discussion of the ROD remedy, the 2003 Section 36 BOA ESD, proposed remedy changes that are included in a draft ESD for the Shell Disposal Trenches project, and what appear to be remedial actions based on incorrect verb tenses. In addition, the discussion of some of those elements is incomplete. The following are just several examples of the confusion evident in the organization of this subsection:

a. The subsection states, "Any agent-contaminated soil found during monitoring was caustic washed and landfilled." This statement implies that agent was found. However, no agent-contaminated soil was identified during monitoring, so caustic washing was not required during remedy implementation.

b. This subsection also states, "Parts of the former HHE area will be covered with a two-foot thick soil cover and the former potential risk to biota area will not be covered with a one-foot-thick soil cover." This discussion eliminates the ROD-required remedy, confuses the ROD remedy and the 2003 ESD remedy, and combines the 2003 ESD remedy with a draft ESD for the SHELL DISPOSAL TRENCHES that RVO prepared after the FYR cut-off date of March 31, 2005. In addition, it discusses remedial actions that are, in fact, dependent upon approval of the draft 2005 ESD, without properly identify the dependency.

c. This subsection includes a brief discussion of the 2003 ESD; however, the description is incomplete. Discussion of the deletion of the 1-foot and 2-foot soil covers is not included.

This subsection should be revised to: 1) quote the ROD remedy; 2) quote/summarize all the elements of the 2003 ESD remedy; and 3) provide the remediation description and status with references to applicable reports and data that document the remedy status. The discussion of remedial actions should clearly indicate that caustic washing was not required because agent monitoring did not detect any agent-contaminated soil. In addition, for the discussion of the remedial status of future actions, dependency on approval of formal ROD-change documentation should be acknowledged.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. a) The requested clarification

was made throughout the document. b) and c) See Sections 4.3.1.5 and 4.1.3.1 for discussions of these ESDs.

Comment 15. **Section 4.1, Soil, Secondary Basins, Pages 14 and 15.** This subsection describes remedial actions for the Secondary Basins Project. The following are comments on this subsection:

a. This discussion includes the ROD-required remedy for Secondary Basins, but the status of the remedy is not provided. This bullet should be revised to provide the remediation status and references to applicable reports and data that document the remedy status.

b. This subsection states, "Revegetation, long-term maintenance and ICs consistent with ROD requirements for covers will also be included, along with long-term groundwater monitoring." It is not clear why this statement is provided for the description of the covers over the Secondary Basins, and not for any of the other cover projects (e.g., Basin A, SPBA, Section 36 BOA, etc.). The source of this statement should be referenced and Section 4.1 should be revised to include this requirements statement in all project discussions requiring a cover.

c. The description of the ESD is not clear. This discussion should be revised to explain that the ESD required excavation of biota soil that was originally going to be left in place. This allowed the soil cover to be eliminated and the revegetation efforts were modified to be consistent with the wildlife refuge requirements, rather than the requirements specified for covers.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) This language structure was modified for consistency. c) See Sections 4.3.3.16 and 4.3.3.17 for discussion of this ESD.

Comment 16. **Section 4.1, Soil, Complex Trenches, Page 15.** This subsection describes the remedy for the Complex Trenches Project. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. As a result, this description is inaccurate. Specifically, this subsection indicates that the RCRA-Equivalent cover will include 18 inches of biota barrier. However, the ROD requires 6-inches of concrete as a component of the cover, and no formal documentation to incorporate the proposed 18-inch biota barrier has been prepared during the FYR period. Therefore, this subsection should be revised to clearly state the ROD requirement for Complex Trenches. The text should then state that the conceptual design document has proposed the use of 18-inches of biota barrier in place of the 6-inch layer of concrete, and that this potential modification to the ROD will be formally evaluated and documented in the future. In addition, this subsection does not include a description of the remedy status

for this project, nor references to applicable reports and data that document the remedy status. This information should be provided.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. Also see the response to General Comment 12 and Specific Comment 10, above.

Comment 17. **Section 4.1, Soil, Shell Trenches, Page 15.** This subsection describes the remedy for the Shell Trenches Project. However, this discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy, and does not include a separate description of the remedy status for this project. The information in this subsection should be revised to quote the ROD requirement, and provide the remediation description and status with references to applicable reports and data that document the remedy status.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment.

Comment 18. **Section 4.1, Soil, Hex Pit, Page 15.** This subsection describes the Hex Pit Soil remedy and project. The following are comments on this subsection:

a. There is no discussion of EPA SITE's involvement with the project. The section should be revised to discuss the EPA SITE Program and the role it performed for this project.

b. There is no discussion of the contingent remedy element of the ROD remedy. The section should be revised to discuss the contingent remedy as an element of the ROD remedy. In addition, the discussion of the ROD Amendment should acknowledge that the contingent remedy was considered, but was not selected.

c. The subsection also fails to discuss remedial actions that occurred after the ROD Amendment, and should be revised to include discussion of these actions. In addition, the discussion of remedial actions should be documented with references to applicable reports, including CCRs and data summary reports (DSRs).

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. The revised text for the Hex Pit project status is presented in Section 4.3.3.14.

Comment 19. **Section 4.1, Soil, Section 36 Lime Basins, Pages 15 and 16.** This subsection describes the Section 36 Lime Basins Project. The following are comments on this subsection:

a. The subsection begins with a discussion of the design of the remediation project, but fails to discuss the ROD remedy on which the original design

was based. The subsection should be revised to quote the Section 36 Lime Basins ROD remedy.

b. The subsection does not accurately present the proposed remedy outlined in the *Proposed Plan*. The discussion states, "The proposed remedy…is containment by constructing a RCRA-equivalent cover over the project site. … Once built, the cover would be reseeded with native vegetation; a vertical groundwater barrier wall would be installed into the bedrock to isolate waste from the groundwater; the groundwater would be lowered within the barrier wall to below waste; and contaminated groundwater would be treated at on-site facilities." However, the vertical barrier walls and dewatering wells will be installed before the cover is built, not after as is suggested by this discussion. The bullet should be revised to clearly indicate that the proposed remedy consists of a vertical barrier wall, dewatering wells, and a RCRA-Equivalent cover, and that the cover is built last, not first.

c. The subsection should be revised to include a discussion of the remediation status (percent design complete) and reference applicable reports and data that document the remedy status such as design documents and design treatability studies conducted.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) A discussion of the ROD Amendment has been added in Section 6.3.14. c) This level of schedule detail is not required as a basis for the protectiveness determinations.

Comment 20. **Section 4.1, Soil, Buried M-1 Pits, Page 16.** This subsection describes the Buried M-1 Pits Project. The following are comments on this subsection:

a. The subsection appears to discuss only the remedial actions that occurred and does not discuss the ROD remedy. The subsection should be revised to quote the Buried M-1 Pits ROD remedy.

b. The subsection states, "Caustic washing and landfill of any agent-contaminated soil found during monitoring was completed." This statement implies that agent was found; however, no agent-contaminated soil was identified during monitoring, so caustic washing was not required during remedy implementation. The subsection should be revised to clearly indicate that, while the remedy called for caustic washing in the event agent-contaminated soil was identified, no caustic washing was required because agent monitoring did not detect any agent-contaminated soil.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) As noted in the response to Specific Comment 14, the requested clarification was made throughout the document..

Comment 21. **Section 4.1, Soil, Burial Trenches, Page 16.** This subsection discusses the Burial Trenches Project. The following are comments on this subsection:

a. The discussion is not clear with respect to the ROD remedy and the remedial actions because it mixes and combines these two elements into one paragraph, although the discussion of the ESD appears to be sufficiently distinct. The discussion should be revised to clearly quote the original ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status.

b. This subsection states that the Burial Trenches ESD was issued in June 2004. However, the ESD did not receive the final signature until July 15, 2004. The discussion of the ESD should be revised to state that the ESD became effective on July 15, 2004, as indicated by the date of the final signature.

c. The subsection also states that the project changes associated with the ESD resulted in a decrease in HHE volume from 31,629 bcy to 14,481 bcy. However, the Burial Trenches ESD indicates that the HHE volume decreased to 20,684 bcy (TTFWI 2004). The subsection should be revised to identify the correct final volume of HHE soil.

d. The discussion of remedial actions should be documented with references to applicable CCRs and DSRs.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) The ESD approval date has been corrected. c) The volume detail has been removed from the ESD discussion and the percent decrease is cited instead. d) Appropriate citations have been included and the references have been added to Section 12..

Comment 22. **Section 4.1, Soil, Chemical Sewers, Pages 16 and 17.** This subsection describes the Chemical Sewers Project. The following are comments on this subsection:

a. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. The discussion should be revised to clearly quote the original ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status.

b. The remedy for the chemical sewers has been implemented through several different projects over the past five years. The applicable

remediation projects should be listed, and should include a summary of each project's scope with respect to chemical sewers.

c. This subsection also describes changes to the Chemical Sewer remedy, makes reference to "The amended remedy…", and identifies an ESD that was prepared for chemical sewers. However, this discussion inaccurately states that the ESD was applicable to all of the chemical sewers at RMA outside the SPCPA and the Complex Trenches, when in fact, it was only written for specific sections of the chemical sewer system outside the SPCPA and the Complex Trenches. This subsection should be revised to accurately reflect the scope of the *Explanation of Significant Difference for Chemical Sewer Remediation (Section 35 and Section 26)* (FWENC 2000e).

d. This subsection is incomplete because it does not address the changes to the chemical sewer remedy that were defined in the *Explanation of Significant Differences for Section 36 Balance of Areas Soil Remediation Project* (FWENC 2003b), or the *Final Explanation of Significant Differences for North Plants Structure Demolition and Removal Project, Rocky Mountain Arsenal Federal Facility Site* (TTFWI 2004e). All ROD changes to the Chemical Sewer remedy should accurately be described.

e. This subsection should be revised to accurately quote the ROD remedy and all ROD modifications, describe the remedy status for the chemical sewers, and provide references to applicable reports and data that document the remedy status.

Response: a), b), and e) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. c) The ESD is now discussed in Section 4.3.3.17. d) The ESDs are now discussed in Sections 4.3.1.5 and 4.4.2.4.

Comment 23. **Section 4.1, Soil, Sanitary/Process Water Sewers, Page 17.** This subsection describes the Sanitary and Process Water Sewers Project. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. The information in this subsection should be revised to quote the ROD requirement and provide the remediation status with references to applicable reports and data that document the remedy status. In addition, the remedy for the sanitary and process water sewers has been implemented through several different projects over the past five years. The applicable remediation projects should be listed, including a summary of each project's scope with respect to sanitary and process water sewers.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment.

Comment 24. **Section 4.1, Soil, North Plants, Page 17.** This subsection describes the North Plants Project. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. The

information in this subsection should be revised to quote the ROD requirement and provide the remediation status with references to applicable reports and data that document the remedy status.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment.

Comment 25. **Section 4.1, Soil, Toxic Storage Yards, Page 17.** This subsection describes the Toxic Storage Yards Project. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. This subsection should be revised to quote the ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment.

Comment 26. **Section 4.1, Soil, Munitions Testing, Page 17.** This subsection discusses the Munitions Testing (MT) Project. The following are comments on this subsection:

a. This subsection only discusses only the remedial actions that have occurred, and does not discuss the ROD remedy. The subsection should be revised to quote the ROD remedy.

b. The subsection does not identify that this is an on-going project. This subsection should be revised to indicate that the project is not yet complete and identify the work that remains to be completed.

c. The subsection does not discuss Part 1 of the project that has been completed. The subsection should be revised to include a discussion of the part of the project that has been completed.

d. The subsection does not discuss Part 2 of the project, including SAR Site ESA-4a. The target clearance at ESA-4a has expanded dramatically from the ROD-identified area, with over 1,500 munitions and explosives of concern (MEC) characterized. The subsection should be revised to describe the expansion of the scope of the remedial actions at ESA-4a.

e. The discussion of remedial actions should be documented with references to applicable CCRs and DSRs.

Response: a), b), and e) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. c) Part 1 of the project is now discussed in Section 4.3.3.10. d) A revised discussion of the expansion of Site ESA-4a is provided in Section 4.3.1.3.

Comment 27. **Section 4.1, Soil, Lake Sediments, Pages 18.** This subsection describes the Lake Sediments Project. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. This

subsection should be revised to clearly quote the ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status. This subsection should also address ICs that apply to the contaminated soil that was left in place (e.g., maintenance of lake levels and monitoring).

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. The Lake Sediments ICs are specifically noted in Section 6.3.11 with references to the 2006 RMA Interim Institutional Control Plan.

Comment 28. **Section 4.1, Soil, Ditches/Drainage Areas, Page 18.** This subsection discusses the remedy for Ditches/Drainage Areas. The following are comments on this subsection:

a. The subsection is not clear with respect to the ROD remedy and the remedial actions because it combines the two discussions into one paragraph. The subsection should be revised to clearly quote the original ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status.

b. The subsection does not discuss the fact that ditches have been remediated under different implementation projects. In order to confirm that the ditches identified in the ROD and/or the Soil Quantity Calculation Summary Report (SQCSR) (FWENC 1996b) have been remediated, the subsection should discuss the individual SAR sites and the projects under which they were remediated.

Response: a). Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) A detailed discussion of the SAR Sites comprising the Ditches/Drainages component of the On-Post soil remedy is not necessary as a basis for the protectiveness determinations in this FYRR.

Comment 29. **Section 4.1, Soil, Sanitary Landfills, Page 18.** This subsection discusses the Existing (Sanitary) Landfill (ESL) Project. The following are comments on this subsection:

a. The subsection is not clear with respect to the ROD remedy and the remedial actions because it combines the two discussions into one paragraph. The subsection should be revised to clearly quote the original ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status.

b. The subsection does not discuss the various parts of the project that have been completed. The ESL project was implemented at the Section 1 ESL, Section 4 ESL, the Section 30 ESL, and the Section 36 ESL. In order to confirm that the sanitary landfills identified in the ROD have been

remediated, the subsection should discuss the SAR sites and the projects under which they were remediated.

c. The subsection does not indicate that this is an on-going project because the ESD and CCR were not approved prior to the FYR cut-off date of March 31, 2005. The subsection should be revised to indicate that this is an on-going project and identify the remaining work to be completed.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) A detailed discussion of the SAR Sites comprising the ESL component of the On-Post soil remedy is not necessary as a basis for the protectiveness determinations in this FYRR. c) The ESD is discussed in Sections 4.3.1.2, 4.3.3.6 and 4.3.3.7.

Comment 30. **Section 4.1, Soil, Buried Sediments, Pages 18.** This subsection describes the remedy for buried sediments. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. This subsection should be revised to clearly quote the ROD remedy, then provide the remediation status with references to applicable reports and data that document the remedy status. This subsection should also identify the ICs that apply to the contaminated soil that was left in place at the Previously Excavated Lake Sediments site in Section 12 (SAR Site SSA-3b) and the effectiveness of the ICs during the past FYR period.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. The Previously Excavated Lake Sediments (SSA-3b) ICs are specifically noted in Section 6.3.11 with references to the 2006 RMA Interim Institutional Control Plan..

Comment 31. **Section 4.1, Soil, Sand Creek Lateral, Page 18.** This subsection discusses the Sand Creek Lateral (SCL) Project. The following are comments on this subsection:

a. The subsection is not clear with respect to the ROD remedy and remedial actions because it combines the two discussions. The subsection should be revised to clearly quote the original ROD remedy and provide the remediation status with references to applicable reports and data that document the remedy status.

b. The subsection does not discuss the fact that the SCL was remediated as part of several different projects, including the Miscellaneous Southern Tier Project, the Section 35 Soil Remediation Project, and the Basin F/Basin F Exterior Project. The applicable remediation projects should be listed and include a summary of each project's scope with respect to the SCL.

c. There is no discussion of the HHE and biota contamination discovered in the fall of 2004 along the banks of the SCL, which is clearly associated with the SCL. There is also no discussion of the plans to characterize the

extent of contamination, even though Revision 0 of the *Miscellaneous Southern Tier Soils Remediation Project, Sand Creek Lateral, Additional Human Health Exceedance Delineation, Final Sampling and Analysis Plan* is dated February 22, 2005 (TTEC 2005b). The subsection should be revised to discuss the recently discovered contamination, and the plans for characterization and remediation of the SCL and its banks.

Response: a) Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. b) and c) The Sand Creek Lateral is discussed in the revised Sections 4.3.1.7, 4.3.3.12, and 4.3.3.17 for the projects that included Sand Creek Lateral remediation. Sections 4.3.3.12 and 4.3.3.17 also discuss the additional contamination discovered along the banks of the lateral and the status of remedial activities.

Comment 32. **Section 4.1, Soil, Surficial Soil, Pages 18.** This subsection describes the remedy for contaminated surficial soil sites at RMA. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. This subsection should be revised to quote the ROD remedy, then provide the remediation status with references to applicable reports and data that document the remedy status. This remedy was implemented through several different implementation projects. The applicable remediation projects should be listed, and the listings include a summary of each project's scope with respect to surficial soils. In addition, several surficial soil sites were not backfilled as required by the ROD. This minor ROD change and the reports where the change is documented should be discussed with appropriate references to reports and data.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. An detailed discussion of the many elements of the Surficial Soil component of the On-Post soil remedy is not necessary as a basis for the protectiveness determinations in this FYRR. The issue related to unbackfilled HHE excavations is discussed in Sections 4.3.3.3, 4.3.3.6, 4.3.3.8, 4.3.3.11, 4.3.3.12 and 6.3.8.

Comment 33. **Section 4.1, Other, Pages 18 through 23.** This subsection describes additional components of the selected remedy. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. In many of the bulleted discussions comprising this subsection, the status of the remedy is not described at all, or is so intermingled with a description of the ROD requirements that it is difficult to tell the difference between requirements and status. This section should be revised to clearly quote the ROD remedy, then provide the remediation status with references to applicable reports and data that document the remedy status. The Section on the Trust Fund provides an extensive amount of historical detail and could be more succinct. Additionally, the subsequent text on the BAS should be separate from the Trust Fund text. The overall presentation of the BAS discussion could also be more succinct.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment. The Trust Fund is discussed separately in Section 4.5.2.2 and revised text regarding BAS activities is now presented in Section 6.3.3.

Comment 34. **Section 4.2, Remedy Selection – Off-Post OU, Page 24.** This subsection describes the remedy for the Off-Post OU. This discussion is not clear because it appears to be a combination of the required ROD remedy and the status of the remedy. The information in this section should be revised to quote the ROD requirement, to provide a status describing how that ROD requirement is being met, and to provide references to applicable reports and data that document the remedy status.

Response: Section 4 has been substantially revised to better follow the FYR guidance and the suggestions provided by this comment..

Comment 35. **Table 3, Pages 26 to 33.** This table provides completion information on the remedial action projects. However, this table contains numerous inaccuracies. For example:

a. Table 3 indicates that the final CCR for Miscellaneous Southern Tier Soil Remediation Project was approved on July 14, 2000. However, there was a Revision 1 to the CCR issued on June 2000, and Addendum 1 to the CCR, which documents deep acute contingent soil volume (CSV) removal in 2004, was issued in June 2005. Approval dates for the revision and addendum to the CCRs should be provided.

b. The table indicates that issuance of the CCR for South Plants Balance of Areas and Central Processing Area Soil Remediation Project, Phase II, Part 1, documenting Soil Remediation, is forecast for the Fall of 2005, and that Phase II, Part 2, for documentation of cover construction, will be issued in the Spring of 2009. However, Phase II, Part 3 will document cover construction, and the CCR that will be completed in the Fall of 2005 is for both Part 1 and Part 2 of Phase II, to document Soil Remediation. These corrections should be made to the table.

c. The table indicates that the final CCR for the Secondary Basins Soil Remediation Project, Phase I and II was approved July 15, 2004. However, Revision 1 to the CCR was issued May 13, 2004. An approval date for the revision to the CCR should be provided.

d. This table does not include the Section 1 ESL project. Additional work was completed on this project in 2003 and an Addendum to the CCR was issued on March 9, 2004 (RVO 2004c). This project should be included in Table 3 and addressed in the FYRR.

Table 3 should be thoroughly reviewed and revised to accurately document CCR completion dates. In addition, this table should include a complete list of all project completion documents (all CCR revisions and addendums), or

another table should be provided in the FYRR to do so. It would also be helpful to the reader if Table 3 contained page references to the respective discussions in Section 7.0.

Response: Table 3 has been revised and renumbered as Table 2.0-2. A complete list of CCRs and Addendums is included. a) The approval date listed for the CCR is for Revision 1. The approval date for revising the Addendum has been added. b) The requested corrections have been made. c) The approval date has been included in the revised table. d) The Section 1 Existing Sanitary Landfill (ESL) project was added along with the approval date for the Addendum.

Comment 36. **Section 5.2.1, Basin F Wastepile, Pages 34 and 35.** This section discusses the results of follow-up actions since the 2000 FYR for the operation of the Basin F Wastepile leak detection system. The following are comments on this section:

a. The first paragraph states, "...the larger than anticipated volume of leachate being generated at the Basin F Wastepile is not impacting groundwater." and goes on to note that "...no new action is recommended to address the deficiency noted above...". However, the "deficiency" that was described in the 2000 FYRR is that the primary system (the leachate collection system) in the second cell is not functioning as designed. Page 50 of the 2000 FYRR states, "The Wastepile is not functioning as designed in the second cell (there are three cells in the Wastepile). Significant volumes of leachate are being collected in the secondary sump, not the primary sump as the system was designed to do" (DOA 2000). The problem with the Wastepile leachate collection system should be correctly stated in this section. In addition, no assessment of the primary system to function as designed was provided in the 2000 FYRR, nor is any explanation provided in this FYRR. An assessment of the primary leachate collection system in the second cell of the Basin F Wastepile should be provided.

b. The FYRR references the conclusions of the 2000 FYRR with the statement, "All evidence indicates that the larger than anticipated volume of liquid being generated at the Basin F Wastepile is not impacting the groundwater." However, the basis for this statement is not provided. The FYRR should describe what actions have been taken since the 2000 FYRR to verify this statement and what documentation exists to support this statement (e.g., groundwater monitoring records).

c. Page 80 of the 2000 FYRR required that, "...leachate levels should continue to be carefully monitored on a daily basis until the wastepile is addressed as directed in the On-Post ROD. The On-Post ROD requires the Basin F Wastepile to be re-excavated and placed in the ELF [Enhanced Hazardous Waste Landfill]..." (DOA 2000). The current FYRR recommends that, "...leachate levels should continue to be carefully monitored on a daily, to near daily, basis...." However, no rationale is

provided for this change in monitoring. Unless a rationale is provided and agreed upon, leachate levels should be monitored on a daily basis until the Basin F Wastepile is re-excavated and placed in the ELF, as required in the 2000 FYRR. In addition, any recommendations or follow-up actions to address Issues identified by the FYR should be discussed in Section 9.0 rather than this section.

d. This section ends with, "The above-described actions taken to date have achieved the intended purpose." The meaning of this sentence is unclear, because the only action discussed is monitoring of leachate levels in the Basin F Wastepile cell, and no specific purpose for this monitoring with respect to the performance of the primary collection system is given. The purpose for the monitoring action should be given.

Response:

a. The RVO has added the requested language. However, the RVO believes that the conclusions of the 2000 FYRR remain valid and that substantial re-evaluation is not appropriate or required in the absence of specific new data that show a change of condition.

b. The RVO has deleted the language regarding no impacts to groundwater. Groundwater monitoring data indicate that groundwater impacts are unlikely. For example, groundwater elevations in wells near the Basin F Wastepile have declined and remained relatively stable since the Interim Response Action (IRA) was implemented. Additionally, concentrations of wastepile leachate constituents with relatively high concentrations in the leachate, such as 4-chlorophenylmethyl sulfoxide, (CPMSO) p-chlorophenylmethyl sulfone, diisopropyl methylphosphonate and chloride have declined in groundwater in downgradient wells with few exceptions since the IRA was implemented. However, an upgradient well has not been sampled since 1999 when the monitoring program was revised under the LTMP. Consequently, the ability to draw definitive conclusions is limited. Therefore, the RVO has deleted the language regarding no impacts to groundwater.

c. This is no longer an issue as Basin F Wastepile remediation is underway. The words "near daily" are no longer part of the discussion.

d. The topic is addressed in Sections 4.3.1.6 and 4.3.2.5, assessed in Sections 7.1.8 and 7.2.3.12, and identified as an issue in Section 8.1.

Comment 37. **<u>Section 5.2.2, Off-Post Institutional Controls, Page 35</u>.** This section describes the status of recommendations from the 2000 FYR for off-post ICs. Section 8.1.2 of the 2000 FYRR for RMA states, "The well notification institutional control procedure has therefore not been completely effective" (DOA 2000). However, details of the follow-up actions are not provided. The status of follow-up actions for the off-post ICs should be documented and

referenced, to include the dates of State Engineers Office meetings, delivery of groundwater exceedance maps, the number of well applications within the potentially affected area, and whether the proper notification was attached to these applications.

Response: Details of the follow-up actions are provided in Section 5.2.2, the topic is discussed in Section 4.2.1.3, assessed in Section 7.2.2.3, identified as an issue in Section 8.13 and follow-up is provided in Section 9.11. The text has been revised in accordance with Tri-County Health Department's (TCHD) comments. The follow-up actions recommended by TCHD have been included.

Comment 38. **Section 5.2.5, CERCLA Compliance Document for the LWTU, Page 36.** This section states, "It was agreed by all stakeholders that the CCD [Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Compliance Document] should be updated after every FYR, not annually, as specified in RMA's 2000 FYR Report." A reference should be cited for this agreement.

Response: A reference to the 2002 CERCLA Compliance Document has been provided.

Comment 39. **Section 5.2.7, Private Well Network, Page 37.** This section discusses the Private Well Network, and notes that the 2000 FYRR recommended that eight confined flow system wells (1070B, 343A, 359A, 486C, 588A, 589A, 848A, 914B) were to be sampled for diisopropylmethyl phosphonate (DIMP) annually until contaminant concentrations fell below analytical reporting limits, or until each well had been sampled at least five times and the mean concentration plus two standard deviations was less than the CSRG for DIMP. A review of the data from the RMAED for these listed wells indicates that, since 2000, four of them (343A, 486C, 588A, 589A) have not been sampled for DIMP. The 2003 Well Networks Update suggests a monitoring start date of 2003 for sampling (FWENC 2003c), but this does not match the discussion in the Five-Year Groundwater Summary Report, which recommends that monitoring be continued from 2000 onward (FWENC 2004f). The FYRR should discuss the lack of monitoring data for these wells.

Response: The private well monitoring follow-up actions are presented in Section 5.2.7, the topic is discussed in Section 4.2.1.2 and assessed in Section 7.2.2.2..

Comment 40. **Section 6.0, Five-Year Review Process, Pages 37 to 50.** The *Guidance*, Exhibit 3-3, lists site inspections and site interviews as elements of the FYR process that should be discussed in this section (EPA 2001). The site inspections are only mentioned briefly in two places in Volume I. This section should contain a summary of the site inspections and findings. Likewise, a summary of the interviews conducted as part of the FYR process should also be provided.

Response: In regard to site inspections see the response to General Comment 2. In regard to interviews see the response to Specific Comment 4.

Comment 41. **Section 6.1, General, Pages 37 and 38.** This section lists individuals that participated in the FYR. Denise Arthur is listed as an employee of EPA. However, Dr. Arthur is actually employed by ESCO Associates. This list should be corrected.

Response: The requested correction to Section 6.1 has been made.

Comment 42. **Section 6.2, Community Involvement and Public Information, Page 39, Paragraph 2.** This section on community involvement and public notification indicates that a number of stakeholder organizations were encouraged to provide input, concerns, or issues for the second FYR. However, their specific concerns are not described. A summary of stakeholder concerns should be included in this section and addressed in the FYRR. For example, at the FYR interview with the Site Specific Advisory Board (SSAB) held on February 1, 2005, an issue was raised regarding the potential for perchlorate contamination at RMA. As a result of the work conducted by the National Academy of Sciences, EPA established on February 18, 2005, a reference dose of 0.0007 mg/kg/day for perchlorate, which has been posted to the IRIS database. Because sampling was conducted for perchlorate over the past FYR period, the Army should respond to this issue raised by the SSAB and provide a discussion of where the sampling was conducted, the sampling results, and any other relevant information on this issue.

Response: As noted in response to General Comment 2, community involvement and public notification is discussed in Section 6.2 and Appendix A. The perchlorate topic is addressed in Section 6.4.1.7.

Comment 43. **Section 6.4, Data Review, Page 40.** This section describes remedy costs. This discussion is misplaced. Costs should be addressed in Sections 4.0 and 7.0.

Response: Program costs are discussed in Section 6.3.15. Please also refer to the response to EPA General Comment #5.

Comment 44. **Section 6.4, Data Review, Pages 40 to 50.** The data reports that form the basis for the data review are not all available to confirm accuracy of statements (e.g., the FY03 and FY04 OARs for the groundwater extraction and treatment systems). Either the missing documentation needs to be developed and provided for review, or the necessary data and evaluation should be included in this section of the FYRR.

In addition, this section does not include a discussion of actual and planned waste volumes for the HWL. Section 6.4 should be revised to include an assessment of HWL volumes.

Response: During the preparation of the FYRR and response to comments, the OARs were finalized and have been referenced in the Final 2005 FYRR. The information on HWL waste volumes is presented in Section 4.3.2.1.

Comment 45. **Section 6.4.1, Groundwater, Page 40.** This section discusses on-post and off-post groundwater monitoring programs not directly associated with the groundwater treatment systems, and indicates that data were evaluated from 2000 to 2005. The section includes subsections that discuss the monitoring results for water level tracking, site-wide water quality, confined flow system monitoring and exceedance monitoring. However, there are no actual values presented, no sample locations identified, no discussion of the assessment methodology and no references to reports in which this data assessment is made. As a result, an assessment of the effectiveness of the on-post and off-post groundwater monitoring program cannot be conducted based on the information provided. Either the missing documentation needs to be developed and provided for review, or the necessary data and evaluation should be included in this section of the FYRR.

Response: The Final FYRR includes an evaluation of site-wide monitoring in accordance with the reporting guidelines outlined in the LTMP and additional references have been included in the text. A water level comparison map for the 5-year period has been added to the report.

Comment 46. **Section 6.4.1.1, Water Level Tracking, Pages 40 and 41.** This section discusses the water level tracking conducted as part of the LTMP. The following are comments on this section:

a. The first paragraph of this section on Page 40 suggests that the purpose of the water level monitoring is to monitor the shallow aquifer on and near RMA, and after project-specific remedial actions are completed. However the project-specific remedial actions are not documented in the text. The project-specific remedial actions should be identified.

b. The first paragraph also suggests that several soil remedies were completed during the second FYR and their impact on groundwater was evaluated. However, these soil remedies are not identified and there appears to be no evaluation provided in the text. The completed soil remedies should be identified and the results of the water level monitoring should be discussed.

c. The first paragraph on Page 41 lists the sources and remedy areas that are addressed by the water level tracking program. However, there is no discussion of the results for Basin A and HWL and ELF remedy areas, and the remaining areas are not discussed in significant detail to understand the results of the water level tracking. The data quality objectives for water level tracking in these areas should be identified, and the results of the water level tracking in these remedy areas should be discussed.

d. The second paragraph on Page 41 states, "Off-post water level tracking data were used to support the Exceedance Monitoring Program." However, the text does not explain how the Exceedance Monitoring Program was supported. The text should explain the role of water level monitoring in supporting the Exceedance Monitoring Program.

e. The second paragraph also suggests that site-specific details with respect to water level monitoring will be addressed in monitoring reports for the individual areas that require monitoring. Other than the groundwater monitoring reports for the HWL project (for which there is no reference provided in the text), there do not appear to be any site-specific reports produced to validate this statement. The site-specific reports should be listed and referenced to support this statement.

f. The bullets in the second paragraph discuss the conclusions reached with respect to water level monitoring in specific areas. However, there is no documentation provided or referenced that provides support to these conclusions. As a result, the validity of these conclusions cannot be evaluated. The FYRR should provide the documentation necessary for validating the conclusions presented.

g. The first bullet in the second paragraph states there were no changes in groundwater levels or flow patterns upgradient of the containment systems that affected the systems during the second FYR period. However, decreasing water levels were used as justification for shutdown of the North of Basin F Well during the FYR period. In addition, the Hydrogen Release Compound (HRC) pilot project and the North Boundary Enhancement (NBE) project both identified groundwater flow directions and groundwater flow in the alluvial paleochannel that did not support previous interpretations. Because these systems are upgradient of the NBCS, these results should be discussed in the text.

h. The sixth bullet in the second paragraph suggests that the implementation of the Shell Trenches and Complex Trenches Slurry Walls and Bedrock Ridge intercept system has not changed groundwater levels and flow patterns in areas upgradient and downgradient of the remedy areas. This statement is incorrect. The purpose of the slurry walls is to eliminate groundwater flow into the Shell Trenches and Complex Trenches source areas and to induce groundwater flow around these sources. The slurry walls are also supposed to create changes in water levels upgradient and downgradient of the slurry walls. In addition, the purpose of the Bedrock Ridge intercept system is to change groundwater flow patterns and induce contaminated groundwater into the extraction wells. Because site-specific monitoring reports have not been provided, the text should discuss the results of the monitoring of these three remedies and clarify the conclusions in this paragraph.

Response:

a. The text in Section 6.4.1 has been revised to state the purpose of the water level tracking as identified in the LTMP. According to the LTMP: "water level tracking wells will be used to monitor water levels and track flowpaths between individual on-post remedies and the RMA boundary, as well as off post."

b. A brief discussion of the soil remedies for which source monitoring, either water level or water quality, identified in the LTMP and the 2003 and 2004 Well Network Update, is included in the revised text in Section 6.4.1.1.

c. The Final FYRR includes a discussion of the source area monitoring programs identified in the LTMP.

d. The text has been revised to describe how the water level monitoring data for off-post wells in the site-wide water level tracking network are used to make the regional water table maps. The regional water table contours, together with the water quality data, are used to estimate and draw the exceedance areas on the CSRG Exceedance maps.

e. The text has been revised to include a discussion of water level tracking results and a water level comparison map for the five-year review period in accordance with the LTMP. References have been added where reports are available, including the HWL Report, annual water level maps, and the OARs.

f. As stated in Response to Comment 46 e, the text has been revised to provide the supporting documentation.

g. Please see responses to comments 46 e and f above.

h. Please see responses to comments 46 e and f above.

Comment 47. **Section 6.4.1.2, Site-Wide Water Quality, Pages 42 to 44.** The 2000 FYRR referenced the Five-Year Groundwater Summary Report (FWENC 2000f) to support discussions and conclusions made in that report. Because an updated Five-Year Groundwater Summary Report has not been produced to date, validation of the data assessment process for the 2005 FYRR is not available. Either the missing documentation needs to be developed and provided for review, or the necessary data and evaluation should be included in this section of the FYRR.

Response: The 2000 Five-Year Groundwater Summary Report was prepared because of the vast amount of data available for the transition period from investigation to remediation mode. Due to the streamlining of the monitoring programs and the reduced data volume resulting from the implementation of the LTMP, the

RVO decided that such a summary report was not required for this FYRR. However, the Final FYRR has been revised to provide all the information outlined in the LTMP with references to other documents.

Comment 48. **Section 6.4.1.2, Site-Wide Water Quality, Page 42 and 43.** This section discusses the site-wide water quality monitoring program. The following are comments on this section:

a. The second paragraph on Page 42 lists the remedy source areas that have been evaluated with respect to the FYR. The third paragraph summarizes the site-wide water quality monitoring results. However, the first four bullets in the third paragraph discuss the water quality results from the groundwater treatment systems, which are not listed in the second paragraph. The text should concentrate on the site-wide water quality evaluation and discuss the treatment system results in another section.

b. The second bullet on Page 43 discusses the South Plants Area and suggests that concentrations of indicator compounds have been stable with the exception of chloroform. The text does not describe the indicator compounds evaluated. The text should discuss the indicator compounds evaluated. The text also discusses decreasing chloroform concentrations in "certain wells" but does not list these wells. The text should discuss the results from both the "certain wells" and other wells.

c. The third bullet on Page 43 states, "In the Basin A/Basin A Neck areas, concentrations display an overall decreasing trend." This statement does not define the Basin A/Basin A Neck area, does not identify what concentrations are being discussed, what overall decreasing trend means, and does not specify the timeframe for which this statement applies. The text should define the area that was evaluated, identify the wells, identify what concentrations are being referenced, and validate that all concentrations are decreasing.

d. The third bullet on Page 43 also suggests that n-nitrosodimethylamine (NDMA) concentrations in the Basin A/Basin A Neck area have been much lower since 2002 due to shutdown of the North of Basin F extraction well. The text does not discuss why shutdown of this extraction well would reduce NDMA concentrations in plumes in the Basin A/Basin A Neck area. Because the North of Basin F extraction well was installed to reduce contaminant concentrations emanating from Basin F, the relation to Basin A/Basin A Neck appears to be incorrect. The text should discuss the nature and extent of NDMA, the relation of the NDMA contamination to Basin A/Basin A Neck, and expand on the role of the North of Basin F well in reducing NDMA concentrations.

e. The fourth bullet on Page 43 suggests that in the former Basin F area many contaminants display an overall decreasing trend. The text does not define the former Basin F area, does not discuss the trend analysis methodology, does not reference the wells used to make the determination of decreasing

concentrations, does not identify the contaminants evaluated, and does not define the term "overall decreasing trend." In addition, an evaluation of influent results for the Basin A Neck from the North of F extraction well suggest that 4-chloro-phenylmethyl sulfoxide (CPMSO) and trichloroethylene (TCE) had steadily increasing trends during the time that influent analyses were performed. Though the influent data were not collected past 2000, which is near the beginning of this FYR period, there is no information provided in the FYRR to suggest that these trends have changed. The FYRR should provide the documentation that supports the conclusions made in this bullet.

f. The fifth bullet on Page 43 discusses the monitoring of the Bedrock Ridge intercept system. The text suggests that the system has gone through an extensive startup evaluation due to the difficult nature of completing extraction wells in Denver Formation sandstones. This discussion is not correct. EPA did not approve the CCR for the Bedrock Ridge intercept system because the system was not adequately capturing the Bedrock Ridge plumes, thus allowing bypass of contaminants to occur. An additional extraction well was installed in 2005 to eliminate the bypass, but a formal discussion of extraction system performance has not yet occurred. Because the construction completion, startup and operation of the Bedrock Ridge intercept system has occurred during this FYR period, the FYRR should provide a comprehensive discussion of the operational problems associated with the Bedrock Ridge intercept system supported by both data and maps.

g. The fifth bullet on Page 43 also suggests that after startup, concentrations in downgradient wells have declined for several contaminants. However the contaminants showing this trend are not mentioned, the well locations where measurements were taken are not listed, and the amount that the concentrations have declined is not quantified. The FYRR should provide this information or reference the report containing the information.

h. The sixth bullet on Page 43 states, "In North Plants, concentrations of DIMP and chloroform are lower; however monitoring is somewhat limited." This statement suggests that there is insufficient monitoring in the North Plants area to establish the water quality in this area, and to substantiate the conclusions presented in this bullet. The text should be revised to provide a clear explanation of the data that was used to develop this statement and the portion of the North Plants that lacks adequate monitoring capability or monitoring frequency. This bullet should also identify the additional monitoring that would have been required to fully support a technical assessment of the DIMP and chloroform plumes and the resulting statement determination.

i. The sixth bullet on Page 43 also mentions that remediation of fuel oil contamination characterized during the North Plants soil remediation is under evaluation. The following are comments on this bullet:

1) This bullet should explain that during excavation of a chemical sewer by the North Plants Structure Demolition and Removal Project, petroleum-contaminated soil was encountered and it became evident that a petroleum spill had contaminated the soil, resulted in a layer of free product, and had potentially contaminated groundwater (TTFWI 2004d).

2) This bullet indicates that the North Plants Soil Remediation Project completed the characterization. However, the North Plants Soil Remediation Project is still in the early design phase and is not complete, the characterization of the free product waste is not complete, and full characterization of media potentially contaminated by the free product waste has recently been removed from the scope of the North Plants Soil Remediation Project. These facts should be stated.

EPA considers the discovery of the free product waste a new contamination source. Because the presence of this free product waste was not known previously, remedy requirements were not defined in the ROD. The text should provide a discussion of efforts-to-date to characterize the nature and extent of the fuel plume, and the resulting evaluation of data collected.

j. The seventh bullet on Page 43 discusses the data collected under the South Lakes Groundwater Investigation Plan. The text discusses the results of the water quality monitoring performed under the plan, but does not discuss the results of the water level evaluation performed as a component of this plan. The FYRR should discuss the results of the water level investigation.

k. The eighth bullet on Page 43 discusses the results of chloride and sulfate monitoring. The text does not define the area evaluated, does not discuss the trend analysis methodology and does not reference the wells used to make the determination of decreasing concentrations. Also the text does not define how chloride was determined to be "on track to meet the CSRG within 30 years." A more detailed discussion of the monitoring for these compounds should be provided in the FYRR.

Response:

a. The text has been revised to include groundwater information related to the operation of the groundwater containment, extraction, and treatment systems in Section 4.1, and the sitewide groundwater evaluation in Section 6.4.

b. The LTMP specified wells and indicator analytes for each well in the site-wide monitoring network. Table 6.4.1-2 in the revised document includes well and indicator analyte information for the on-post areas included in the Water Quality Tracking and CFS monitoring networks. The section

6.4.1.2 South Plants text has been revised to include specific well and analyte information and identify the wells with decreasing chloroform trends.

c. The "overall decreasing trend" refers to the long-term trend, whereas "short-term variations" refers to the 5-year review period. The text has been revised to clarify that the area referred to is the area within the Basin A plume group as defined in the ROD and the specific groups of wells monitored are indicated in the LTMP. The revised text includes an expanded discussion of contaminant trends.

d. The North of Basin F extraction well had been impacted by n-nitrosodimethylamine (NDMA) as a result of contamination in the former Basin F. The NDMA originated from the Hydrazine Blending and Storage Facility in South Plants where some groundwater contamination also occurred. Groundwater pumped from the North of Basin F well was piped to the Basin A Neck Containment System (BANCS) for treatment from 1990 to 2000. The shutdown of this well therefore eliminated the main NDMA source from the Basin A Neck system influent. Much lower levels of NDMA also migrate to the BANCS from South Plants. Since the Basin A Neck system does not include NDMA treatment, there was a potential for increasing NDMA concentrations in the downgradient wells from operation of the North of Basin F well. The text has been expanded to include information on NDMA detections and concentration trends in wells 26006 and 35505 downgradient of BANCS during the review period.

e. The "overall decreasing trend" refers to the long-term trend, which includes data prior to this FYRR period. The text has been revised to also address the trend during the current review period, to clarify that the area referred to is the area within the Basin F plume group as defined in the ROD, and to clarify that the specific groups of wells monitored and indicator compounds are those identified in the LTMP. To address EPA's concern about the CPMSO and trichloroethylene (TCE) trends during the previous FYRR period, it should be noted that the NBCS treatment plant influent met the CSRG for CPMSO and TCE throughout the current review period, and only one NBCS extraction well exceeded the CSRG for CPMSO in 2001 only. All NBCS extraction wells have met the CSRG for TCE since 2002. Thus, both of these compounds displayed decreasing concentration trends at the NBCS during the current FYRR period.

f. The text in Section 4.3.1.4 has been expanded to include a more detailed description of the basis for and decisions related to the Bedrock Ridge system. However, since the additional extraction well was installed in FY 2005, any evaluation of its performance would be premature at this time.

g. The LTMP specified wells and indicator analytes for each well in the Bedrock Ridge area monitoring network. The text has been expanded to include a reference to the LTMP for detailed information and Table 6.4.1-2 summarizes the on-post water quality tracking wells and analytes

h. The statement has been revised to clarify its intent, which was to explain that further conclusions should not be drawn based on chemical data from the low number of wells. However, the RVO does not believe that the "limited" number of wells is inadequate. It is important to note that the on-post monitoring program relies on water level monitoring as its primary tool and that tracking of indicator compounds is not intended for plume map development. The current monitoring network was developed based on a careful review of contaminant histories and hydrogeological information. The well network will be evaluated and revised as necessary in the revised LTMP.

i. The discovery of and status of the fuel oil release in North Plants is discussed in Section 4.4.2.4, assessed in Section 7.3.23, identified as an issue in Section 8.10, and follow-up is provided in Section 9.8

j. The text has been revised to include a statement regarding how the water level requirement in the On-Post ROD was addressed through the Data Quality Objectives for the South Lakes groundwater investigation in the 2001 Sampling and Analysis Plan (SAP) for Groundwater (USGS et al 2001), and the related conclusions presented in the 2004 South Lakes Groundwater Monitoring Report (USGS 2004). The investigation results led to the conclusion that lake level maintenance was not necessary to prevent contaminants from migrating into the lakes at levels exceeding CBSGs. Please see response to Specific Comment #7. The RVO has removed the lake level maintenance requirement from the ROD through the Groundwater Remediation and Revegetation Requirements ESD, which was signed on 3/31/06.

k. The text has been revised to include information about the data evaluation that led to these conclusions. As described in the Development of Chloride and Sulfate Remediation Goals for the North Boundary System report (MKE 1996), chloride and sulfate CSRGs will be met in the NBCS effluent primarily by decreasing groundwater flow from the former Basin F area. The referenced chloride and sulfate analysis and compliance time-frame predictions for the ROD were conservative in that meeting the CSRG at the NBCS was not dependent on concentrations decreasing in upgradient wells, just the quantity of flow from this area. Even though upgradient concentrations may actually increase, the overall contaminant mass flowing toward the NBCS is expected to decline. Consequently, the conclusions concerning meeting the CSRGs are based primarily on NBCS influent/effluent concentration trends. The trends in upgradient monitoring wells were evaluated for completeness.

Comment 49. **Section 6.4.1.3, Confined Flow System, Page 44.** This section discusses the confined flow system (CFS) monitoring. The following comments pertain to this section:

a. The text does not identify the wells used to make the determination of whether contaminants are moving into the CFS. The FYRR should provide an expanded data evaluation discussion for the CFS and provide the documentation necessary to validate the results.

b. The third bullet in the second paragraph suggests that chloride concentrations are increasing in two CFS wells, but does not identify the wells or where they are located. Since increasing concentration of contaminants in CFS wells is the criteria for determining whether downward migration of contaminants is occurring, it would appear that this is occurring in the area of these two wells. The text should discuss the implications to the CFS monitoring program due to these increased concentrations.

c. The third paragraph suggests that no contaminant migration to the CFS has occurred during this FYR period. The information provided in the third bullet makes this conclusion questionable. Additional discussion of the increase in chloride concentration in the two CFS wells should be provided.

Response:

a. The text in Section 6.4.1.3 of the revised FYRR has been expanded to include a discussion of the Confined Flow System (CFS) evaluation with references to the CFS well network and analyte lists specified in the LTMP. Table 6.4.1-2 provides information on the CFS wells monitored, analytes, and monitoring frequencies.

b. The discussion of the increased chloride concentrations has been expanded to include the possible explanations for the increase and the potential implications for the CFS monitoring program. The CFS well network was scrutinized carefully to include wells where the well construction appeared to be acceptable and well documented, and an effective aquitard likely was present. However, some uncertainty is inherent for both of these elements. Consequently, other explanations of the increasing chloride concentrations such as questionable aquitards or leaking well seals may exist. The discussion of the CFS evaluation for these wells has been expanded in the text.

c. The discussion of the conclusions in the third paragraph has been expanded to include a discussion of the increasing chloride concentrations.

Comment 50. **Section 6.4.1.4, Exceedance Monitoring, Pages 44 - 46**. This section discusses the off-post exceedance monitoring program. The following are comments on this section:

a. The first bullet in the third paragraph of Page 45 suggests that because the 2002 and 2004 Exceedance Maps (DOA 2003; DOA 2005) show contaminant distributions consistent with the previously mapped exceedance areas, the LTMP will provide adequate coverage for planned exceedance monitoring during the third FYR period. Review of the off-post exceedance maps referenced in this bullet has raised significant concern with respect to the adequacy of the exceedance monitoring program. The following comments identify these concerns:

   1) The exceedance maps show plumes that are partially derived from wells that are not in the current LTMP for exceedance mapping. Wells 37397 and 37440 are examples of these wells. These wells should be included in the LTMP exceedance map sampling list because they are helping to define the off-post plumes.

   2) The exceedance maps show two private wells in Section 9, north of RMA, that have DIMP values that have exceeded the CSRGs on both the 2002 and 2004 Exceedance Maps. However, there are almost no monitoring wells east or west of these wells to establish the nature and extent of this contamination, which would have emanated from RMA. The text should be revised to discuss this lack of definition in the Off-Post DIMP plume and provide an evaluation of how the current groundwater sampling efforts are achieving the intent of the monitoring program.

   3) In some cases, the exceedance maps show concentrations above CSRGs in wells that do not have a well downgradient to establish the extent for the given plume. Examples include the CSRG exceedances at Wells 37374, and 37379, among others, for which there are no wells monitored downgradient to track the contaminant plume. This is also the case for exceedances of CSRGs that occur in downgradient monitoring wells associated with the Northern Pathway System. The text should be revised to discuss this lack of definition in the Off-Post CSRG plumes and provide an evaluation of how the current groundwater sampling efforts are achieving the intent of the monitoring program.

   4) The extent of dieldrin above CSRGs has increased north of the NBCS since publication of the 2002 Exceedance Map. Well 37318 is an LTMP well located downgradient of the dieldrin plume and has had DIMP above the CSRG in the 2002 sampling period. This well is labeled as closed on the 2002 Exceedance Map. EPA has been requesting the status on replacement of this monitoring well since August 2004. RVO has continued to suggest that they were reviewing

the replacement of this well. The well is in a critical location for establishing the true extent of the DIMP and dieldrin plumes and was not sampled during the 2004 exceedance monitoring because it was damaged. The downgradient extent of dieldrin and DIMP cannot be fully evaluated. Because the RVO has not replaced this critical well after it was damaged nearly a year ago, it would appear that groundwater monitoring program has been significantly hampered and cannot successfully achieve the intent of the monitoring program. The text should be revised to discuss this lack of definition in the Off-Post dieldrin plume and provide an evaluation of how the current groundwater sampling efforts are achieving the intent of the monitoring program.

5) In addition, numerous off-post Army wells that are listed in the LTMP have been closed or cancelled during this FYR period. The 2003 Well Networks Update lists Army wells that have either been closed or cancelled due to well damage (FWENC 2003c). A review of the data collected during the FYR period suggests that some of these wells were not monitored as specified in the LTMP prior to being proposed for closure in 2003. According to the LTMP, Wells 37355, 37356, and 37357 should have been sampled for water quality parameters between 2000 and the 2003 closure date, but were not sampled during this period. These wells, and wells 37345, 37382, 37432, and 37340 were to be monitored annually for water levels, but no water levels were measured in 2001 or 2002. Well 37340 should have been replaced in 2003 as stated in the 2003 Well Networks Update (FWENC 2003c) but there is no water level data from this well in the RMAED, and a field visit conducted by EPA on August 16, 2005 did not find a replacement well. These data suggest that there is no policy with respect to replacing damaged wells that are in the LTMP. The text should be revised to discuss the current policy for identifying monitoring wells for closure, the rationale for this policy, the impact on sampling objectives, and how the intent of the monitoring program is achieved.

b. The second bullet in Paragraph 2 on Page 45 suggests that DIMP is the only organic compound that has exceeded the CSRGs at the OGITS during the FYR period. However, the 2002 Exceedance Map shows that both chloroform and dibromochloropropane (DBCP) exceeded the CSRGs during this time period (DOA 2003). The text should clarify that additional organic compounds have exceeded CSRGs at the OGITS.

c. Bullets 3 through 7 in Paragraph 2 on Page 45 discuss trends in concentrations as seen in off-post wells. However no references are provided to support the conclusions made, no data is presented, no well locations are identified, and there is no discussion of the trend analysis methodology used. The FYRR should provide the data analysis that supports the conclusions made in these bullets.

Response: a.

1) The RVO will consider adding wells 37397 and 37440 to the CSRG Exceedance Monitoring network during the 2007 LTMP review and revision.

2) The text in the Final FYRR has been revised to include information on how the intent of the monitoring program was achieved. Well 37351, located along 104th Ave about one and a half miles to the northwest of RMA, is about one-half mile upgradient of wells 359C and 986A. Water quality data from well 37351 and wells 359C and 986A were used to construct the DIMP exceedance areas in the vicinity of wells 359C and 986A. Before finalizing the 2004 CSRG map, the RVO reviewed the DIMP data in the vicinity of wells 359C and 986A to ensure that probable boundaries of all exceedance areas were delineated in accordance with all available data.

3) The RVO plans to review and revise the off-post water quality network as part of the 2007 LTMP update. It is recognized that the current network has lost several wells due to activities associated with off-post development. The RVO agrees that wells may need to be added in some off-post areas to better define the extent of the CSRG exceedances. The RVO is working with a water quality network that was established as part of the long-term monitoring plan for groundwater (FWENC 1999). The RMA parties agreed upon the plan. In some cases, wells critical to the delineation of exceedance areas have been lost as a result of ongoing development in the off-post area. Four of the 57 monitoring wells in the LTMP CSRG exceedance network have been closed. Of the four, one (37318) is already replaced and DIMP concentrations in two others had been below the CSRG since 1994 or earlier. Historically, some of the Exceedance Monitoring areas have had no detections, including the areas downgradient of O'Brian Canal and Burlington Ditch because of the effects of surface water recharge. In the case of wells 37374/37379, well 37374 is an alluvial well that has been below 8 ppb for DIMP since 1994. Adjacent well 37379 is an unconfined Denver well that is still above 8 ppb because the lower permeability Denver zone has been slower to clean up. The RVO has depicted the DIMP Exceedance area near these wells more conservatively, and it is unlikely that the exceedance areas for chloride, DIMP, and sulfate extend downgradient of O'Brian Canal. DIMP concentrations in the alluvium upgradient of the canal in well 37374 already meet the Applicable or Relevant and Appropriate Requirement (ARAR). The canal water contains low levels of chloride and sulfate and the effect of surface water recharge likely lowers the groundwater concentrations significantly.

4) Well 37318 was replaced on 01/26/06. The well was screened in the unconfined Denver Formation and had not had a detection of dieldrin since 1983. DIMP concentration data for this well may not be representative of the overlying alluvium because of the lower hydraulic conductivity of the Denver Formation.

5) Some off-post Army wells have been damaged or destroyed by construction/redevelopment activities. Because of new development of the properties where the wells were located, the wells could not be redrilled in the same location. Nearby wells were used instead to draw water table maps or construct the exceedance plumes. As monitoring well problems developed over the past five years, they were discussed with the Regulatory Agencies during the monthly Water Team status meetings. In 2003, a revised off-post groundwater monitoring network with a reduced number of monitoring wells was proposed to and accepted by the Agencies.

b. The text in the Final FYRR has been revised to clarify that additional organic compounds, including chloroform, dibromochloropropane, and tetrachloroethylene exceeded CSRGs at the west end of the OGITS Northern Pathway System.

c. The Final FYRR includes an evaluation of off-post water quality monitoring in accordance with the reporting guidelines outlined in the LTMP and references have been added to further support conclusions made in the text.

Comment 51. **Section 6.4.2, Biota Monitoring, Page 46.** This section is a review of Biota Monitoring data. This section refers to two reports that provide biota-monitoring data, the *RMA National Wildlife Refuge Annual* Progress *Reports and the Annual Narrative Reports*. However, these reports are internal to the U.S. Fish and Wildlife Service (USFWS) and, therefore, EPA has not reviewed the biota monitoring data summarized in the reports. If these reports are the appropriate supporting documentation for this section, then the reports should be submitted through the usual RMA process for review and comment. At this time, EPA is not able to validate the conclusions presented in this section.

Response: EPA representatives on the RMA BAS review and evaluate biota monitoring data on an ongoing basis. The biota monitoring data contained in the referenced reports were provided to the EPA through the RMA Biological Assessment Committee. The referenced reports will be made available to EPA.

Comment 52. **Section 6.4.3, Air, Pages 47 and 48.** This section describes air-monitoring results. The tone of the discussion regarding air quality contained in Section 6.4.3 is primarily focused on the perceived success of the air program with little discussion of the exceedances that the air program has experienced at the

boundaries during the past FYR period. Specifically, a more detailed and factual discussion of the chloroform exceedance during the South Plants project as well as the "blue haze" incident related to the M-1 Pits project should be included in the FYRR.

In addition, there is no discussion of the North Plants GB detection provided in the Air section. The text should be modified to add a description of this event and the efforts to identify the source of this detection. Finally, the revisions currently being considered for the Site-Wide Air Quality Monitoring Plan (SWAQMP) should be identified.

Response: Changes in the text for the discussion of the "blue haze" incident have been made as discussed in the RVO response to CDPHE comment #76. The remainder of the text concerning chloroform and the "blue haze" are factual as presented. Neither the chloroform detection nor the "blue haze" incident represents failures of the Site-Wide Air Monitoring Program.

Comment 52 discusses the inclusion of a GB detection at North Plants in Section 6.4.4. This GB detection is not germane to the discussion of the protectiveness of the remedy, and has not been included in the FYRR. However, a reference to the North Plants Demolition Project Assessment of Anomalous Detections in Vapor Containment Structure Perimeter Depot Area Air Monitoring System Tubes (April 2003) has been included in the text in Section 4.4.2.4.

Comment 53. **Section 6.4.3, Air, Page 47, Paragraph 5.** The paragraph discusses the fenceline exceedance of the acute reference concentration for mercury that occurred in 2000. The monitoring location of the exceedance is not discussed, and the FYRR dismisses this exceedance by saying that it is believed to be attributable to sample media contamination and not RMA activity. No evidence is presented to support the theory of media contamination and no reference is made to any report that supports this claim. The FYRR should provide the data to support the conclusion that this acute exceedance was a result of media contamination, or provide the reference to the report or document where this conclusion can be verified.

Response: Section 6.4.4 has been revised to include a reference to the Air and Odor Monitoring Data Report for the Calendar Year 2000.

Comment 54. **Section 6.4.3, Air, Page 47, Paragraph 6.** This paragraph briefly discusses the chloroform exceedance occurring in 2002 as a result of the South Plants Remediation. The discussion in this paragraph is confusing because the first sentence states that there were two instances where the "chronic health risk annual action levels" were exceeded. It is EPA's understanding that air action levels (AALs), and the annual air budget for chloroform levels were also exceeded at AQ-5 as a result of the October 1, 2002 chloroform detection. Furthermore, more than 100 percent of the annual budget was expended at

both AQ-1 and AQ-5, and chloroform was measured at the Montbello High School located more than a mile south of the RMA fenceline. The text describing these events in the FYRR should be replaced with the description and analysis presented in the South Plants CCR. This was a major event at the time of the occurrence and it resulted in significant confusion and different interpretations of the actions required in the SWAQMP. As a result of the problems encountered on the South Plants Project, the SWAQMP is undergoing a significant revision, and this should also be reflected in the FYRR.

Response: An extensive discussion of the chloroform exceedance is presented in the context of the project in Section 4.3.1.4 with a general note regarding the topic in Section 6.4.4.

Comment 55. **Section 6.4.3, Air, Page 48, Paragraph 3.** This paragraph states that there were several occurrences of short-term Particulate Matter less than 10 Micrometers in Diameter (PM-10) values approaching internal action levels at the RMA visitor locations. The FYRR should be revised to explain the importance of these action levels, the number of high values occurring, what RMA activities were occurring at the time of the high values, and what contribution RMA sources made to the regional dust problem. In addition, the FYRR does not state if public site visitations were taking place during these events, and if so, how any actions taken were protective of the public. The paragraph should be revised to provide the missing information.

Response: The Particulate Matter Less Than 10 Micrometers in Diameter (PM-10) monitoring discussed in Section 6.4.4 shows levels with no impact to the public health. Because the EPA PM-10 levels represent no impact to the public health, further information about public site visitations is unnecessary.

Comment 56. **Section 6.4.3, Air , Page 48, Paragraph 4.** The section discusses fugitive dust events at RMA and states that there were no documented instances of fugitive dust from on-site sources crossing the RMA fenceline. However, the *South Plants Balance of Areas and Central Processing Area Soil Remediation Project - Phase 2, Part 1 and 2, Construction Completion Report* states that there was a documented fugitive dust event occurring on January 3, 2002 (TTEC 2005c). The text should be revised to incorporate the South Plants CCR discussion.

Response: The text in Section 6.4.4 has been modified to reflect the CCR language.

Comment 57. **Section 6.4.3, Air, Page 48, Paragraph 5.** This paragraph describes odor detections occurring on-post and at the fenceline. The last sentence in the paragraph states that control protocols were followed and were effective. However, the paragraph also discusses the "blue haze" incident where odor emanated and migrated from the M-1 Pits Project to the Recycled Materials work site located on the old Stapleton runway near the southern boundary of

the RMA. While the State Nuisance Odor regulation was not exceeded, there were reports of illness and missed work associated with the incident. It is inaccurate to say the protocols were effective when the project impacted a neighboring facility. Therefore, this discussion should be revised to factually represent this incident. Also, the "blue haze" incident discussed in this section occurred in September 2001, not 2002 as stated in the paragraph, and the discussion should be revised accordingly.

Response: Section 6.4.4, has been revised to include the text: '...although nuisance effects from the incident were reported from one off-post entity and one citizen.' The remainder of the text accurately represents the incident.

The technical inaccuracy that the "blue haze" incident occurred in September 2002 has been corrected as requested.

Comment 58. **Section 6.4.3 Air, Page 48, Paragraph 6.** The paragraph states that the SWAQMP and the Site-Wide Odor Monitoring Plan (SWOMP) are working and meeting all objectives and goals envisioned from program implementation to the present time. EPA agrees that Applicable or Relevant and Appropriate Requirements (ARARs) have been met; however, work during this five-year period has also illuminated the weaknesses in these site-wide plans. The SWAQMP is presently undergoing a significant revision to address the ambiguities and inadequacies of the plan. Likewise, the blue haze incident discussed above demonstrates the inability of the SWOMP to prevent odors (and related chemicals, including bicycloheptadiene and dicyclopentadiene) from migrating off RMA under some meteorological conditions. For this reason EPA relies heavily on site-specific monitoring plans. The section should be revised to discuss the revisions being made to the SWAQMP and the reasons for the revisions.

In addition, the SWAQMP calls for the use of real-time instrumentation to characterize exposure under various conditions, including high odor events. The section should be revised to discuss the rationale for eliminating real-time monitoring of project specific contaminants, and why the remedy (particularly the up-coming Basin F projects) will be protective without real-time monitoring capability. The FYRR should describe how the changes made in the air program will achieve the intent of the air monitoring program without a pro-active, real-time measurement system.

Response: The statements made in Section 6.4.4 accurately describe the Site-Wide Air Quality Monitoring Program (SWAQMP) and the Site-Wide Odor Monitoring Program. The RVO believes the revisions to the SWAQMP are proactive responses to further strengthen our Air Monitoring Program and not corrective actions in response to previous perceived failures. With this proactive view of the revisions to the SWAQMP, the RVO feels little need to include a discussion of these revisions in the FYRR. Similarly, real-time monitoring of

site-specific contaminants can be identified if such monitoring is determined necessary.

Comment 59. **Section 6.4.4, Surface Water, Pages 48 to 50.** This section notes that surface water monitoring data collected between October 1, 1999 and September 30, 2004 were evaluated for this FYRR. The following are comments on the surface water monitoring program and results:

a. The FYRR does not discuss the on-post surface water sampling program as described in the Surface Water Monitoring Program Sampling and Analysis Plan (FWENC 2001c). The results of the on-post surface water program should be included in this section.

b. The sampling and analysis plan indicates that on-post and off-post surface water sample locations have a storm water component to the monitoring program (FWENC 2001c); however, the text does not discuss whether the program met the annual storm water sampling requirements. This discussion should be provided.

c. The second complete paragraph on Page 49 discusses the exceedance of CSRGs in the First Creek sampling station off-post at Highway 2. However, the text does not report the actual values that were detected for analytes exceeding the CSRGs, and does not evaluate the data relative to flow measurements recorded at these stations. In addition, the report does not state whether the samples with exceedances were routine samples or storm water samples. The text should be revised to incorporate this documentation and provide an evaluation of the cause of the exceedances in First Creek relative to flow measurements and possible groundwater-surface water interactions.

d. Surface Water Stations 24004 and 37001 were visited during the FYR site inspections for NBCS and OGITS. Signs identifying these sample locations were not observed in the field. The text should be revised to describe the protocols used to ensure that sampling is consistently obtained from the required locations during each sampling event.

e. The Introduction to the *Long-Term Monitoring Program Rocky Mountain Arsenal Annual Data Summary, 2004 Water Year* report states, "Data in this presentation precedes interpretive evaluation reports for the LTMP program and is intended only to present data collected as part of this program." (USGS 2005). However, no interpretive reports for surface water monitoring are referenced in the FYRR. The FYRR should reference the interpretive reports produced during this review period and discuss the evaluations performed for the surface water monitoring program.

Response:

a. An analysis of results of the on-post surface water program and a reference to the 2003 Off-Post Surface Water Data Evaluation report have been included in the revised text.

b. The text has been revised to document the annual storm water sampling requirements and summarize the results.

c. The text has been revised to include a discussion of the analytes and values that exceeded CSRGs, whether the samples with exceedances were routine samples or storm water samples, and an evaluation of the data relative to flow measurements recorded at these stations.

d. The text has been revised to state that, depending on flow conditions, the exact sampling location can change by a few hundred feet in order to optimize the straightness of the reach, the uniformness of the flow, and the uniformity and stability of the channel bottom.

e. Interpretive reports for surface water monitoring were not produced by prior agreement of the parties. In lieu of separate interpretive reports, additional interpretation of the data from the past 5 years has been incorporated into the FYRR.

Comment 60. **Section 7.0, Assessment, Pages 51 to 140.** This section is entitled, "Assessment." However, the information in Section 7.0 does not include a technical assessment as outlined in Exhibit 3-3 and Appendix E of the *Guidance* (EPA 2001). Section 7.0 should be restructured to provide a technical assessment of the remedy at RMA in accordance with the *Guidance.*

Response: The text has been revised to follow the current guidance.

Comment 61. **Section 7.1, Remedy Assessment, Pages 51 to 124, and Table 4, Page 51.** Section 7.1 is intended to respond to Question A, and Table 4 is a summary of review standards for Question A. However, the review standards in the left column of the table do not cite the most current FYR guidance (i.e., EPA 2001), and therefore, the review standards are not accurate. Specifically, the list of review standards that should be used to answer Question A are described in Sections 4.1.1 and 4.1.2, and in the checklist on Page E-27 of the *Guidance* (EPA 2001). For example:

a. Section 4.1.1 of the *Guidance* states that remedial actions that are under construction should determine: (1) if the remedy is being constructed in accordance with the decision documents and design specifications; (2) if the remedy is expected to be protective when completed; and (3) if access and institutional controls are in place and successfully preventing exposure.

b. For remedial actions that are operating or are completed, Section 4.1.2 and the checklist on Page E-27 of the guidance list specific information that must be answered as part of the technical assessment (EPA 2001).

Table 4 should be rewritten to accurately reflect the requirements of the *Guidance*, and Section 7.1 should be reorganized to provide a technical assessment that answers Question A.

Response:

a. The list of review standards was modified as requested.

b. The list of review standards was modified as requested and Section 7 was reorganized in accordance with the 2001 EPA FYR guidance.

Table 4 was deleted and the guidance is reflected at the beginning of Sections 7.1, 7.2 and 7.3.

Comment 62. **Section 7.1, Remedy Assessment, Question A, Pages 51 to 124.** This section consists of a summary of ROD requirements and remedial actions for the implementation projects conducted in the past five years. The following are comments on this section:

a. Exhibit 3-3; Appendix E, Page E-23; and Appendix F, Pages F-17 to F-21 of the *Guidance* indicate that this type of information (the remedy selection, remedy implementation, remedy performance, system operations, and operations and maintenance) should be included in Section 4.0 of the FYRR (EPA 2001). As stated in the general comments, much of the remedy information in Section 7.1 should be moved to Section 4.0 to follow the *Guidance*.

b. The technical information in Section 7.1 is often incorrect. Several specific comments are provided below that identify many of the details that are inaccurate. The facts about the remedy that are currently reported in Section 7.1 should be reviewed, verified, corrected, and then moved to Section 4.0 of the FYRR.

c. Section 7 should be revised to technically assess remedial action that is introduced in Section 4. Pages E-26 through E-29 of the *Guidance* provide a framework for conducting the technical assessment (EPA 2001). A revised Section 7.1 should consist of the first part of the technical assessment, as required in the *Guidance* (Pages 4-1 through 4-4, Page E-7). Section 7.1 should be revised to include the first component of the technical assessment: determining whether each component of the remedy at RMA is functioning as intended.

d. This section does not provide COCs for the implementation projects, as Page E-6 of the *Guidance* indicates should be done (EPA 2001). The

COCs for each project should be identified, or it should be indicated that they are identified in the CCRs.

e. Waste volumes reported in this section do not accurately reflect those certified by the Department of the Army (DOA) to be correct in the respective CCRs. Some specific examples are provided in subsequent comments. This section should be revised to thoroughly crosscheck waste volume to ensure the correct volumes are reported in the FYRR.

f. This section does not list the ROD standards and goals applicable to control of air emissions. Air emissions goals and standards in the ROD apply to each of the soil remediation projects. This section should be revised to describe the ROD goals and standards for air emission control. The FYRR should clarify that the ROD goals and standards for air emission control apply to all implementation projects.

g. This section does not include references to documents that demonstrate completion of each remediation project. Complete references and citations to reports and data assessments that demonstrate completion of the implementation projects should be provided in this section.

Response:

a. The requested revision has been made and most of this information has been moved to Section 4.3.

b. As requested, the facts reported in Section 7 was reviewed, verified, corrected and moved to Section 4 of the FYRR.

c. Section 7 was revised to technically assess the remedial action introduced in Section 4 and Sections 7.1, 7.2 and 7.3 was revised to include the first component of the technical assessment to follow guidance.

d. As requested, the Section 3.0 of the revised text includes statements that the project-specific Contaminants of Concern are presented in the CCRs.

e. As requested, the volumes were verified and corrected as appropriate.

f. The ROD goals and standards for air have been included in Section 4.

g. Complete references have been compiled for the final FYRR.

Comment 63. **Section 7.1.1, Pages 51 to 60.** This section describes remedial actions that are under construction. The following comments apply to the discussion of remedial actions. The remedial action descriptions for each implementation project should first be revised and then this information should be moved to Section 4.0 of the FYRR as stated above and in the General Comments.

a. The FYRR does not consistently describe the ROD requirements (from Section 9 of the ROD) or the ROD Goals and Standards (from Table 9.5-1 of the ROD) for these projects. This information is important in determining an answer to the question: "Is the remedy functioning as intended by the decision documents?" This section should be revised to consistently describe ROD requirements, goals, and standards for each of the remedial actions under construction.

b. The Section 36 BOA Soils Remediation Project is not discussed. The section should be revised to include a discussion of this project.

Response:

a. The selected remedy from the ROD has been consistently presented in Section 4. The ROD goals and standards from Table 9.5-1 are presented as part of the Section 4 remedy status to provide context to that discussion.

b. The Section 36 Balance of Areas project has been added to Table 2.0-2 status is discussed in Section 4.3.1.5 and the project is assessed in Section 7.1.7.

Comment 64. **Section 7.1.1, Existing (Sanitary) Landfills Remediation Section 30, Pages 52 and 53.** This subsection discusses the ESL remediation project. This project does not identify the fact that MEC was found during the implementation of this project, even though the project was not identified as an unexploded ordnance (UXO) area in the ROD. The subsection should be revised to discuss the finding of MEC, the manner in which that finding was managed, and discuss whether, in light of the finding and action, the remedy is functioning as intended.

In addition, this subsection does not describe sampling and disposal of drums or bottles that were suspected to have recovered chemical warfare materiel (RCWM). Proper management of wastes is an important aspect of the functioning remedy at RMA and therefore is applicable to the FYRR.

Response: The requested revision has been made and the discovery of Munitions and Explosives of Concern (MEC) included in Section 4.3.1.2 and in the assessment in Section 7.1.2. In addition, sampling and disposal of bottles and other small containers of liquids have been noted in Section 4.3.1.2. No drums were discovered and that incorrect statement was deleted.

Comment 65. **Section 7.1.1, Munitions (Testing) Soil Remediation Part II, Page 53.** This subsection describes the MT project and indicates that based on information gained regarding the history of the 4.2" mortar's flight path, the area of SAR Site ESA-4a was expanded. The following are comments on this subsection.

a. This subsection does not identify the ROD remedy. This subsection should be revised to quote the ROD remedy.

b. This subsection does not identify the ROD goals and standards. This subsection should be revised to identify the ROD goals and standards applicable to this project.

c. This subsection does not discuss remedial actions corresponding to all elements of the ROD remedy. This subsection should be revised to discuss remedial actions corresponding to the following additional ROD remedy elements: 1) removal and landfill of soil in excess of the toxicity characteristic leaching procedure (TCLP) concentrations, and 2) that UXO (or MEC to use the current term) is transported off-post for detonation. This discussion should include a description of the procedure used to transport the MEC and the location(s) for detonation/ disposal of the MEC. Section 7.0 should be revised to discuss the technical assessment of this project and whether the remedy is functioning as intended. In particular, the section should address any problems or potential concerns for communities and the environment during transport of the MEC to the off-post location.

d. This subsection does not fully describe the background for the expansion of the SAR Site ESA-4a. This subsection should more fully describe the background of the site, including the fact that the site remediation was thought to be effectively completed (FWENC 1999a), and that UXO items were found during additional clearance stemming from the Summary Team review efforts. In addition, the specific information used as a reason to expand the ESA-4a areas, and the source of that information, should be identified and discussed.

e. This subsection does not discuss the potential implications resulting from the background and clearance activities conducted at the site. These aspects of the MT project include the adequacy of review of site records, the thoroughness and criteria of the clearance activities conducted in association with the Sanford Cohen and Associates survey, and the need to conduct quality assurance (QA) surveys because of the high percentage of targets remaining after the original survey. This section should be revised to identify these aspects of the MT project. Based on the revision anticipated for this section, EPA expects that these aspects of the project will result in the identification of Issues to be addressed in Section 8.0 of the FYRR.

Response:

a. The selected remedy from the ROD has been presented in Section 4.3.1.3.

b. The ROD goals and standards from Table 9.5-1 are presented as part of the Section 4.3.1.3 to provide context to that discussion.

c. A summary of the requested information has been provided in Section 4.3.1.3. With very few exceptions, MEC recovered on RMA have been subjected to extreme "heat, shock, and friction" as a result of some

variation of a previous functioning/disposal attempt. MEC subjected to these types of forces are considered unstable. The degree of instability is left to the munitions response experts, based on extensive publications research and the experts' previous experience. At RMA, the degree of instability has consistently been determined to be safe for on-site transportation, although there have been five occasions when recovered MEC was deemed unsafe for on-site transportation and the item was blown in place. However, the assurance of safely transporting off-site is highly subjective, essentially requiring recovered MEC to be in as-manufactured condition. Given these considerations, the RVO and PMC have collaboratively determined that MEC which may have been previously subjected to extreme forces are considered moderately unstable and therefore unsuitable for transportation off-site. This discussion is presented in Section 4.5.1.3.

d. The requested discussion is provided in Section 4.3.1.3.

e. As discussed in Section 7.1.3, the RVO disagrees that the process undertaken is an issue requiring identification in Section 8. The CERCLA processes and the expertise brought to bear on the issue have addressed these concerns.

Comment 66. **Section 7.1.1, Section 36 Bedrock Ridge Groundwater Plume Extraction System, Pages 53 to 54.** This subsection discusses the Bedrock Ridge Extraction System and the installation of another extraction well to achieve capture of the plumes. The following are comments on this subsection:

a. This subsection does not identify the ROD remedy. This subsection should be revised to quote the ROD remedy.

b. This subsection does not identify the ROD goals and standards. This subsection should be revised to identify the ROD goals and standards applicable to this project.

c. The preliminary construction closeout for the Bedrock Ridge project is documented in a Final Document Review conducted in May 2000, and in a CCR dated September 2000 (WGI 2000). The CCR was not approved by the Regulatory Agencies due to concerns about the ability of the system to capture the contaminant plumes. Improvements to the Bedrock Ridge system, which involved adding an additional extraction well to the system, were completed in July 2005. This suggests that the Bedrock Ridge system has not met its ROD requirement for containment throughout the entire FYR period, and additional evaluation will be needed to determine whether it meets requirements in the future. Because the Bedrock Ridge system was not fully functional during the FYR, and because corrections to the remedy were not completed during the current FYR period, EPA cannot validate that, (1) the remedy is functioning as intended by the decision documents, and (2) whether any new information has come to

light that could call into question the protectiveness of the remedy. This section should be revised to describe the plume capture aspects of the project. Based on the revision anticipated for this section, EPA expects that these aspects of the project will result in the identification of Issues to be addressed in Section 8.0 of the FYRR.

Response:

a. The selected remedy from the ROD has been presented in Section 4.1.

b. The ROD remedy for groundwater requires extraction and treatment until shut-off criteria (CSRGs) are met. This requirement is included in the discussion in Section 4.1..

c. The continuous evaluation of all systems, including the Bedrock Ridge extraction system, during the past 5-year period led to the decision to modify the system to improve plume capture. The data that formed the basis for this conclusion were presented to the Regulatory Agencies during Water Team meetings throughout 2003. The decisions to perform pumping tests and to add a well were made in agreement with representatives from the Regulatory Agencies in a meeting on June 11, 2003. The text has been revised to identify the extraction system bypass as an "Issue" in Section 8.5, to provide follow-up in Section 9.4 and to explain the decision to enhance plume capture to be in compliance with the On-Post ROD.

Comment 67. **Section 7.1.1, Miscellaneous RMA Structure Demolition and Removal Phase 2, Pages 54 to 56.** This subsection describes Phase 2 of the Miscellaneous RMA Structure Demolition and Removal Project. The following are comments on this section:

a. This subsection does not identify the ROD remedy. This subsection should be revised to quote the ROD remedy.

b. This subsection states that Phase 2 of the Miscellaneous RMA Structures Demolition and Removal Project documented redesignation of some structures for Future Use. However, EPA's August 14, 2003, comments on the Phase 2 design change notice (DCN) (DCN-MSD2-002) state that sufficient technical justification was not provided for reclassifying structures that the ROD identified for demolition (no future use) to "be retained for future use" (EPA 2003b). "Straw-man" technical justification reports for changing the Future Use status were provided by EPA to RVO in 2004. EPA understands that the technical justification reports are being finalized by RVO for each proposed change in future use status. However, until these changes are documented and approved by the Regulatory Agencies, the Miscellaneous Structures, Phase 2 Project has not been completed or implemented as intended by the ROD. This section should be revised to reflect the actual status of this project. EPA expects

that this revision will result in a follow-up action in Section 9.0 to include a list of the structures to be redesignated for Future Use and provide a schedule for finalizing the needed documentation.

Response:

a. The selected remedy from the ROD has been presented in Section 4.4.. The ROD goals and standards from Table 9.5-1 for structures are also presented as part of the Section 4.4.

b. RVO believes that the future use redesignation process was captured adequately as a Design Change Notice (DCN) to the Miscellaneous Structure Phase 2 Design and documented in the CCR for the project which is presented in Section 4.4.1.1 of the FYRR text. Follow-up in Section 9.0 was not required.

Comment 68. **Section 7.1.1, South Plants Balance of Areas and Central Processing Area Soil Remediation Phase II Part 1 and 2, Pages 56 through 58.** This subsection describes the SPBA and SPCPA Soil Remediation Project (South Plants Soil), Phase II, Part 1 and 2, which is a remedial action that is currently under construction. The following are comments on this subsection:

a. This subsection inconsistently describes the project as Phase II and Phase 2. Consistent nomenclature should be used.

b. This subsection does not include a discussion of the chloroform emissions that took place during Part 1 of the project. A significant evaluation of the chloroform emissions was conducted by the Regulatory Agencies and the RVO to determine whether the remedy was functioning as intended, and this should be addressed in this subsection of the FYRR. This subsection should clarify that the air emissions goals and standards were met as documented by PMC Air Quality Group monitoring data, observations, and reports. As discussed further in the draft CCR (TTEC, 2005c), the chloroform annual air budget was exceeded at two fenceline air monitoring stations (AQ1and AQ5) during excavation of chloroform-contaminated soils. In addition, an elevated chloroform detection was measured at the Montbello High School monitoring station. This subsection should be revised to include this information and explain the response protocols developed to reduce chloroform emissions, as well as provide an assessment of monitoring results taken through completion of the project.

c. Paragraphs 1 and 2 on Page 56 describe the selected remedy for SPCPA and the SPBA. However, the selected remedy for the South Plants Ditches, Chemical Sewers, and Sanitary/Process Water Sewers are not included. The South Plants Soil implementation project includes these components of the selected remedy as well. This section should be

revised to include the selected remedy for the South Plants Ditches, Chemical Sewers, and Sanitary/Process Water Sewers.

d. Paragraph 2 on Page 56 describes the selected remedy for the SPBA. However, the introduction sentence does not state this fact. The first sentence should be revised to state, "The selected remedy in the ROD for the SPBA requires the following: '(e)xcavation (maximum depth of 10 ft) and landfill…'"

e. Paragraph 3 on Pages 56 and 57 lists ROD standards that apply to the South Plants Soil project. However, this section is missing the ROD standards for agent decontamination that applies to the South Plant Soil Remediation Project, Phase II. This subsection should be revised to include the agent decontamination standard. In addition, the subsection should describe how the ROD standard was met.

f. In addition, this subsection should identify the ROD Technology for each standard (e.g., UXO Clearance, Excavation, Plugging, etc.). For example, the ROD Standard to "Identify, transport off-post, neutralize, and destroy explosives/explosive residue" should be identified as a UXO Clearance Technology.

g. Page 57 attempts to describe the scope of Phase II. However, the scope of Part 1 and Part 2 was fairly complicated, and it is important that the scope is correctly described in the FYRR. The following paragraphs from the CCR executive summary (or a summary of this information) should be included to describe the scope of the project (TTEC 2005c):

"The SPBA and SPCPA Soil Remediation Project was separated into two phases (Phase 1 and Phase 2) during the 95 percent design development. This CCR is written for SPBA and SPCPA Soil Remediation Project - Phase 2, Part 1 and Part 2 (herein referred to as Phase 2, Part 1 and Part 2). The CCR for Phase 1 was approved by the Regulatory Agencies in August 2002.

"Phase 2, Part 1 included remediation of human health exceedance (HHE) soil and biota exceedance soil (Biota), as identified in the ROD and Design Package, as part of the cover subgrade construction. Per the ROD, the HHE soil blocks in the SPCPA were excavated to a maximum depth of 5 ft below grade and removed, and the remaining contamination below 5 ft is to be covered with a Resource Conservation and Recovery Act-equivalent cover. Also per the ROD, HHE located in the SPBA was excavated to a maximum depth of 10 ft below grade and removed. Prior to the conclusion of Phase 2, Part 1, it was determined that final subgrade contours required recontouring, and as a result, final subgrade contours were not achieved during Phase 2, Part 1. Phase 2, Part 2 was developed for completion of recontour work to achieve final subgrade contours. The

redesign and recontour requirements of the final subgrade contours were approved and implemented during Phase 2, Part 2 via DCN-SPPT2-001.

"During implementation of Phase 2, Part 2, interim subgrade boundaries and contours were approved via the DCN process to allow continued use of 7th Avenue for access to Building 312 and also to improve surface water drainage during the interim period between subgrade and cover construction. As part of Phase 2, Part 3, and as required by the approved DCNs, the entire subgrade will be surveyed and improved as needed to achieve the design boundary and contour requirements established in DCN-SPPT2-001, prior to cover construction."

h. Paragraph 3 on Page 58 explains that the property involved in this project is subject to restrictions on land and water use. This subsection should explain the specific restrictions. In addition, this subsection should describe how the site-wide ICs have been implemented, including references to appropriate documentation, to ensure that these restrictions are enforced.

Response:

a. Consistent nomenclature has been used.

b. The remedy status discussion in Section 4.3.1.4 has been modified to include the requested discussion regarding chloroform emissions.

c. Discussion that includes the selected remedy is now presented in Section 4.3.1.4.

d. The discussion of selected remedy has been revised as requested and moved to Section 4.3.1.4.

e. The ROD standard for agent decontamination has been added in Section 4.3.1.4.

f. ROD technologies are not presented or discussed anywhere else in the FYRR. Including such information would add additional detail unnecessary to the protectiveness determinations.

g. The corrected explanations detailing project scope have been included in Section 4.3.1.4 of the revised report.

h. Institutional Controls (ICs) are discussed in a general sense with each project and more fully in Section 6.3.11.

Comment 69. **Section 7.1.1, Basin F and Basin F Exterior Remediation, Pages 58 and 59.** This section discusses the Basin F Exterior part of the Basin F remedy. However, the section does not discuss the excavation of PT waste (if the ROD

Amendment is approved as discussed in Section 4.0) and placement of the RCRA-equivalent cover. These actions are components of the on-going remedial action for this project. This discussion should be revised to identify and describe these components of the remedial action in Section 4.0. Section 7.0 should be revised to provide a technical assessment of this on-going project that addresses Question A, "Is the remedy functioning as intended?" In particular, the section should discuss whether access or institutional controls are sufficient to prevent exposure during the implementation of this project. Changes to the boundary and access controls, including the change to the western boundary caused by deletion of the Western Tier Parcel and conversion of the west gate from a manned to an unmanned gate, increase the likelihood that controls will be compromised, and the ease with which this may be accomplished. The section should be revised to provide a technical assessment, including access controls, of the additional components of the Basin F remedy.

In addition, Section 7.1.6, Access and Institutional Controls, does not address these concerns. Section 7.1.6 should also be revised to discuss these considerations as part of the technical assessment of the ICs at RMA, and in particular with respect to the Basin F Wastepile project.

Response: The ROD amendment does not directly impact this project and is not discussed. PT soil excavation is not part of this project, and cover construction is included in a later phase (#46 on Table 2.0-2). Institutional controls are addressed generally in Section 4.3.1.7, with additional discussion in Section 6.11.

Comment 70. **Section 7.1.1, Basin A Neck Containment System Groundwater Intercept and Treatment System North of Basin F Hydrogen Release Compound, Page 59 and 60.** This subsection in Section 7.1.1 describes the North of Basin F Project remedial actions. The following comments apply to this subsection:

a. This subsection does not identify the ROD remedy. This subsection should be revised to quote the ROD remedy.

b. This subsection does not identify the ROD goals and standards. This subsection should be revised to identify the ROD goals and standards applicable to this project.

c. The title of the subsection should refer to the "Groundwater Intercept and Treatment System North of Basin F Well." Also, The North of Basin F Well is incorrectly identified as the "OGITS North of F Well." The North of Basin F Well has no relation to the OGITS system. Reference to the OGITS systems should be removed from this description.

d. The text also refers to the HRC "installation," but does not describe the project, which is the NBE Project. The FYR should describe the NBE project and remove language tying it to the approval of the North of F

Well CCR. The HRC injected into this general area is associated with the NBCS, not the Basin A Neck Containment System (BANCS) or North of Basin F Well. "Hydrogen Release Compound" should be deleted from this title and discussed in a separate section..

Response: a) The selected remedy from the ROD has been presented in Section 4.1. b) The ROD remedy for groundwater requires extraction and treatment until shut-off criteria (CSRGs) are met. This requirement is included in the discussion in Section 4.1. c) The reference to the OGITS system was removed from this discussion. d) The text has been revised to clarify that the North Boundary Enhancement project is an enhancement to the NBCS. Hydrogen release compound has been deleted from the title.

Comment 71. **Section 7.1.2.2, Corrective Action Management Unit (CAMU) Soils Remediation Completion and Support Project (Part 2), Pages 62 and 63.** This subsection describes Part 2 of the Corrective Action Management Unit (CAMU) Soils Remediation Completion and Support Project. The following are comments on factual details in this section that are not correct or need clarification:

a. This subsection does not clearly explain the ROD requirements for the CAMU. This subsection should briefly explain the CAMU, and the scope of the support tasks for the project.

b. The first sentence of the first paragraph states, "This project addressed remedial actions stated in the On-Post ROD for the CAMU Soil Remediation Completion and Support Project (Part 2)." This statement is misleading. The On-Post ROD does not include remedial actions for the "CAMU Soil Remediation Completion and Support Project (Part 2)." In fact, the ROD does not identify a "CAMU Soil Remediation Completion and Support Project." Excavation of these soils as a separate project was developed after the ROD, in order to prepare the CAMU area for construction of the HWL, and it includes components of the ROD remedy such as remediation of some of the Surficial Soil medium group, as described in Section 9.3 of the ROD (FWENC 1996a). This subsection should be revised to make this distinction. This subsection should also describe the selected ROD remedy for Surficial Soil.

c. The second paragraph describes Part 2 of this project, as, "The CAMU Soils Remediation Completion and Support Project (Part 2) was undertaken to complete activities conducted under the CAMU Soils Remediation Project Part 1 during 1998." However, because the scope of Part 1 is not provided, it is not possible to understand the actual scope of the project. To aid in understanding the scope of the Part 2 project, this subsection should briefly describe the scope of Part 1, and explain that Part 1 was assessed under the first FYR.

d. This subsection does not refer to specific SAR sites that were remediated. This subsection should list the SAR sites that were remediated, as is done for other remedial actions in Section 7.1.2.2.

Response:

a. The Corrective Action Management (CAMU) soils project referred to in the FYRR is a minor soil excavation project. Extensive discussion about the requirements for the CAMU is not necessary.

b. The text in Section 4.3.3.1 was changed to explain the development of this project and that it incorporated areas of the surficial soils medium group. The selected remedy for surficial soil should be presented again.

c. The requested additional text was provided in Section 4.3.3.1.

d. The discussion in Section 4.3.3.1 has been revised to note that the remediated areas of Biota soil are identified in ROD as NCSA-4b and Priority 1 soil contamination was identified by the BAS.

Comment 72. **Section 7.1.2.2, Construct Hazardous Waste Landfill Cell 1 and Landfill Wastewater Treatment Unit, Page 63.** This subsection describes completion of Cell 1 of the HWL project. The following are comments on this subsection:

a. list is given of the implementation projects that are associated with the HWL. Included in this list are the "HWL Operations" and the "HWL Cap Construction" implementation projects. Neither of these implementation projects has been completed even though they are included in Section 7.1.2.2. A note should be provided stating that these projects have not been completed.

b. Closure of the HWL is listed on the RDIS as a HWL implementation project. Closure of the HWL should be included in the list with a note indicating that this implementation project has not been completed.

Response:

a. The list in Section 4.3.3.2 was revised as suggested to indicate the pending nature of HWL Operations and HWL Cap Construction.

b. Closure of the HWL has been added to the list as a future implementation project.

Comment 73. **Section 7.1.2.2, Section 26 HHE and Biota Soils/CAMU Completion and Support, Pages 65 to 66.** This subsection describes the Section 26 HHE and Biota Soils/CAMU Completion and Support project. The following are

comments on factual details in this subsection that are not correct or that need clarification:

a. The first sentence of the first paragraph states, "This project addressed remedial actions stated in the On-Post ROD for the Section 26 HHE and Biota Soils/CAMU Completion and Support project." This statement is misleading. The On-Post ROD does not include remedial actions for the "Section 26 HHE and Biota Soils/CAMU Completion and Support project." In fact, the ROD does not identify this project. Excavation of these soils as a separate project was developed after the ROD, in order to prepare the CAMU area for construction of the HWL and it includes components of the ROD remedy such as remediation of some of the Surficial Soil medium group, as described in Section 9.3 of the ROD (FWENC 1996a). This subsection should be revised to make this distinction. This subsection should also describe the selected ROD remedy for Surficial Soil.

b. The waste quantities provided are approximate numbers. The actual numbers should be provided, as is done for most projects described in Section 7.1.2.2. Specifically, the quantity of HHE soil should be identified as 13,718 bcy and the quantity of Biota soil should be identified as 4,032 bcy (RVO 2004b).

c. This subsection explains that subsequent to the project, the BAS recommended that additional Biota soil be excavated from SAR Site NCSA-4b. This subsection should also explain that this recommendation was the result of sampling conducted by the BAS at HHE excavation areas that had not been backfilled.

Response:

a. The text has been revised as requested and the selected remedy for surficial soil is presented in Section 4.3.3.3.

b The requested corrections were verified and included.

c. The requested information regarding BAS sampling at unbackfilled HHE site has been added.

Comment 74. **Section 7.1.2.2, Shell/Complex (Army) Trenches Slurry Wall, Pages 67 through 69.** This subsection discusses the Shell/Complex (Army) Trenches Slurry Wall. The following are comments on this subsection:

a. Although the slurry wall was evaluated for both the Shell Disposal Trenches and the Complex (Army) Trenches as part of one study, the Shell Disposal Trenches and Complex (Army) Trenches are projects identified separately in the ROD. The performance of the slurry wall at each area must be evaluated in the context of the remedy for that project.

Therefore, the discussion in this subsection pertinent to the Shell Disposal Trenches should be included as a subheading or subsection to the Shell Disposal Trenches project, and the discussion pertinent to the Complex (Army) Trenches project should be included as a subheading or subsection to the Complex (Army) Trenches project.

b. Although the slurry walls have been installed at the Shell Disposal Trenches and Complex (Army) Trenches sites, the slurry walls are just one element of the remedy identified in the ROD for these projects. The remedy for these projects has not been completed. Therefore, the discussion of the Shell Disposal Trenches project and the Complex (Army) Trenches project should be included within Section 7.1.1 with those projects that are under construction.

c. The first paragraph on Page 67 states, "The selected remedy in the ROD for the Shell/Complex (Army) Trenches requires the following: ...". However, the quote is only applicable to the Shell Disposal Trenches project, not the Shell Disposal Trenches / Complex (Army) Trenches project. The statement should be revised accordingly.

d. Paragraph 2 on Page 69 states, "The design concept found in the ROD incorporated a slurry wall that fully enclosed the Army Complex Trenches to achieve the goal of 'augmenting containment.'" However, the goal stated in the On-Post ROD is, "Dewater as necessary to ensure containment," which was previously stated in this section. The sentence regarding "augmenting containment" should be deleted.

e. Paragraph 5 on Page 69 states, "...remedial actions under this project have been completed, have achieved the intent of the ROD to be protective of human health and the environment, and...are fully functional." However, this subsection has not provided data to demonstrate that containment of the waste, contaminants, and groundwater has been achieved at either the Shell Disposal Trenches project or the Complex (Army) Trenches project. Although, in a previous paragraph it was stated, "However, it was determined during the design phase that a closed wall was not necessary to achieve the goal with groundwater extraction systems in place...", the mere fact of having groundwater systems in place does not demonstrate that the ROD goal of ensuring containment has been met. Therefore, EPA cannot validate the statements regarding project completion and protectiveness. The FYRR should be revised to provide and discuss the groundwater-related information for both the Shell Disposal Trenches and Complex (Army) Trenches projects necessary to determine protectiveness

Response:

a. Consistent with the comment, the two project have been separated for discussion purposes into Sections 7.3.5 and 7.3.6.

b. Because the construction of the slurry walls is complete and the projects are in O&M, they have been presented as such in Section 7. The title of the section now included the word construction in parenthesis

c. The requested revision has been made.

d. The statement has been deleted as requested.

e. For details, please refer to the response to Specific Comment #103. The dewatering goals are based on target water levels, but meeting the goals within a specific time frame is not a requirement. Estimates of how long it might take to meet the dewatering goals were made in the Design Document and in the Complex Trenches Groundwater Extraction System Operational and Functional Report (OFR) (RVO 2002), but these were not commitments or requirements. For example, in the OFR it states, "In order to ensure that the dewatering goal of lowering the water table below the bottom of the disposal trenches could be achieved in a reasonable amount of time (e.g., 5 to 10 years, or less), a conservatively high design flow rate of 3 gallons per minute (gpm) was selected." Additionally, the dewatering system did not begin operation until 2001, so it is unrealistic to expect the dewatering goals to be met by 2005. Until the remedy is fully implemented and the Resource Conservation and Recovery Act (RCRA)-equivalent covers are installed, it is unlikely that these target levels will be reached or maintained in both compliance wells because infiltration of precipitation causes groundwater recharge within the area inside the slurry wall. In a flow rate analysis of testing of the dewatering trench that was required to complete the Complex Army Trenches Groundwater Barrier Project CCR (FWENC 2001), it is stated, "It should be recognized that lowering the water table in the vicinity of the Complex (Army) Trenches may be difficult until the RCRA-equivalent cover is constructed over the area, thereby essentially eliminating surface recharge." Therefore, while we agree that the dewatering goal has not yet been met, the RVO believes that this part of the remedy is functioning as intended.

Comment 75. **Section 7.1.2.2, Existing (Sanitary) Landfill Remediation, Section 4, Pages 71 through 73.** This subsection describes Section 4, ESL Soil Remediation Project. The following are comments on factual details in this subsection that are not correct or that need clarification:

a. This subsection does not include a discussion of health and safety monitoring as is included for other projects in Section 7.1.2.2. In particular, monitoring that was conducted for this subsection should be revised to include a discussion of health and safety aspects of the project for consistency.

b. The waste quantities provided are approximate numbers. The actual numbers should be provided, as is done for most projects described in Section 7.1.2.2. Specifically, the quantity of HHE soil should be

identified as 7,747 bcy and the quantities of trash and debris should be reported as 40,260 bcy as certified by DOA to be correct in the CCR (FWENC 2000c).

c. This subsection indicates that 13 confirmatory samples were collected during the Section 4 ESL project. However, the CCR indicates that 14 confirmatory samples were collected (FWENC 2000c). This subsection should be revised to be consistent with the CCR.

d. The Section 4 ESL project included management of other wastes that should be described. Specifically, sampling and disposal of drums, bottles that were suspected to have chemical warfare materiel, asbestos-containing material (ACM), and objects that were suspected to be UXO or OE should be described (FWENC 2000c). Proper management of these wastes is an important aspect of the functioning remedy at RMA and therefore is applicable to the FYRR.

e. Section 1.2.2.3 of the Section 4 ESL CCR states, "The Lake Ladora stockpile was located in the southwest corner of Section 2. Approximately 1,000 bcy of fill material was obtained from a stockpile located near Lake Ladora that was generated during dam construction in 1998." This soil was used to backfill excavations created during implementation of the Section 4 ESL project (FWENC 2000c). During remediation of a Terrestrial Residual Ecological Risk (TRER) site near Lake Ladora dam, contaminated soil was recently discovered, presumably from overflows of the SCL in this area. It is not clear if the Lake Ladora Stockpile may have included some of this contamination. This subsection should explore this possibility and assess if the remedy is functioning as intended by the ROD.

Response:

a. The requested discussion of health and safety has been included in the revised text in Section 4.3.3.6.

b. As requested, the actual waste quantity numbers have been added.

c. The text has been corrected and the number of confirmatory samples is now consistent with the CCR.

d. The requested information regarding management of other waste streams has been included in the revised document.

e. The stockpile generated during dam construction was comprised of soil removed from the area of the spillway construction and/or the dam itself and did not include soil from Terrestrial Residual Ecological Risk (TRER) site 2NW-4. Soil disturbance within TRER site 2NW-4 was limited to installation of a new water line and did not generate soil for the stockpile. The stockpiled soil used for backfill in the Section 4 ESL project was not

contaminated. Use of on-post, uncontaminated borrow material for backfill of excavation areas was envisioned in the ROD, therefore this activity does not indicate that the remedy is not functioning as intended.

Comment 76. **Section 7.1.2.2, Existing (Sanitary) Landfills Remediation Section 36, Pages 72 and 73.** This subsection discusses the Section 36 ESL Remediation Project. The following are comments on this subsection:

a. This subsection does not include a discussion of health and safety monitoring as is included for other projects in Section 7.1.2.2. This subsection should be revised to include a discussion of health and safety aspects of the project for consistency.

b. This subsection indicates that remediation included excavation of munitions debris and removal of ACM. However, the Section 36 ESL project included management of other wastes that should be described. For example, the subsection does not describe sampling and disposal of drums or bottles that were suspected to have RCWM. Proper management of wastes is an important aspect of the functioning remedy at RMA and therefore is applicable to the FYRR.

Response:

a. As requested, health and safety information has been included in the revised text in Section 4.3.3.7..

b. The requested waste management information has been included in the revised text.

Comment 77. **Section 7.1.2.2, Lake Sediment Remediation, Pages 73 and 74.** This subsection describes the Lake Sediment Soil Remediation Project. The following are comments on factual details in this subsection that are not correct or need clarification:

a. The second paragraph on Page 74 states, "Backfilling was not required as part of the project." However, the ROD remedy states, "The excavated HHE area is backfilled with on-post borrow material...." This subsection should provide the rationale for not backfilling these sites as required by the ROD.

b. This subsection does not include a discussion of health and safety monitoring as is included for other projects in Section 7.1.2.2. In particular, this subsection should be revised to include a discussion of the health and safety monitoring that was conducted specific to this project for consistency.

c. The waste quantities provided are approximate numbers (17,000 bcy HHE soil and 15,000 bcy of Biota soil). The actual numbers should be

provided, as is done for most projects described in Section 7.1.2.2. In addition, Revision 1 of the *Lake Sediments Remediation Project Construction Completion Report* appears to report different quantities of HHE soil and biota soil in Table 5.2 and the executive summary (i.e., 17,218 bcy of and 20,342 bcy of HHE soil respectively; and 12,771 bcy and 12,671 bcy of Biota soil respectively) (FWENC 2000b). The correct excavation volumes should be determined from the excavation record drawings, and a correction should be issued to the *Lake Sediments Remediation Project Construction Completion Report*. The FYRR should be revised to report the correct excavation volumes.

d. The quantity of CSV reported in the FYRR for the Lake Sediments Soil Remediation Project is 400 bcy. However, the CCR reports that 157 bcy of CSV soil was removed by this project (FWENC 2000b). The correct quantities of CSV should be verified and incorporated in the FYRR.

Response:

a. The requested rationale for not backfilling excavated HHE areas has been included in the revised text in Section 4.3.3.8.

b. The requested health and safety monitoring has been included in the revised text.

c. Quantities of HHE soil in the FYRR have been corrected to be consistent with those in the CCR. .

d. The Contingent Soil Volume (CSV) quantity has been corrected in accordance with the CCR.

Comment 78. **Section 7.1.2.2, Burial Trenches Soil Remediation Part 1 and 2, Pages 74 through 76.** This subsection discusses the Burial Trenches (BT) project. The following are comments on this subsection.

a. The subsection lists the ROD remediation standards that applied to this project, but does not identify the agent decontamination standards. This subsection should be revised to describe the ROD goals and standards for agent decontamination.

b. This subsection indicates that two CCRs have been completed for the project and discusses the BT Project, Part 1 CCR. However, the date of the BT Project, Part 1 CCR is not identified. The subsection should be revised to identify the date of the CCR.

c. This subsection states that 18 sites were included in the original design and 17 sites were incorporated into the project thereafter. However, no discussion is provided regarding whether these 17 sites were transferred from another project or were not identified during the Remedial

Investigation (RI). These 17 sites are not the sites assigned to the BT project by the Summary and Evaluation Team. This subsection should discuss the "source" of the 17 sites; why they were not identified in the ROD; any Summary and Evaluation Team discussions regarding these additional sites; and implications for the RMA remedy with respect to the protection of human health and the environment.

d. This subsection does not include a discussion of health and safety monitoring as is included for other projects in Section 7.1.2.2. A discussion of the health and safety monitoring that was conducted specifically for this project should be included.

e. Approximate remediation waste volumes are provided. The subsection should be revised to provide specific and accurate remediation volumes.

Response:

a. The selected remedy as well as the ROD goals and standards have been quoted in Section 4.3.3.9. The agent decontamination standards were also added to Section 4.3.3.9.

b. The CCR date has been included in the revised text.

c. The requested information regarding identification of the 17 additional sites and the implications these discoveries have to remedy protectiveness have been included in the revised text.

d. The requested health and safety monitoring information has been included in the revised text.

e. The requested revision has been made to the remediation volumes.

Comment 79. **Section 7.1.2.2, Munitions (Testing) Soil Remediation Part 1, Pages 76 through 78.** This subsection describes the MT project. The following are comments on this subsection.

a. This subsection describes the ROD remediation standards that applied to this project, but does not identify the ROD air standards. This subsection should be revised to describe the ROD goals and standards for air emission control.

b. This subsection does not include a discussion of health and safety monitoring as is included for other projects in Section 7.1.2.2. This subsection should be revised to include a discussion of health and safety aspects of the project for consistency.

c. This subsection states, "The first CCR (Part 1), already completed, addressed the work scope completed from March through November of 2000." However, the MT CCR, Part 1 also addressed work conducted at

SAR Site CSA-2c in 2003 (TTFWI 2004a). The subsection should be revised to indicate that the MT CCR, Part 1 addressed work conducted in 2003 at CSA-2c.

d. This subsection also states, "The second CCR (Part II) will address the additional work scope assigned to the project (e.g., characterization and remediation work at MT project Sites ESA-4a and CSA-2c)...." However, both the original and subsequent work conducted at CSA-2c was documented under the MT CCR, Part 1 (TTFWI 2004a). The subsection should be revised accordingly.

e. This subsection states, "MT Part II consists of completing the Phase 1 and Phase II anomaly characterizations and removals from Site ESA-4a and surrounding areas." However, the meaning of "surrounding areas" is unclear. The discussion should be revised to further define "surrounding areas," or to limit the characterization description to ESA-4a, as appropriate.

f. This subsection states, "A total of 34,495 bcy of contaminated soil was disposed in the HWL during the course of this project." However, the statement is inaccurate, as the volume of 34,495 bcy does not include ACM or biota soil (TTFWI 2004a). The paragraph should be revised to separately identify the volume of munitions debris soil, biota soil, and ACM.

g. The subsection does not discuss remedial actions corresponding to all elements of the ROD remedy. The subsection should be revised to discuss remedial actions corresponding to the following additional ROD remedy elements: 1) Removal and landfill of soil in excess of the TCLP concentrations, and 2) that UXO (or MEC to use the current term) is transported off-post for detonation.

h. This subsection does not include references to documents that demonstrate completion of this project. Complete references and citations to reports and data assessments that demonstrate completion of this implementation project should be provided in this subsection.

Response:

a. The air remediation goals and standards have been added to Section 4.3.3.10 and to all relevant projects.

b. The requested discussion of health and safety information has been added.

c. The requested information regarding work at CSA-2c conducted in 2003 has been added.

d. The reference to CSA-2c as part of the Munitions Testing Part II CCR was removed.

e. A definition of the "surrounding areas" has been included in the revised text for Munitions Testing Phase II in Section 4.3.1.3.

f. The paragraph has been revised to separately identify these volumes consistent with those documented in the CCR. These volumes are as follows; munitions debris soil (34,495 bcy), biota soil (925 bcy) and Asbestos-Containing Material (613 bcy).

g. The requested text describing removal and landfill of soils in excess of the Toxicity Characteristic Leaching Procedure (TCLP) and management of Unexploded Ordnance has been revised in Section 4.3.3.10. In addition, UXO/MEC management is discussed in Section 4.5.1.3.

h. A reference to the CCR has been included.

Comment 80. **Section 7.1.2.2, Miscellaneous Northern Tier Soil Remediation, Pages 78 and 79.** This subsection describes the Northern Tier Soil Remediation Project. The waste quantities provided are not consistent with Addendum 1 to the CCR (RVO 2004a). The actual numbers reported in the addendum, and the correct excavation volumes, should be reported in the FYRR.

In addition, this subsection discusses the additional CSV excavation conducted at SAR Site NCSA-8b in 2004. However, the subsection does not address the implications of this excavation. Specifically, this subsection should be revised to address the implications of misplacement of soil with acute levels of HHE soil in Basin A, and the elimination of the backfill requirement for HHE excavations less than 2-feet in depth. These circumstances should be reviewed relative to Question A, "Is the remedy functioning as intended?" and addressed in this subsection.

Response: The requested revisions have been made. The actual numbers reported in the addendum were used and the facts regarding additional CSV excavation are now presented in Section 4.3.3.11 along with a discussion of the inadvertent placement of HHE soil in Basin A. In addition, the implications of the elimination of the backfill requirement for HHE excavations is assessed in Section 7.3.14.

Comment 81. **Section 7.1.2.2, Miscellaneous Southern Tier Soil Remediation, Pages 79 and 80.** This subsection describes the Southern Tier Soil Remediation Project. The following are comments on this subsection:

a. The waste quantities provided are not consistent with Revision 0 of the CCR (FWENC 2000a), Revision 1 of the CCR (FWENC 2000d), or Addendum 1 to the CCR (RVO 2005b). The correct excavation volumes should be verified and reported in the FYRR, with corrections made to the appropriate CCR documents.

b. This subsection does not include ROD standards and goals for management of ACM. This project included abatement of ACM prior to building demolition. The ROD goals and standards applicable to this project should be revised.

c. The third paragraph on Page 80 describes additional contamination found at the SCL and states, "...spoils contain concentrations of aldrin and dieldrin warranting additional remediation." However, contamination has been identified along the banks of the SCL in areas where aerial photographs did not show evidence of spoil piles, where "spoils" do not currently exist, and the SCL itself has become recontaminated because the banks were used as backfill. The subsection should be revised to discuss the contamination along the banks of, and in, the SCL, as opposed to "spoils."

d. Analytical results from the first phase of sampling along the SCL were included within the *Miscellaneous Southern Tier Soils Remediation Project, Sand Creek Lateral, Additional Human Health Exceedance Delineation, Final, Sampling and Analysis Plan, Revision 1* (TTEC 2005b). These results show that contamination is present along the banks of the SCL in both Section 2 and Section 35. This further confirmation and extent of contamination should be described in this subsection.

e. In addition, a previously deleted area partially overlaps with this contamination in Section 2. The subsection should be revised to describe these circumstances and provide a technical assessment that specifically addresses Question A "Is the remedy functioning as intended?"

f. The newly discovered contaminated soil related to SCL has concentrations of aldrin and dieldrin that exceed both human health and biota criteria. This paragraph should be revised to clearly state that both HHE and Biota soil have been identified in the spoils on the banks of the SCL and that this contamination is being characterization.

g. The third Paragraph on Page 80 indicates that the remedial actions have been completed and have achieved the intent of the ROD to be protective of human health and the environment. However, this statement is premature because of the additional contamination discovered along the SCL. The statement regarding completion of remedial action and protectiveness should be deleted.

h. This subsection addresses the implications of the additional remediation that was conducted at SAR Site NCSA-8b in 2004. Specifically, this subsection should be revised to address the implications of eliminating the backfill requirement for HHE excavations less than 2-feet in depth and misplacement of soil with acute levels of HHE soil in Basin A. These

circumstances should be reviewed relative to Question A, "Is the remedy functioning as intended?" and addressed in this subsection.

Response:

a. The correct waste volumes were verified and presented in Section 4.3.3.12.

b. The ROD goals and standards are presented. The asbestos abatement standards were added.

c. The requested revisions to describe the broader universe of contamination were made.

d. As requested, the further confirmation and extent of contamination have been presented.

e. A discussion of the deep acute soil is provided in Section 4.3.3.12 and assessed in Section 7.3.15. The protectiveness of the remedy was not impacted by the deletion.

f. The text has been revised to reflect the presence of both HHE and biota level contamination associated with spoils.

g. The text in Section 7.3.15 has been revised to state that the project is complete and protective except the portions of Sites SSA-2b and SSA-2a that require additional remediation.

h. Additional information on the unbackfilled HHE soil area has been included in Section 4.3.3.12 and assessed in Section 7.3.15..

Comment 82. **Section 7.1.2.2, Buried M-1 Pits Soil Remediation, Pages 85 through 87.** This subsection discusses the Buried M-1 Pits Soil Remediation project. The following are comments on this subsection:

a. This subsection describes the ROD remediation standards that applied to this project, but does not identify the ROD air standards. This paragraph should be revised to describe the ROD goals and standards for air emission control. In addition, the subsection should discuss how those standards were met.

b. The subsection identifies one of the ROD standards to be the reduction in contaminant concentrations in leachate, and indicates that the treatability study confirmed that the technology was effective. However, the Buried M-1 Pits design indicated that successful stabilization was to be determined by the TCLP results on an initial series of treated soil batches (FWENC 2001). The subsection should identify the design requirements for successful demonstration of stabilization and discuss the results.

c. The subsection indicates that a ROD standard was to certify 3X decontamination of soil. However, the results of the agent screening to attain ROD 3X certification are not discussed. The subsection should discuss the results of the chemical agent screening for ROD 3X certification.

d. The discussion on Page 86 indicates that chemical agent monitoring was conducted during excavation of M-1 Pits soil. However, the results of the chemical agent monitoring are not discussed. The subsection should include a discussion of the results of the chemical agent monitoring.

e. Paragraph 2 on Page 86 indicates that a total of 27,465 bcy of contaminated soil and miscellaneous debris was disposed in the HWL during this project. However, the volume of 27,465 bcy applies only to contaminated soil (FWENC 2002a). The paragraph should be revised accordingly.

f. The subsection does not discuss the site-specific real-time monitoring that was conducted for mercury. The subsection should be revised to indicate that site-specific, real-time monitoring for mercury was conducted, and discuss the results of that monitoring.

g. The subsection does not include references to documents that demonstrate completion of this project. Complete references and citations to reports and data assessments that demonstrate completion of this implementation project should be provided in this subsection.

Response:

a. The air remediation goals and standards have been added to Section 4.3.3.13 and to all relevant projects.

b. The requested information regarding TCLP confirmation sampling on an initial series of batches has been added in Section 4.3.3.13.

c. The requested information on 3X screening has been added.

d. The results of the chemical agent monitoring are noted in the FYRR.

e. The volume of contamination soil was modified in accordance with the CCR.

f. A discussion of the site-specific real-time mercury monitoring and results has been included in Section 4.3.3.13.

g. As requested, references to relevant documents have been added.

Comment 83. **Section 7.1.2.2, Hex Pit Soil Remediation, Pages 87 through 90.** This subsection discusses the Hex Pits Soil Remediation project. The following are comments on this subsection.

a. The subsection does not describe the ROD remediation standards that applied to the In Situ Thermal Destruction (ISTD) project, including the ROD air standards. This subsection should be revised to describe the ROD goals and standards that were applicable to the ISTD remedy.

b. Paragraph 2 on Page 88 indicates that ISTD was the innovative technology chosen to remediate the site. A general description of the ISTD process is provided in Paragraph 3 on Page 88. However, a more thorough discussion of the ISTD process, and a reference to the report that documents this technology selection, should be included.

c. Paragraphs 5 and 6 on Page 88 describe the operation and failure of the ISTD system, and the assessment of the failed system. However, these descriptions are not consistent with the draft Hex Pit Remediation Project CCR (FWENC 2002b). Descriptions of the operation, failure, and assessment of the ISTD system should be consistent with the draft CCR.

d. The subsection does not discuss the types of waste or the waste volumes disposed of as part of the Hex Pit ISTD remedy. The subsection should be revised to be consistent with the description presented in Section 5 and 7 of the draft CCR (FWENC 2002).

e. The subsection does not discuss confirmatory samples or CSV for the ISTD remedy. The subsection should be revised to indicate that confirmatory samples were not collected, and CSV was not excavated during the ISTD remedy (FWENC 2002).

f. As indicated in the comments above, there is not an approved, final report that documents the ISTD remedy attempted for Hex Pits. While potential 'lessons learned' from the Hex Pits experience may not benefit other projects at RMA, there is a potential that such a report would be useful at other DOA, CERCLA, or private sites. This subsection should discuss the status of finalizing such documentation and include a schedule in Section 9.0 for completing this task.

g. Although the subsection indicates that an alternative remedy was approved via a ROD Amendment, the subsection does not describe the ROD Amendment. The subsection should be revised to briefly describe the ROD Amendment.

Response:

a. The air remediation goals and standards have been added to Section 4.3.3.14 and to all relevant projects.. The in situ thermal destruction (ISTD) remediation standards have also been provided in Section 4.3.3.14.

b. A reference to the ISTD Site report has been included, but the added detail is not appropriate for a FYRR or necessary to making a protectiveness determination.

c. A review revealed that the Hex Pit discussion in the draft FYRR was very similar to the draft CCR. As a result no changes were made.

d. The waste volumes for the ISTD alone were not broken out in the CCR.

e. The requested information regarding the absence of CSV sampling and excavation has been added.

f. The RVO considers the project adequately documented in the ISTD Site report and the ROD Amendment.

g. A description of the ROD amendment has been included in the FYRR in Section 4.3.3.14.

Comment 84. **Section 7.1.2.2, South Plants Balance of Areas and Central Processing Area Soil Remediation Project, Pages 90 through 92.** This subsection describes the South Plants Soil, Phase I, Remediation Project. The following are comments on this subsection:

a. This subsection should clarify that the scope describe in Section 7.1.2.2 is for work implemented under Phase I of the South Plants Balance of Areas and Central Processing Area Soil Remediation Project has been completed, and that Phase 2 is a remedial action that is still under construction.

b. The subsection discusses that the ROD also requires collection of two composite samples per acre prior to placing the 1-foot cover to verify that the soil under the 1-foot cover does not exceed human health criteria. The FYRR should be revised to describe the enhancements to the sampling program and to reference documentation of the sampling program and analytical results (e.g., reference *South Plants Balance of Areas and Central Processing Area Soil Remediation Project-Phase2, South Plants Balance of Areas Sample Results Report,* FWENC 2001a).

c. This subsection describes the ESD and states that the ESD removed the requirement for a 1-foot cover in the SPBA, in lieu of 1-foot of backfill. However, this subsection does not explain the rationale for deleting the 1-foot cover. As stated in the ESD for the SPBA and SPCPA, an enhanced sampling program was conducted during the design phase of the project that included collection of more than 600 samples over 208 acres, removal of all identified HHE soil, and removal of all Biota soil in the 1-foot area (RVO 2000). This information should be included in the description of the ESD.

Response:

a. As requested, the text in Section 4.3.3.15 has been revised to clarify the scope.

b. The information regarding the sampling enhancement was provided and the ESD was referenced.

c. As noted above, additional information regarding the sampling has been added to the discussion about the ESD.

Comment 85. **Section 7.1.2.2, Secondary Basins Soil Remediation, Pages 92 through 95.** This subsection describes the Secondary Basins Soil Remediation Project, Part 1 and 2. The ROD remedy for Secondary Basins is included in this subsection. However, this project also included remediation of Surficial Soil contamination, but the ROD remedy for Surficial Soil is not provided. This subsection should be revised to include the ROD required remedy for Surficial Soil.

Response: The selected remedy for Surfical Soil is presented in Section 4.3.3.16.

Comment 86. **Section 7.1.2.2, Section 35 Soil Remediation, Pages 95 through 96.** This subsection describes the Section 35 Soil Remediation Project. The following are comments on this subsection:

a. This subsection states, "This project addresses remedial actions stated in the On-Post ROD for the Section 35 Soil Remediation project." However, the ROD does not identify a Section 35 Soil Remediation Project. This project is comprised of several ROD-identified remedial actions: Surficial Soil, Chemical Sewers, Ditches/Drainage Areas, and Secondary Basins (for Basin B). This subsection should be revised to correctly identify the ROD requirements for the remedy components that were grouped to create the Section 35 Soil Remediation implementation project.

b. This subsection does not identify the two ESDs that are applicable to the Section 35 Soil Remediation Project. Both the ESD for the Chemical Sewers, and the Secondary Basins ESD should be identified in this subsection, and the change to the applicable components of the ROD remedy should be described.

c. The subsection does not discuss the presence of contaminated soils along the banks of the SCL in Section 35 that was confirmed in March 2005. The subsection should be revised to discuss this contamination consistent with the comments made on this subject for the Miscellaneous Southern Tier Soils Remediation Project..

d. The second Paragraph on Page 96 indicates that the remedial actions have been completed and have achieved the intent of the ROD to be protective of human health and the environment. However, this statement is premature because of the additional contamination discovered along the SCL. The statement regarding completion of remedial action and protectiveness should be deleted.

Response:

a. The selected remedy, and the ROD remediation standards and goals applicable to the Section 35 Soil Remediation Project are now presented in Section 4.3.3.17. The standards now reflect the remedy components that were grouped to create the Section 35 Soil Remediation Project.

b. The requested information related to the two ESDs has been included in the revised text.

c. The requested discussion regarding SCL contamination has been added consistent with the EPA comments on the Miscellaneous Southern Tier Soils Remediation Project.

d. The text in Section 7.3.22 has been revised to state that the project is complete and protective except the portions of Sites NCSA-5c and NCSA-5b that require additional remediation..

Comment 87. **Section 7.1.2.2, North Plants Structure Demolition and Removal, Pages 96 through 99.** This subsection describes the North Plants Structure Demolition and Removal Remediation Project. The following are comments on this subsection:

a. This document describes the free product as a diesel fuel; where subsequent reports such as the North Plants Soil Remediation Project, 30 Percent Design Package (TTEC 2005a) refer to this material as fuel oil. The FYRR should be revised to refer to this free product waste consistently with other RMA reports.

b. The discovery of the free product waste at North Plants was identified after the ROD was signed, and since completion of the 2000 FYR. This free product waste is impacting the groundwater in the North Plants area and is not treated by any of the RMA groundwater treatment systems. The extent of the free-product waste plume is presently undefined and likely to be co-mingled with other contaminant plumes underlying the North Plants area. This subsection should be revised to provide this additional description of the free product waste plume as interpreted from characterization efforts conducted to-date and provide a technical assessment that addresses whether the remedy is functioning as intended.

   In addition, a technical assessment that discusses this identification of a new contamination source should be developed for inclusion in Section 7.2. As a new source, the fuel oil waste plume will need to be fully characterized, and potential remedy alternatives evaluated and presented to the public for selection of a remedy. EPA expects that remediation of this new source will be identified as an Issue in Section 8.0 and the conduct of the usual CERCLA process (remedial investigation and

feasibility study) will be identified as one of the follow-up actions included in Section 9.0 of the FYRR.

c. This subsection does not describe subsequent characterization work conducted to identify soils contaminated by the free product waste. The FYRR should describe these activities and include a technical assessment that addresses whether the remedy is functioning as intended in this subsection and an assessment that discusses this new contamination source in subsection 7.2.

d. This subsection states that a Category 2 anomaly was discovered in North Plants. However, the definition of a Category 2 anomaly is not provided. This subsection should explain what constitutes a Category 2 anomaly, and should describe the item that was found.

e. This subsection describes GB detections on February 11, 12, and 19, 2003, and explains that an assessment of the field operations and laboratory activities could not identify a source for the GB detections. This subsection should reference and provide a citation for the assessment report.

f. This subsection states, "This project will not require any long-term O&M at the completion of the North Plants Soil Remediation Project." However, this subsection is written for the North Plants Structure Demolition and Removal Project. In addition, the ROD requires a soil cover in this area that would require O&M. Until a formal ROD change is completed (e.g., ESD or ROD Amendment), construction of a cover and associated long-term O&M is required. This subsection should be revised to state that long-term O&M will be necessary in the North Plants Structure Demolition and Removal area to maintain a soil cover.

g. There is no discussion of the "somewhat limited monitoring" referenced in Section 6.4. Based on revision of Section 6.4.1.2 to provide the additional information requested by earlier comments, EPA expects that revision of the LTMP will be identified as a follow-up action to provide for adequate monitoring in the North Plants area so that water quality in the North Plants area can be adequately assessed.

Response:

a. The proper terminology, fuel oil, has been included in the revised Section 4.4.2.4 text.

b. The plan for addressing the North Plants Free Product issue had not been resolved during the five-year review period. As noted in Table 2.0-2, the issue is currently being addressed under the North Plants Soil remediation project.

c. A statement regarding the soil assessment has been added with a reference to the North Plants Soil Remediation Project Petroleum Release Evaluation Report, Rev 0.

d. The requested description of a Category 2 anomaly has been added.

e. The reference for the assessment report has been added, as requested.

f. The revision to document currently required O&M has been made.

g. The 1999 LTMP includes operational water quality monitoring in North Plants because of its source area designation due to its GB manufacturing history. Although the LTMP will be revised in 2007 and changes to groundwater monitoring in North Plants may occur, the revision is not being driven by a deficiency in monitoring in this area. A decision about long-term groundwater monitoring in the North Plants area will not be finalized until the site-specific evaluation has been completed.

Comment 88. **Section 7.1.2.3, Western Tier Parcel, Pages 101 through 102.** Section 7.1.2.3 is titled "Other Completed Projects" and this subsection indicates that the Western Tier Parcel deletion was an implementation project. This is incorrect and misleading. Discussion of the Western Tier Parcel deletion is not appropriate for this subsection. The status of the Western Tier Parcel deletion is more appropriate for Section 2 - Site Chronology, Section 5 - Progress Since Last Five-Year Review, and Section 7.2 – Question B: Changes in Land Use. The FYRR should be revised to place the discussion of the Western Tier Parcel deletion in the appropriate section(s).

Response: As noted in Section 4.5.2.1, although the Western Tier Parcel (Deletion) is not a project tracked in the RDIS, due to its importance at that time, it was included as an "Other Project" in the 2000 FYRR. To avoid confusion and to ensure items in the 2000 FYRR are closed out, a discussion was provided.

Comment 89. **Section 7.1.2.3, Trust Fund, Pages 102 through 103.** This subsection includes a summary of work conducted by the Trust Fund Group. However, the status of the Trust Fund work should be provided in Section 4.0 of the FYRR. For Section 7.1, the discussion should provide a technical assessment of the Trust Fund efforts and whether the remedy is functioning as intended (i.e., have the goals identified in the ROD been achieved)? It should be noted that EPA, in cooperation with Colorado Department of Public Health and Environment (CDPHE), is currently developing a document that will summarize the work conducted by, and conclusions of, the Trust Fund Work Group. The FYRR summary of the Trust Fund work in Section 4.0 of the FYRR should be reviewed for consistency with this summary document, when finalized.

Response: A status and evaluation summary for the Trust Fund issue has been provided in the FYRR at Section 4.5.2.2. The text was reviewed for consistency with the final summary document and a reference is provided.

Comment 90. **Section 7.1.2.3, Summary Team Evaluation, Pages 103 through 106.** This subsection describes the Summary Team Evaluation. The following are comments on this subsection:

a. The "Summary Team Evaluation" was not an implementation project. The initial Boneyard work that led to discovery of sarin bomblets was conducted as part of the Miscellaneous Structure Demolition Removal Project, Phase I. Discussion of the work leading to the bomblets discovery should be expanded and discussed in Section 4.0. The remainder of this discussion should be moved to Section 7.2 that addresses new contaminant sources and Section 7.3 regarding new information that has come to light. In addition, the Summary Team Evaluation was only one of several actions that resulted from the follow-up to the findings of the bomblets. Therefore, the discussion should also be retitled to "Bomblet Discovery."

b. Paragraph 2 on Page 104 indicates that cleanup of the Boneyard is part of the remedy selected in the 1996 On-Post ROD. However, the implementation project in which the remediation was to occur is not identified. The subsection should be revised to identify the implementation project under which the Boneyard was to be remediated.

c. The verb tense in places has not been changed from that used in the Summary Team Report. For example, Paragraph 3 on Page 104 and Paragraph 2 on Page 105 correspond to paragraphs in the Summary Team Report (HESS 2002). However, because the verb tense has not been changed it is unclear whether the evaluation discussed in this paragraph is part of the FYR, or was part of the Summary Team efforts. The verb tense throughout the subsection, where appropriate, should be revised to either change the verb tense, or to clarify that the text is a direct quote from the Summary Team Report.

d. Paragraph 4 on Page 104 indicates that a three-pronged approach was developed to ensure that all aspects of the RMA project incorporated more complete measures to identify potential OE and RCWM hazards, and to address future discoveries of OE and RCWM. However, the subsection does not discuss that this three-pronged process was the result of an EPA letter and a series of meetings to determine the best approach forward. EPA's letter recommended that all remediation activities be modified or suspended until a UXO plan of action was completed (EPA 2000). This subsection should be revised to describe the factual sequence of events leading to this effort.

e. The subsection discusses the revision to the Integrated Contingency Plan and the Visitor Access Plan, but these revisions were not part of the work conducted by the Summary Team (HESS 2002). The subsection should be

revised to clarify that the Summary Team Evaluation was tasked solely with the evaluation of OE and RCWM hazards, and not the other two plans.

f. The last paragraph on Page 105 states, "Subsequently, surface sweeps were performed to identify and clear the areas of munitions debris." The statement is placed in a paragraph that discusses the Summary Team efforts, but this work was not part of the Summary Team. This statement should be moved to a paragraph in the Summary Team discussion in which the sites and actions recommended by the Summary Team are discussed.

g. As noted above, this subsection should include a discussion of the remediation of the six sites, and other recommendations, identified by the Summary Team as having the potential for OE hazards. This discussion should identify under which implementation projects the site was remediated, the type of action, the findings of those actions, and whether those findings support the conclusions of the Summary Team.

h. The subsection should include a technical assessment of the findings by the Summary Team to determine if the management of OE and RCWM adhered to the goals of the ROD and the remedy is functioning as intended.

Response:

a. The Summary Team Evaluation was discussed as part of Miscellaneous Structures Phase I status in Section 4.4.1.1, and consistent with guidance, as a "Document Reviewed" in Section 6.3.1. For comments b through h, as much as possible, the executive summary of that document has been adopted, largely unchanged into the FYR. The technical assessments are made in the context of the projects conducting the activities.

Comment 91. **Section 7.1.3, Ongoing Projects, Pages 106 through 111.** This section describes ongoing projects such as the revegetation program, site-wide groundwater monitoring, UXO management, etc. The following are comments on this section:

a. This section may be more appropriately titled, "Ongoing Programs" because the tasks described provide site-wide support for remediation projects throughout RMA, and they are not specific implementation projects themselves.

b. This section does not address several site-wide programs that support implementation of the remedy at RMA. For example, programs for site-wide remediation waste management, borrow area management, health and safety, quality assurance, and storm water and erosion control are not addressed. Each of these programs is a critical component of the remedy at RMA and should be assessed under the FYR.

c. This section does not provide a technical assessment of each of the site-wide programs. The effectiveness of the overall remedy at RMA is greatly dependent on each of these site-wide programs. For example, if UXO is not managed properly, there may be a risk to human health and the environment. If monitoring programs are not conducted per requirements, there is not sufficient information to determine protectiveness. Therefore, it is appropriate to assess the performance of each program as part of the FYR. The FYRR should be revised to:

   1) Describe each of the site-wide programs for inclusion in Section 4.0.

   2) Evaluate each program against questions A, B, and C that are identified in the *Guidance* (EPA 2001) and describe this effort in Section 7.0.

   3) Identify components of each program that were not operating as intended in the past five years; identify components of these programs that may need modification to adapt to changes in exposure assumptions, toxicity data, cleanup levels, or remedial action objectives (RAOs); and identify components of these programs that may need modification in response to new information for inclusion in Section 8.0.

   4) Document any changes made to correct problems in the past five years, and determine and document changes that are necessary to implement for each program in the future as part of Section 9.0.

d. Regarding the borrow area management program, this section should discuss the occurrence of unexpected waste, soil contamination, and OE debris found in some of the borrow areas during adjacent remediation activities, borrow operations, or during borrow area characterization. The following are examples of unexpected contamination that was found during borrow area operations that should be addressed in the FYRR:

   1) High pH soil was identified in Borrow Area 10 during borrow area characterization activities. Borrow Area 10 overlaps the historical Toxic Storage Yard at which mustard spills were neutralized with caustic solution during historic sampling. The FYRR should describe the identification, characterization, and disposition of this high pH soil.

   2) An empty E-139 submunition and a former burn area were discovered in Borrow Area 10 during borrow area characterization activities. Remediation of this area was added to the Munitions Testing, Part II Soil Remediation Project via a DCN (DCN-MTBT-65). The FYRR should describe the identification of this area and describe the disposition of this area through the Munitions Testing Project.

3) Borrow Area 9A encompasses a former OE testing area. Disposition of "anomalies" by the UXO emergency response group occurs frequently in this area. In addition, buried asbestos and miscellaneous pieces of trash have been observed in this area. The FYRR should describe the identification of the anomalies, asbestos and other trash in this area and explain how the disposition of this unexpected waste is handled.

Response:

a. Consistent with the EPA 2001 Guidance, the FYRR has assessed all projects as: 1) remedial actions under construction; 2) operating remedial actions; or 3) completed remedial actions in the Final FYRR.

b. Consistent with the RDIS, Borrow Area Management has been added as a project in Section 4.3.2.4 and assessed in Section 7.2.3.4. The FYR guidance does not suggest that detailed reviews of programs ancillary to the remedy projects be performed. The other programs noted are addressed where relevant to the context of a specific project.

c. The information requested by EPA has been included in the revised FYRR in the context of project descriptions where applicable and in accordance with the EPA 2001 Guidance and the RDIS. UXO is included in the RDIS and is discussed in Section 4.5.1.3 and assessed in Section 7.2.3.8.

d. The information requested by EPA has been discussed in Section 4.3.2.4 and assessed in Section 7.2.3.4 of the revised FYRR.

Comment 92. **Section 7.1.3, Ongoing Projects, Revegetation Program, Page 106-108.** This subsection outlines the over-all revegetation program. The following are comments on this subsection:

a. This subsection describes a *Comprehensive Management Plan* (CMP). However, a reference to this document is not provided. A reference for the CMP should be included in the FYRR.

b. Paragraph 4 on Page 107 describes the reseeded acreage and the application of USFWS success criteria. The supporting documentation for the areas judged successful and nearly successful should be provided. In addition, an outline of the criteria used to assess the revegetation should be included.

Response:

a. A Comprehensive Management Plan reference has been added in the discussion of the Vegetation Management Plan provided in a new Section 6.3.12.

b. This paragraph describes areas seeded for mitigation and habitat improvement. Since these areas are not related to protectiveness of any portion of the remedy implementation, the paragraph was deleted.

Comment 93. **Section 7.1.3, Site-Wide Biota Monitoring, Page 108.** This subsection refers to a discussion in Section 6.4.2 of the FYRR. However, according to the *Guidance* the information to be provided in Section 6 and Section 7 of the FYRR are different: Section 6 is intended to provide a description of the current FYR Process, including a data review, and Section 7 is intended to be a technical assessment of the remedy (EPA 2001). Therefore, it is not appropriate to defer discussion of the assessment of the Site-Wide Biota Monitoring Program to Section 6. This subsection should be revised to provide a technical assessment of the Biota Monitoring Program at RMA, based on a review of the data, in accordance with the *Guidance*.

In addition, EPA has voiced concerns regarding the risk evaluation of biota monitoring data with respect to TRER Site 1SE-4. Several of these concerns address the actual assessment process of field data collected by the USFWS as part of their biomonitoring program (i.e., the starling nest box study). The overall assessment process for use of the biota monitoring data should be closely coordinated with EPA, and Section 7 of the FYRR revised in accordance with those discussions.

Response: The requested assessment of the biota monitoring program has been added in the FYRR. Section 4.5.1.1 directs the reader to the discussion in Section 6.4.3 and the assessment is provided in Section 7.2.3.5.

Comment 94. **Section 7.1.3, Site-Wide Air Monitoring, Page 108.** This subsection refers to a discussion in Section 6.4.3 of the FYRR. However, according to the *Guidance* the information to be provided in Section 6 and Section 7 of the FYRR are different: Section 6 is intended to provide a description of the current FYR Process, including a data review, and Section 7 is intended to be a technical assessment of the remedy (EPA 2001). Therefore, it is not appropriate to defer discussion of the assessment of the Site-Wide Air Monitoring Program to Section 6. In addition, Section 7 does not acknowledge the Site-Wide Odor Monitoring Program. This subsection should be revised to provide a technical assessment of the both the Site-Wide Air Monitoring Program and the Site-Wide Odor Monitoring Program at RMA, based on a review of the data, in accordance with the *Guidance*.

Response: The text has been revised to follow EPA Guidance. Section 4.5.1.2 directs the reader to the discussion in Section 6.4.4 and the assessment is provided in Section 7.2.3.6.

Comment 95. **Section 7.1.3, Site-Wide Groundwater Monitoring, Page 108**. This subsection discusses the requirements for groundwater monitoring based on both the On-Post and Off-Post RODs, and states that the LTMP is the

document that presents the monitoring program. The following are comments on this subsection:

a. The groundwater monitoring program supports all of the groundwater remedies and a number of soil remedies for the site. While the LTMP should contain the pertinent information for the components of the monitoring program, it has not been updated since it was published in 1999. Two well update reports have been produced in 2003 and 2004, which propose changes to the well network, but do not provide evaluations of the data or other rationale to support the changes. The LTMP Annual Data Summary Reports are data reports only and make no interpretations with respect to the effectiveness of the groundwater (and surface water) program. The 2000 FYR was supported by the Five Year Groundwater Summary Report (FWENC 2000f), which provided some level of evaluation to support the conclusions in the 2000 FYR. A Five Year Groundwater Summary Report was not provided to support this current FYR.

   Section Five of the LTMP states, "The Five Year Site Review Report is used to assess the status of the remedy and, based on this assessment, address necessary changes in remedies and monitoring programs. For the groundwater monitoring program, specifically, the Five Year Site Review will be used to ensure that the ROD objectives for groundwater are met." The LTMP also provides a schedule for completion of the second Five Year Site Review Report. Table 2.4-1 in The Well Retention and Closure Program [Plan] lists the Five Year Site Review Report as a critical component of the process for evaluating well closures. The LTMP Annual Data Summary Report, Water Year 2004, Introduction states, "Data in this presentation precedes interpretive evaluation reports for the LTMP program and is intended only to present the data collected as part of this program." Due to the lack of evaluation provided in the FYRR, EPA cannot evaluate (1) whether the groundwater remedy is functioning as intended by the decision documents, and (2) whether any new information has come to light that could call into question the protectiveness of the remedy. Given the minimal presentation of data evaluation or references to data evaluation reports, EPA expects that some of the follow-up actions identified will be to develop/provide a data evaluation report to support the FYR assessment process and revise the LTMP to establish the monitoring program for the next FYR period.

b. EPA reviewed sampling data for a subset of monitoring wells (48) in the LTMP to verify if the water level measurements and water quality monitoring (both sample frequency and analyte suite) were in compliance with the LTMP during the FYR period. In general, the required monitoring was performed in compliance with the LTMP. However, where wells have been damaged during the FYR period there are often no attempts to repair the wells. The 2003 Well Networks Update Report

proposes numerous wells for closure because they were damaged or could not be located (FWENC 2003c). The report does not provide an evaluation of whether the well is important to the monitoring program, and the main reason for closure is that the well is damaged. A review of the monitoring results from some of these wells suggests that they were not sampled as required by the LTMP and may have been damaged/lost years before they were proposed for closure. This suggests that there is no consistent program for replacing or fixing LTMP wells. This subsection should be revised to describe the LTMP approach for ensuring that necessary monitoring wells are repaired in a timely fashion so that goals of the ROD can be achieved. Based on the revision anticipated for this section, EPA expects that the lack of sampling at some wells identified in the LTMP will result in the identification of Issues to be addressed in Section 8.0 of the FYRR.

c. During site inspections, the general condition of monitoring wells on-post at RMA was evaluated. The inspections discovered that numerous wells at RMA had protective casings that were missing or damaged, and missing well covers. In some cases the inner well caps were missing, lying on the ground or lying upside down on top of the casing. Well locks were missing from most wells on post. This lack of maintenance for LTMP wells raises concerns for EPA because water quality samples collected from damaged wells or wells without caps may not be representative of the actual groundwater water quality. If the samples are not representative, the remedy implementation cannot be adequately assessed to determine if the remedy is functioning as intended. This section should be revised to discuss these observations from the site inspection and assess if the LTMP program is achieving the intent of the ROD. Based on the revision anticipated for this section, EPA expects that the lack of timely maintenance for LTMP wells will be identified as one of the Issues to be addressed in Section 8.0 of the FYRR.

d. During site inspection of the NBCS and OGITS, it was observed that there were no signs identifying the surface water sample locations in the field. Given that samples should be collected at the same location each time sampling is performed, EPA expects that one of the follow-up actions identified in Section 9.0 will be to post signs designating the sample locations for the surface water sample sites

e. During site inspections of off-post Army wells, a number of wells were found to be damaged and had well covers that were missing, damaged or not locked. Sixty off-post Army wells were visited to determine well condition. The four wells noted as a "deficiency" in the Executive Summary and Section 8.1.2 of the FYRR were not included in this subset of off-post wells. Eleven of these wells either did not have locks or the protective cover was damaged to the point the lock did not secure the well cover. Five wells were found to have broken or missing well caps. In

some cases the well had been damaged. Wells 37327 and 37349 have been damaged to the point that the covers will not fit on the wells. Samples collected from damaged wells, and wells without caps or wells that have not been secured may not be representative of actual groundwater water quality. This lack of maintenance for off-post wells raises concerns for EPA because water quality samples collected from damaged wells or wells without caps may not be representative of the actual groundwater water quality. If the samples are not representative, the remedy implementation cannot be adequately assessed to determine if the remedy is functioning as intended. This section should be revised to discuss these observations from the site inspection and assess if the off-post monitoring program is achieving the intent of the ROD. Based on the revision anticipated for this section, EPA expects that the lack of timely maintenance for off-post wells will be identified as one of the Issues to be addressed in Section 8.0 of the FYRR.

f. Numerous wells used to monitor the off-post plumes have been removed from the off-post monitoring programs because of development, loss of private wells or damage to Army wells. As a result, the off-post monitoring network has been drastically diminished and does not provide the level of detail necessary to sufficiently characterize the extent of the off-post groundwater plumes. The FYRR should discuss the loss of wells in the off-post area and the resultant decrease in the distribution of well locations. Because of the limited number of wells in the off-post well network, EPA cannot validate that (1) the remedy is functioning as intended by the decision documents, and (2) whether any new information has come to light that could call into question the protectiveness of the remedy. This section should be revised to discuss these observations from the site inspection and assess if the off-post monitoring program is achieving the intent of the ROD. Based on the revision anticipated for this section, EPA expects that the lack of timely maintenance for off-post wells and the diminished number of wells available for sampling will be identified as Issues to be addressed in Section 8.0 of the FYRR.

g. This FYRR does not address changes to the nature and extent of the on-post groundwater plumes at RMA. Updated, on-post plume maps have not been generated during either the 2000 or 2005 FYR periods. The 5 Year Groundwater Summary Report (FWENC 2000f) was used to support the technical assessment of the groundwater remedy for the 2000 FYRR. This report relied heavily on the plume maps generated as part of the Groundwater Monitoring Report for Water Year 1994 (USGS 1997). However, with the completion of the current FYR, decisions with respect to remedy effectiveness for on-post groundwater systems and monitoring must default to 10-year-old plume depictions because maps newer than 1994 have not been developed. The 1994 plume maps have been used in numerous RVO proposals that include decisions on shutdown of groundwater intercept and treatment systems and in supporting areas for

deletion. At ten-years-plus since the samples were collected, EPA is no longer confident in the use of the 1994 plume maps to evaluate if the groundwater plume interception and containment remedies are functioning as intended by the ROD or that the groundwater remedies are protective of human health and the environment.

EPA has reviewed the data used to create the 1994 plume maps as part of this FYR. The data used for constructing the maps were evaluated, as well as pre- and post-1994 data from on-post wells that were sampled but not used to create the plume maps. Dieldrin, chloroform, benzene, tetrachloroethene, DIMP and arsenic were evaluated. The general conclusions reached from this evaluation are:

1) The outline of the individual plumes approximates the general plume extent based on the data used for the maps, but there are areas outside these plume boundaries, where historic data from wells not used in the map construction, suggest that contamination exists.

2) The concentration isopleths within the individual plume boundaries are potentially not accurate based on historic data from wells not used in the map construction.

3) Contaminant plume concentrations seem to be attenuating near the boundary systems to a greater extent than near the remediated (or soon-to-be remediated) source areas. This is contrary to the rationale used to develop the ROD shutdown criteria for the boundary treatment facilities; i.e., the source area groundwater would cleanup before the boundary area groundwater. This observation indicates that this part of the groundwater remedy is not functioning as expected. If the shutdown criterion is not achieving the intent of the ROD, EPA's capability to assess protection of human health and the environment is likely to be compromised. The text should be revised to include a discussion of the effectiveness of implementing the shutdown criteria for the groundwater treatment systems. Based on the revision anticipated for this section, EPA expects that the plume attenuation at the boundary systems only will be identified as an Issue to be addressed in Section 8.0 of the FYRR.

   In addition, based on the lack of evaluation and discussion of the on-post groundwater plumes in the FYRR, the following concerns should be incorporated into the technical assessment regarding continued use of the 1994 plume maps:

   i. Decisions based on the 1994 plume maps are potentially inaccurate due to the limited well data used to delineate the plumes, and

ii. The plume maps are more than ten years out of date, do not represent current contaminant concentrations, and do not incorporate data from wells installed after 1994.

If the intent of on-post groundwater monitoring is to provide a basis for deleting the plumes from the NPL, as was recently proposed by the RVO, then there is an inadequate number of monitoring wells and frequency of sampling for these wells required by the LTMP. The text should be revised to include a discussion of the LTMP data collection efforts, sampling approach for the LTMP, and how the LTMP meets data quality objectives for the current FYR period as well as the 2010 FYR period. Based on the rationale provided above, EPA expects that revision of the LTMP, which is the primary data and evaluation support document for the FYR, will be identified as a follow-up action in Section 9.0, specifically to ensure that sufficient sampling is conducted (number of existing monitoring wells is adequate, frequency of monitoring is appropriate) to confidently assess the nature and extent of the on-post groundwater plumes.

Response:

a. At the time the 2003 and 2004 well network update reports were prepared, it was understood that these reports would be used instead of an annual revised LTMP report, as stated in the Well Retention and Closure Program report (TTFWI 2004). The well network updates were presented to the Regulatory Agencies both at the monthly Water Team status meetings and at working sessions where evaluations of the revised networks were discussed. These new networks were reviewed and approved by the EPA, CDPHE, and TCHD. The RVO plans to update the LTMP in 2007. The five-year review information identified in the LTMP has been included with references in the revised FYRR.

b. Please refer to response to EPA Specific comment #50.a.5.

c. The overall condition of the on-post monitoring network wells is good. The EPA Field inspection of damaged wells used a list of wells from an RMA computer database search of 1192 open wells. Of the 1192 wells, 25 wells were found to need repair (mostly minor) and of these, only 3 wells were water quality wells. The identified problems did not affect the interpretation of groundwater contamination at RMA. The remaining wells were measured for water levels only. Because of on-post RMA security, well locks and protective casings are not required for on-post wells. The RVO has a program for identifying damaged wells and repairing wells when possible. This policy be reviewed during the revision of the LTMP in 2007.

d. Depending on flow conditions, the exact sampling location can change by a few hundred feet in order to optimize the straightness of the reach, the uniformity of the flow, and the uniformity and stability of the channel bottom. These steps help ensure that the constituents are well mixed along the cross section. Hydraulic conditions, water depth and other flow characteristics are all taken into consideration when selecting the exact transect. The objective of each sampling is to safely collect samples representative of the flow conditions at the time of sampling. The U.S. Geological Survey collects all of the surface water samples at RMA and maintains station description folders for each site designating where the samples are to be collected. Thus, there is no need to post signs in the field to aid in the identification of sampling locations.

e. The EPA off-post inspection report lists nine off-post Army wells inspected in the field. Of these, one well sampled for water quality had a damaged protective casing and one well sampled for water quality had a cracked well pad. Of the wells measured only for water levels, one well had a damaged casing, one well had a cracked well pad, and one well needed an ID tag. These problems did not affect the off-post plume maps or the water level maps. The widespread construction in the off-post RMA Operable Unit during the last five years damaged or destroyed many wells and has made large areas unavailable for monitoring well installation. For years, the RVO has made a concerted effort to identify and repair damaged wells and to close wells when requested by the landowner. The few wells in the network that had not been repaired did not adversely affect the interpretation of the groundwater data.

   The RMA monitoring well network was reduced over the last five years due to decreasing contamination concentrations and because of loss of monitoring wells. The well networks were revised with the help of the EPA, CDPHE, and TCHD. All the Regulatory Agencies provided input and approved the final network changes.

f. Please refer to responses to comments 95 a. and e. above. The RVO believes that the revised off-post monitoring network, which was reviewed and approved by EPA and the other Regulatory Agencies, provides sufficient information to delineate the off-post plumes and validate the remedy. However, the RVO plans to evaluate and revise the LTMP in 2007 to ensure that all monitoring needs will continue to be addressed.

g. The On-Post ROD (FWENC 1996) does not require the RVO to map groundwater plumes on-post. The ROD remedy relies on contamination being left in place with covers to prevent surface infiltration and was not intended to implement source area cleanup. The monitoring program presented in the LTMP, which was designed to ensure that all the requirements of the RODs were met, does not include water quality monitoring for the purpose of delineating on-post plumes, but relies on

water level monitoring to track any changes in flow directions and hydraulic gradients that might impact plume migration. The RVO does not use the 1994 groundwater plume maps to assess the remedy effectiveness of the on-post groundwater systems. Decisions with respect to remedy effectiveness for the on-post groundwater systems do not depend on knowing precisely where plumes are located on RMA. On-post water level monitoring data that are used to determine the flow directions and hydraulic gradients help determine whether the hydrologic conditions have changed in a way that could affect groundwater plume movement and capture of the plumes at the boundary containment systems. The operational monitoring programs for the boundary systems augment the site-wide monitoring program for conducting this assessment. Generally, there has been very little change in groundwater flow directions on-post over the past 10 years, but there have been changes in the hydraulic gradient in certain areas, including the South Plants Area, that would affect travel time for various groundwater plumes on post.

The current LTMP on-post monitoring network was designed to rely on water level monitoring to detect changes in water levels and flow directions. The water quality network was not designed for plume mapping but for determining general concentration trends within the plumes identified in the ROD. The RVO used all water quality data from available wells to construct the 1994 groundwater plumes. The RVO would be willing to discuss any concerns the EPA has on the 1994 groundwater plume maps but does not believe that this should affect the FYRR.

The RVO does not believe there is any reason at this point for concern about release of remaining source contamination versus the approach to shutting down extraction wells, since the LTMP was designed to address such issues by detecting changes in upgradient trends. The monitoring program will be updated as the remedy progresses and the groundwater remedy will continue to be evaluated and updated, as needed.

Groundwater in areas where plumes exist is not included in the deletion program and the RVO does not intend to use the current on-post groundwater monitoring to delete groundwater plumes from the National Priority List.

Comment 96. **Section 7.1.3, UXO Management, Pages 108 and 109.** This subsection describes the program to manage identified UXO and describes a few specific incidents. However this subsection does not describe the day-to-day disposition of "anomalies" found at RMA by the UXO management group. The FYRR should describe the UXO program and provide a technical assessment to determine whether it is functioning as intended.

In addition, the FYRR does not include a summary of MEC discoveries over the FYR period. The FYRR should summarize all discoveries of MEC or RCWM as a result of emergency response notifications. The location of these findings should be shown on a figure and compared to areas identified in the ROD and the Summary Team Report (HESS 2002) to determine whether the findings are consistent with historical knowledge. This information should be used to aid in answering Question A in the *Guidance*, "Is the remedy functioning as intended by the decision documents?"

Response: Consistent with the RDIS and Table 2.0-2, the status of the UXO project has been discussed in Section 4.5.1.3 and assessed in Section 7.2.3.8. A detailed summary in the FYRR of every MEC finding at RMA is unnecessary to making the protectiveness determinations.

Comment 97. **Section 7.1.3, South Lakes Plume Monitoring/Lake Levels, Page 111.** This subsection describes groundwater monitoring used to demonstrate plume control. The following are comments on this subsection:

a. This subsection describes the ROD remedy, but does not provide the ROD goals and standards. The subsection should be revised to provide the ROD goals and standards.

b. This subsection suggests that the *South Lakes Investigation Monitoring Completion Report* (MCR) (WGI 2004) has been completed and indicates that one of the conclusions from the South Lakes Monitoring Project was that groundwater contamination above CBSGs was not detected in point of compliance wells at Lake Ladora. However, the second goal for the South Lakes Monitoring project was to establish if lake levels were being maintained such that a hydraulic gradient away from Lake Ladora was accomplished (USGS 2004). The results of the project suggest that a hydraulic gradient away from Lake Ladora was not being maintained (USGS 2004). While the FYRR should reflect the conclusions from the water level evaluation, it should be noted that the report has not been approved by the Regulatory Agencies. Because the FYRR does not provide information on the effectiveness of the lake level maintenance program, EPA cannot validate that the remedy is functioning as intended by the ROD. This section should be revised to assess the effectiveness of the lake level maintenance program. Based on the revision anticipated for this section, EPA expects that the lake level maintenance program will be identified as one of the Issues to be addressed in Section 8.0 of the FYRR.

c. In addition, the South Lakes Monitoring Project only evaluated one of the three contaminant plumes that emanate from South Plants towards Lake Ladora. The FYRR should clarify that only the chloroform plume was evaluated and that the benzene and dieldrin plumes were not evaluated under the South Lakes Monitoring Project. Therefore, the ROD-required monitoring action does not appear to have been completed. This subsection should be revised accordingly. Based on the revision

anticipated for this section, EPA expects that the South Lakes monitoring program will be identified as one of the Issues to be addressed in Section 8.0 of the FYRR.

d. The subsection does not discuss lake levels or lake level maintenance. In addition to the groundwater monitoring evaluation, the FYRR should provide an evaluation of the results of the lake level maintenance program over the FYR period.

e. The text suggests that future monitoring of the South Lakes area will be part of the LTMP. The LTMP does not include Appendix D, which was reserved for inclusion of the monitoring program for South Lakes. Additionally, the 2003 and 2004 Well Networks Updates (FWENC 2003c; FWENC 2004) amended the LTMP and involve additional wells, which have the purpose of "South Lakes Groundwater Monitoring." However, the LTMP has not been updated, and therefore, it is not clear what monitoring for South Lakes will be conducted in the future under the LTMP. The FYR should be revised to clarify the LTMP requirements for South Lakes and how the LTMP ensures that the required sampling is conducted.

f. This subsection does not address the requirements defined in the *Record of Decision for the On-Post Operable Unit* to manage lake levels for reasons other than control of plume migration. Section 9.1 of the ROD states that water levels in Lake Ladora, Lake Mary, and Lower Derby Lake will be maintained to support aquatic ecosystems, and the biological health of these ecosystems will continue to be monitored. In addition, lake levels are required to be maintained to cover HHE soil that has been left in place in Lower Derby Lake. This subsection should be revised to address all requirements for lake level maintenance.

g. Section 7 of the FYRR should include a technical assessment of the lake management program at RMA to date, acknowledge that the details of lake level management requirements are currently not defined at RMA, and identify the need to define specific ICs for lake level management. While a lake level management plan is currently under development, the FYRR should reflect that the final plan for implementing the ICs for lake level management are not complete or approved. A schedule for developing an approved plan should be provided in section 9.0 of the FYRR.

Response:

a. The selected remedy from the ROD has been quoted in Section 4.1.3.5. The ROD goals and standards for groundwater are reflected in the selected remedy for groundwater in Section 4.1

b. The RVO and the regulatory agencies agreed in late 2005 that it was unnecessary to complete the South lakes Monitoring Completion Report , since the results and conclusions about the South lakes monitoring

program had already been published in the 2004 USGS report. The program detailed in the SAP (USGS et al, 2001) took into account the fact that lake levels vary in response to remedy water needs. The groundwater investigation results showed that lake level maintenance was not required for preventing groundwater contamination from entering the lakes at levels above CBSGs. The lake level maintenance requirement was removed through the ESD for Groundwater Remediation and Revegetation, approved by the Regulatory Agencies in March 2006.

c. Additional information about the South Lakes program has been included in the text of the Final FYRR, with references to the relevant documents. The focus of the South Lakes groundwater monitoring program on Lake Ladora was based on an evaluation of all the lakes and plumes in the South Plants area that is presented in the South Lakes SAP for Groundwater (USGS et al, 2001).

d. The text has been revised to state that lake level maintenance was not required to prevent contaminants from discharging into the lakes at concentration levels exceeding CBSGs.

e. Appendix D in the LTMP was intended for the South Lakes monitoring program that was under development at that time and is presented in the SAP (USGS et al, 2001). Long-term monitoring in the South Lakes area is included in the LTMP and the 2003 and 2004 Well Network Updates. The program will be reviewed and revised as necessary as part of the development of the revised LTMP in 2007.

f. Management of lake levels to minimize potential exposure to HHE soil that has been left in place in Lower Derby Lake is noted in the discussion of the Interim Institutional Control Plan in Section 6.3.11.

g. As discussed in response to Comment 97b, the lake level maintenance requirement has been removed from the ROD through an ESD, and the ESD information has been included in the revised text.

Comment 98. **Section 7.1.3, Private Well Network, Page 111.** This section is a placeholder for the private well network. However, the private well network is not a separate project, rather it is a component of the Off-Post, Long-Term Groundwater Monitoring program required by the Off-Post ROD. This section should be included in a section for the Off-Post Groundwater Monitoring.

The following discussion should be incorporated in the description developed for this topic. The 2003 Well Networks Update lists Army wells that have either been closed or cancelled due to well damage (FWENC 2003c). In some cases the Well Networks Update proposed a private off-post well for a damaged Army well (i.e., 37355, 37356, 37357) (FWENC 2003c). However,

the off-post private well monitoring program is a voluntary program, which means that RVO and Tri-County Health Department (TCHD) may or may not be granted permission to monitor these wells. This approach subjects the off-post monitoring program to the unpredictable whims of outside interests and provides little to no control of plume definition objectives for the off-post monitoring program. The text should be revised to discuss the current policy for identifying monitoring wells in the off-post area, the rationale for this policy, the impact on sampling objectives, and how the intent of the monitoring program is achieved. Based on the anticipated responses to this information request, EPA expects that a follow-up action will be identified to re-assess the off-post monitoring network to provide adequate exceedance monitoring of the plumes. Specifically, an independent off-post monitoring network needs to be established that does not rely on private wells, though private wells could be used as an enhancement to the program.

Until the text for this section is received, EPA cannot provide review and comment regarding the effectiveness of the off-post groundwater monitoring program.

Response: The private well network section has been included in the section for off-post groundwater monitoring in the Final FYRR. The off-post private well monitoring program is a voluntary participation program that is intended to supplement the monitoring well network where possible. TCHD is trying to keep in their network as many wells as possible that are critical to identifying exceedance areas. The RMA off-post monitoring well network is also vulnerable to the unpredictable developments of private and public construction projects. However, the entire network will be reviewed and updated as part of the preparation of the revised LTMP in 2007.

Comment 99. **Section 7.1.4, Operation of Hazardous Waste Landfill Cells 1 and 2, Pages 111 to 113.** This section describes on-post operational projects. Operation of the HWL is described in this subsection. Following are comments on this subsection:

a. Water containing detectable concentrations of diisopropylmethyl phosphonate (DIMP) has been detected in the Leachate Detection System (LDS) (RVO 2004d). During design of the LDS, it was not anticipated that the leak detection system would collect water that contains DIMP. This section should be revised to discuss the implications of this occurrence, lessons learned, and provide an assessment of whether the remedy is functioning as intended.

b. The leachate collection system (LCS) collected large volumes of water in July 2004 (229,100 gallons) (RVO 2004e). This water was collected after two-thirds of the HWL was covered by an intermediate cover that was designed to shed water. However, this fact is not addressed. This and other anomalies associated with operation of the LCS should be assessed.

c. Changes during implementation of the remedy may result in the HWL exceeding its design capacity. Actual remediation volumes for completed projects are different from the original ROD estimates and future remediation volumes may have changed. A new landfill volume estimate should be provided based on actual and planned project waste volumes. An analysis of actual versus planned waste volumes disposed in the HWL, and the impacts on the capacity of the HWL and the future capacity of the ELF should be provided. In addition, a discussion of lessons-learned regarding costs, scheduling, and contingency plans for alternative disposal facilities, if required, should also be included in the FYRR.

d. The HWL is located within a CAMU that was established by a CDD. Specific design and operating requirements were imposed by the CDD on the HWL. For example, inspections of the CAMU are conducted by CDPHE. The FYR should address compliance with the CAMU requirements as identified in the CDD.

e. This subsection indicates that the HWL receives waste from the "Housekeeping" project. "Housekeeping" is not an implementation project. A note should be provided explaining the term "Housekeeping" and the associated wastes. This comment is also applicable to the Basin A Consolidation and Remediation Area (Basin A) project description.

Response:

a. A discussion of the leachate detections has been added to Section 4.3.2.1, the DIMP Investigation is discussed in Section 6.3.7, the operational groundwater monitoring is presented in Section 6.4.1.8 and the issue is assessed in Section 7.2.3.1..

b. Leachate that is collected within any particular leachate collection sump was generated months and potentially years prior to the actual date of the pumping event, owing to the travel time of the leachate through the overlying waste material that could be as much as 40 feet in depth. As such, the pumping of this leachate is not considered anomalous and the text was not modified.

c. The volume basis of the design of the HWL and ELF have been addressed in the design documents (design packages, DCNs, etc.) associated with the respective projects. Any volume changes associated with the remedy project have been addressed through change documentation approved by the Regulatory Agencies. The RVO sees no benefit to the reiteration of this information in the FYRR. At the time of this response, the waste volumes anticipated from the remaining remedy projects are fully accommodated by the capacity of the two RMA landfills. As such, there is no need to discuss the potential for alternative disposal facilities.

In addition, as noted in Section 6.3.14, the adequacy of ELF capacity was assessed during the evaluation of remedial alternatives performed as part of the ROD Amendment and determined adequate.

d. This section has been revised as requested to indicate that the HWL complied with requirements established by the CAMU Disposal Document.

e. The list of projects taking waste to the HWL was deemed redundant with the project descriptions and removed.

Comment 100. **Section 7.1.4, Page 113, Operation of LTWU.** Operation of the LWTU is described in this subsection. This subsection states, "Monthly discharge monitoring reports (DMRs) are required to be submitted to the Regulatory Agencies....". However, an amendment to the CCD (EPA 1998b) changed the reporting requirements from monthly to quarterly. The statement should be changed to reflect the fact that DMRs are to be submitted on a quarterly basis since the Amendment was effective during the FYR period.

Response: The revised Section 4.3.2.2 now states that the Discharge Monitoring Reports are submitted quarterly.

Comment 101. **Section 7.1.4, Operation of the Basin A Consolidation and Remediation Area, Page 115.** The Basin A project is described in this subsection. An approximate volume for the "Notch" disposal area within Basin A is provided. However, the description does not indicate whether the given volume is sufficient to accommodate the remaining projects. The description should include an assessment of whether sufficient capacity is available in the Basin A Notch to accommodate the remaining projects.

Response: The approximate volume of the "Notch" is more than adequate to contain the waste material from the last remaining project expected to contribute waste material to the Basin A Consolidation Area. The remediation project is Miscellaneous Structures Phase III that is expected to contribute approximately 66,000 bcy of waste material. Section 4.3.2.3 has been revised to provide this information.

Comment 102. **Section 7.1.5, Operations and Maintenance Projects, Page 116 to 120.** This section discusses the O&M projects. The following are comments on this section:

a. The text states that operation of the groundwater containment and treatment systems is addressed in detail in the OARs for each system. However, to date OARs have not been provided for either 2003 or 2004. Since the assessment of the performance of the treatment systems at RMA in this FYR is based on these OARs, an evaluation of the effectiveness of these systems cannot be completed. The FYRR should provide the

pertinent data and evaluation of the groundwater treatment systems given the lack of supporting documentation from the OARs.

In addition, the OARs completed during this FYR period have not been provided to the Regulatory Agencies in a timely manner. As an example, the FY2000 OAR for BANCS was completed July 2003, the FY2001 report was provided in October 2004, and the FY2002 report was provided in April 2005. OARs for 2003 and 2004 have not been provided to date. Because these reports lag by three years, the usability of these reports for establishing compliance with ROD requirements is negligible. Because there is incomplete evaluation of the effectiveness of the On-Post and Off-Post treatments systems provided, EPA cannot validate that (1) the remedy is functioning as intended by the decision documents, and (2) whether any information has come to light that could call into question the protectiveness of the remedy. If the OARs are to be the documents that assess compliance with the ROD for the treatment systems, EPA expects that the lack of timely reporting of treatment system performance (data and evaluation) to the Regulatory Agencies and the public will be identified as an Issue in Section 8.0 and a follow-up action identified in Section 9.0 to establish a yearly due date for submittal of the OAR reports so that they can be used effectively in the decision-making process.

b. It is believed that RVO evaluates compliance with the ROD by ensuring that the treatment plant effluent concentrations are below CSRGs. However, the treatment plant effluent monitoring only validates that the treated groundwater is being protective of human health and the environment. It does not validate the containment requirement specified in the ROD. The current monitoring program for the North Boundary Containment System (NBCS) and the Northwest Boundary Containment System (NWBCS) includes conformance monitoring wells, which monitor water quality downgradient of the boundary containment systems. The CSRGs have been exceeded in Conformance Monitoring wells at NBCS and NWBCS during the FYR period, but there are currently no compliance requirements for these wells. Because there are no compliance metrics for establishing whether the contaminated groundwater is being contained, EPA cannot validate (1) whether the remedy is functioning as intended by the decision documents, and (2) whether any new information has come to light that could call into question the protectiveness of the remedy. The continued detection of contaminants above CSRGs from boundary containment system conformance wells should be discussed in this section and identified as an Issue that should be addressed in Section 8.0 of the FYRR.

c. Both the Off-Post and On-Post RODs document the shutoff criteria for extraction wells in the RMA extraction systems. The ROD states that wells removed from production and monitoring wells upgradient and downgradient of the systems will be monitored quarterly for a period of

five years to determine whether contaminants have reappeared; however, those wells shut down for hydraulic reasons will not be subject to the five-year monitoring requirements. The ROD does not define what "hydraulic purposes" means, but suggests that the shutdown of a well would not affect the containment objective of the system. EPA has the following concerns with respect to the shutdown of wells at RMA for hydraulic purposes.

1) RVO has suggested that the five year monitoring requirement applies only when the entire system is shut down and does not apply to individual wells shutdown before that time. As a result, quarterly monitoring of these individual wells over a five year period is not being conducted. This appears to conflict with the intent of the ROD to ensure that rebound does not occur. (Water Team Meeting, July 21, 2005).

2) RVO has suggested that wells can be turned off for hydraulic reasons at any time with no notification to the Regulatory Agencies and no evaluation to support the well shutdown (Water Team Meeting, September 1, 2005).

3) There is no clear discussion of how the containment requirement in the ROD is being met either before or after a well is shutdown.

4) Some extraction systems at RMA are intercepting treated recharge water as part of the hydraulic control. For example, "In the portion of the original portion of the Northwestern Boundary System (NWBS) where the recharge wells are located in what was originally downgradient of the extraction wells ..., approximately one-half of the water that is pumped [by an extraction well] is recycled water " (RVO, 2005). However, this would dilute the actual plume concentration measured from an individual extraction well and incorrectly indicate that the groundwater concentrations had decreased to below shutdown criteria (CSRGs). For the NWBS, this could result in shutdown of a well when the actual groundwater concentrations were approximately twice the CSRGs. If the well were then shutdown for hydraulic purposes, the error would be compounded by not conducting quarterly monitoring to detect if rebound of the groundwater plume had occurred.

The text in this section should be revised to reflect these concerns. Based on these concerns, EPA expects that extraction well shutdown criteria will be identified as an Issue in Section 8.0 of the FYRR with follow-up actions recommended in Section 9.0. At this time, EPA cannot validate that the groundwater remedy is functioning as intended by the decision documents.

d. A review of the treatment systems at RMA indicates that there are COCs identified in the ROD for some treatment systems, which the treatment system, as currently configured, cannot treat. Examples of this are arsenic and fluoride at the OGITS and NBCS systems. As a result, there have been exceedances of the CSRGs for arsenic and fluoride in treatment plant effluent, primarily at the OGITS, during the FYR period. The FYRR does not provide the rationale for not incorporating the capability to treat for these CSRG compounds.

CERCLA requires that the remedy selection process evaluate treatment alternatives against nine criteria. The first two criteria, threshold criteria, must be attained by any alternative if it is to be considered for further evaluation by the remaining seven criteria. The threshold criteria that must be met are protection of human health and the environment, and attainment of ARARs. In addition, "remedial actions in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants is a principal element, are to be preferred over remedial actions not involving such treatment." Both the OGITS and NBCS utilize dilution as the de facto treatment technology for arsenic and fluoride. This technology increases the volume of the contaminated groundwater when CSRGs cannot be achieved, and does nothing to decrease the mobility of the contaminants. In addition, these treatment facilities do not consistently attain the ARARs for arsenic and fluoride. The ROD established the groundwater treatment ARARs to be the CSRGs that are generally developed for a $1x10^{-6}$ excess carcinogenic health risk.

This current treatment approach does not meet CERCLA requirements for selection of an appropriate remedy or adhere to the preference for active treatment. Based upon this assessment, EPA does not agree that the groundwater remedy is functioning as intended by the ROD decision documents and, therefore, calls into question the protectiveness of the remedy.

Response:

a. The OARs for FY03 and FY04 were finalized in early December of 2005 and are referenced in the Final FYRR. The OARs during the 5-year period from 2000 to 2004 were in transition from one report per system to one report for all systems. The OARs will be issued on schedule starting with the 2005 OAR. The Regulatory Agencies were kept informed quarterly of the ROD-required compliance points at the treatment plants and of the OAR schedule at monthly status meetings. The quarterly Treatment Plant Effluent Reports, which documented CSRG constituent concentrations at each treatment plant, were published quarterly during the 2005 FYRR reporting period.

b. There are no standards or requirements for conformance wells downgradient of the NBCS and the Northwest Boundary Containment System (NWBCS). These wells are used to monitor contaminant trends downgradient of the systems. Contaminants were in the groundwater downgradient of the systems well before the containment systems were built. During the operations of the systems, the contaminant concentrations indicate a downward trend and are below CSRG concentrations for all but a few of the conformance wells. Because of the clayey deposits in the aquifer, some areas are slower to clean up than others. The RVO does not consider this a FYRR issue.

c. Please refer to response to General Comment 9c. The ROD states that if the well is shut down for hydraulic purposes, the five-year water quality monitoring requirements do not apply. The RVO and EPA have different interpretations of hydraulic purpose. In an effort to develop a consensus for future shutoff monitoring, the RVO is developing new shutoff monitoring procedures, that include a procedure for ROD-required shutoff monitoring that establishes that such monitoring will start when an entire system or a discrete portion of such has been shut off and a procedure for operational shutoff monitoring that applies to any well that is shut off after having met contaminant shutoff criteria.

d. The treatment systems are designed and operated to meet the effluent discharge requirements (i.e., the CSRGs) and, per the ROD, continue to operate as designed. While it is true that the OGITS and NBCS cannot treat inorganic compounds such as arsenic and fluoride, they have been operated such that the ROD requirement for meeting CSRGs in the treatment plant effluents has been met. The apparent exceedances of arsenic and fluoride that EPA refers to were due to analytical method problems and matrix interferences and were not representative of actual effluent concentrations. EPA was informed of these arsenic and fluoride analytical problems in monthly Water Team status meetings and they were discussed in the OARs. Details of these analytical problems are provided below.

   Arsenic exceedances reported for method 6010 during FY2001 and FY2002 were suspected to be associated with analytical instrument and matrix interference problems that caused false positive detections near the reporting limit which is the CSRG. The laboratory support group rejected some of the questionable data, but some of the problems were caused by random instrument surges that could only be qualified by comparison with historical data. This led to the decision to use a different analytical method (7062) that has a lower reporting limit and is less subject to these problems. Since some of the method 6010 results were valid, instead of flagging or rejecting all of the data for method 6010 or using a historical comparison for that purpose, the RVO decided to place more weight on the results with the new method. There have been no arsenic exceedances

in the NBCS and OGITS effluents since the current method was implemented in FY2003. In fact, no arsenic exceedances occurred before or after method 7062 was used.

To help ensure that questionable data are assigned a "Z" data qualifier in the RMA Environmental Database in a timelier manner in the future, the RVO is currently formalizing a policy concerning routine data verification reviews that will be performed in a manner consistent with the document "EPA Guidance for Data Quality Assessment, Practical Methods for Data Analysis, QA/G9, July 2000." It is important to note that there will continue to be situations where sporadic problems with laboratory methods or instruments can result in intermittent data problems that will not be identifiable by formal statistical tests such as outlier tests or trend tests; the RVO is in the process of writing an RMA Post-Laboratory Water Quality Data Assessment Procedure that will provide standard procedures for determining whether water quality data are questionable. There will still be situations in the future when the benefits of hindsight will continue to be invaluable in resolving such data quandaries.

Matrix interference problems were also encountered for fluoride using method TT22, which was also the method used for the common anion group. Interference typically occurs when sulfate concentrations are elevated, which is prevalent at the NBCS and OGITS. This sulfate interference frequently causes the reported fluoride concentration to be biased high above the CSRG. The Regulatory Agencies were informed that this method should not be used for CSRG compliance. The fluoride data for Method TT22 will be evaluated through a validation procedure currently being developed before a decision is made regarding database qualification for the data. In FY2002, the analytical method was changed to a fluoride-specific method that is not subject to interferences.

Both issues have been addressed and arsenic and fluoride levels have been below the CSRGs at the NBCS and OGITS since the analytical methods were changed. This helps confirm the erroneous nature of the previous exceedances. The FYRR text has been revised to explain the apparent exceedances of the arsenic and fluoride CSRGs.

Comment 103. **Section 7.1.5, Shell/Complex Army Trenches Slurry Walls Dewatering of Army Trenches, Page 117 and 118.** This subsection discusses the Shell Disposal Trenches and Complex (Army) Trenches slurry walls. The following comments pertain to this subsection:

a. This subsection combines the O&M discussion for two projects. Although the O&M requirements are similar for both projects, they are different projects and should be discussed separately.

b. The text states "Since some of the [monitoring] wells have been dry, some wells were damaged for a period of time and one well was destroyed, some of the conclusions [with respect to the performance of the slurry wall] are based on limited data." These statements suggest that the piezometers used to monitor the effectiveness of the Shell Trenches remedy were not maintained during this FYR period. EPA expects that the lack of maintenance of monitoring wells should be identified as an Issue in the FYRR because the performance of this part of the remedy cannot be fully assessed.

c. Also, in reviewing the water level data in the RMAED for the Shell Trenches piezometers, it appears that many of these wells were not monitored between the third quarter of 1998 and the third quarter of 2003. Given that the LTMP lists these wells for quarterly monitoring (starting in 1999), the lack of water level monitoring during a significant portion of this FYR period should be identified as an Issue. The reason for this five-year data gap should be discussed in the FYRR.

d. The discussion of the Shell Trenches on Page 118 states, "Based on the available water- level data, it appears that the groundwater elevations have remained below the bottom of the trenches." However, the FYRR does not provide the data or a reference to supporting documents. The FYRR should provide documentation that supports this conclusion.

e. This subsection also discusses the Complex (Army) Trenches remedy, which has two piezometers (36216, 36217) that are used to determine if the single extraction well is lowering water levels below the bottom of the deepest trench at the Complex (Army) Trenches site. The FYRR on Page 118 states "The water level in one well is below its target elevation and one is still above its target elevation." However, a review of the water level data from these two piezometers during the FYR period shows that water levels for Well 36216 have been below the target elevation six times during the FYR period (out of 35 water level measurements), and water levels in Well 36217 have never been below the target elevation during the FYR period. This inability to consistently reach target elevations in the piezometers suggests that the extraction well has not met the requirement to lower water levels below the trench. Because the target elevations are not being met, this part of the remedy is not functioning as intended and should be identified as an Issue in Section 8.0 of the FYRR.

Response:

a. The projects have been separated in the Final FYRR. For the Shell Disposal Trenches Slurry Walls (dewatering) project, the project status if discussed at Section 4.1.3.1 and the assessment is found at Section 7.2.1.1. For the Complex (Army) Trenches (dewatering) project, the project status is provided at Section 4.1.3.2, the assessment is found in Section 7.2.1.2.

b. The text has been revised to clarify that the "limited data" was due to temporary shutdown during short-term construction activities. Based on the explanation provided, the RVO does not see a need to address this as an issue in the FYRR. The temporary shutdown of these wells was caused by the construction of the Shell Trenches slurry wall. This construction of a working bench for deep soil mixing equipment required placement of fill in areas where existing facilities, including 10 Shell Trenches IRA monitoring wells, were located. Consequently, the wells were temporarily taken out of service during this construction (DCN No. 4759-045-004, July 10, 1998). They were cut off at or below grade and capped before the working bench fill was placed. After slurry wall construction was completed, 9 of the 10 monitoring wells were rehabilitated in 2001. One well (36534) was damaged beyond repair and, with Regulatory Agency concurrence, was not replaced. Five new monitoring wells were installed outside of the new slurry wall in 2000. Quarterly water level monitoring of the new wells started in 2000 but, due to an oversight, monitoring of the 9 IRA wells did not resume until July 2003. Several of the IRA monitoring wells (including well 36534) became dry because water levels fell inside one or both slurry walls. Water levels have fallen because the slurry walls are successfully reducing groundwater flow. Despite efforts to protect monitoring wells, they are occasionally damaged during earthmoving or other remediation activities. When this happens, wells intended to be retained in the LTMP are repaired or replaced in a timely manner. Also, access restrictions sometimes prevented collection of water level data for these wells. More information regarding the maintenance of these wells has been added to the text.

c. Please see response to Comment 103 b. above.

d. Information has been added to the text to support the conclusion in the Final FYRR.

e. The RVO has attempted to maximize pumping from the Complex Trenches dewatering system as much as possible to attain the dewatering goals. The dewatering goals are based on target water levels, but meeting the goals within a specific time frame is not a requirement. Attaining the target groundwater elevations in compliance wells 36216 and 36217 was neither specified in the Complex Trenches Design Document (RVO 1997) nor in the ROD. Estimates of the time required to meet the dewatering goals were made in the Design Document and in the Complex Trenches Groundwater Extraction System OFR (RVO 2002), but these were only estimates, not commitments or requirements. For example, in the OFR it states, "(i)n order to ensure that the dewatering goal of lowering the water table below the bottom of the disposal trenches could be achieved in a reasonable amount of time (e.g., 5 to 10 years, or less), a conservatively high design flow rate of 3 gallons per minute (gpm) was selected." Additionally, the dewatering system did not begin operation until 2001, so

it is unrealistic to expect the dewatering goals to be met by 2005. Furthermore, the design flow rate has not always been maintained because of treatment and recharge limitations. The Regulatory Agencies were made aware of these reductions in the flow rate, which increase the time required to meet the dewatering goals.

Until the remedy is fully implemented and the RCRA-equivalent covers are installed, it is unlikely that these target levels will be reached or maintained in both compliance wells because infiltration of precipitation causes groundwater recharge within the area inside the slurry wall. Short-term increases in groundwater elevations, in response to precipitation events, occurred in 2001, 2003, and 2004/2005 and may occur in the future until the RCRA-equivalent cap is installed. These rises in water levels also increase the time needed to meet the dewatering goals. In a flow rate analysis of testing of the dewatering trench that was required to complete the Complex Army Trenches Groundwater Barrier Project CCR, (FWENC 2001) it is stated, "It should be recognized that lowering the water table in the vicinity of the Complex (Army) Trenches may be difficult until the RCRA-equivalent cover is constructed over the area, thereby essentially eliminating surface recharge." Therefore, while we agree that the dewatering goal has not yet been met, the RVO disagrees that this part of the remedy is not functioning as intended.

Comment 104. **Section 7.1.5, Irondale Containment System: Rail Classification Yard System and Motor Pool Area Treatment System, Pages 118 and 119.** This subsection discusses the Irondale, Railyard, and Motor Pool treatment systems. The following are comments on this subsection:

a. The texts indicates that detailed analysis of the performance of these systems can be found in the OARs for FY 2000, 2001, 2002, 2003, and 2004, and lists the references for these documents. However, at this writing, the OARs for FY 2003 and 2004 have not been produced. Therefore, the references provided are not adequate to document the performance of this system during the FYR period. The FYRR should provide the pertinent data and evaluation of the performance of this system.

b. The FY 2002 OAR referenced in the text discusses the shutoff water quality monitoring results for the Motor Pool Extraction System. This report incorrectly suggests that TCE was not above the CSRGs during FY 2002. Samples collected in shutoff monitoring Well 04535 on November 12, 2002 and December 10, 2002 show TCE concentrations above the CSRG. The FYRR should discuss these exceedances, and implications for the shutoff of water quality monitoring for the Motor Pool Extraction System.

Response:

a. See response to Specific Comment #102 a.

b. Please note that the November 12, 2002 and December 10, 2002 samples were collected in FY03. Therefore, TCE was not detected above the CSRG in well 04535 in FY2002. The CSRG exceedances in November and December 2002 are discussed in the FY03 OAR and the information has been included in the revised text in Section 4.1.3.4.. .

Comment 105. **Section 7.1.5, Basin A Neck Containment System, Page 119.** This subsection discusses the BANCS. The following are comments on this subsection:

a. The text states that detailed analysis of the performance of this system can be found in the OARs for FY 2000, 2001, 2002, 2003, and 2004, and lists the references for these documents. However, at this writing, the OARs for FY 2003 and 2004 have not been produced. Therefore, the references provided are not adequate to document the performance of this system during the FYR period. The FYRR should provide the pertinent data and evaluation of the performance of this system.

b. This second paragraph in this subsection states that all extracted groundwater from the BANCS was treated to below CSRGs. However, other compounds such as chlordane, that are not CSRGs for this system have been detected in the influent at BANCS. The effectiveness of treatment on these other compounds should also be discussed.

Response:

a. See response to comment #102 a.

b. Treatment effectiveness for other compounds is discussed in the revised text in Section 4.1.2.5.

Comment 106. **Section 7.1.5, Northwest Boundary Containment System, Page 119.** This subsection discusses the NWBCS. The following are comments on this subsection:

a. This subsection suggests that detailed analysis of the performance of this system can be found in the OARs for FY 2000, 2001, 2002, 2003, and 2004, and lists the references for these documents. However, at this writing, the OAR reports for FY 2003 and 2004 have not been produced. Therefore, the references provided are not adequate to document the performance of this system during the FYR period. The FYRR should provide the pertinent data and evaluation of the performance of this system.

b. The second paragraph in this subsection states that all groundwater intercepted and treated was reinjected with contamination levels below CSRGs except for one exceedance of dieldrin (in the treated effluent sample) in January 2003. The subsection further states, "The capture of contaminant plumes migrating toward the northwest boundary was controlled by the effective operation of the system." However, the section does not discuss exceedance of the CSRGs in monitoring wells downgradient of the NWBCS. Dieldrin was exceeded in Well 37332, arsenic was exceeded in Well 37331 and chloroform was exceeded in Well 37333 twice during the FYR period. Though exceedance of the CSRGs was not consistent in these wells during the FYR period, the data suggest that the requirement for containment of the contaminant plumes is not being consistently met. In addition, a review of the monitoring wells in the off-post area west of NWBCS suggests that there are no off-post monitoring wells other than the conformance wells to determine whether bypass is occurring in the NWBCS system. Well 37125 is monitored as part of the NWBCS monitoring program, but is not in the primary flow path for the NWBCS plumes. The FYRR should evaluate and discuss the monitoring results and explain the paucity of off-post monitoring locations associated with these plumes. Based on the anticipated revision of this Section, EPA expects that the monitoring program for the NWBCS will be identified as an Issue in Section 8.0 with follow-up actions recommended in Section 9.0. At this time, EPA cannot validate that the groundwater remedy is functioning as intended by the decision documents due to the incomplete evaluation and discussion of monitoring data pertinent to the NWBCS.

c. The text suggests that decreases in influent concentrations at the NWBCS indicate a well functioning system performing as intended. It is not clear how the reduction in influent concentrations confirm that the treatment system is functioning properly. The FYRR should discuss the criteria being used to determine that the system functioning as intended.

Response:

a. See response to comment #102 a.

b. The OAR for the NWBCS provides the detailed information of how capture was achieved and the goals of the system met. Conformance monitoring downgradient of the NWBCS has not shown increasing concentration trends for dieldrin and the NWBCS effluent met the CSRGs as reported. In accordance with the long-term monitoring program established in the LTMP, and stated in response to Comment 102 b., conformance monitoring will continue to be used to determine whether contaminant concentration trends conform to expectations downgradient from the boundary systems. The exceedances do not represent an increasing trend; most conformance concentrations are below reporting

limits or decreasing. The exceedance for arsenic in well 37331 cited by EPA was rejected by the RMA laboratory support group in March 2004 because of the problems with method 6010 discussed in previous responses and in the Water Team meeting on 11/30/05. Use of method 6010 was discontinued at the end of 2002. The current analytical method (7062) has a lower reporting limit (1 µg/l), is not subject to interferences, and subsequent samples showed no exceedances. The chloroform exceedances in well 37333 were, according to the 2001 OAR for the NWBCS, suspected to have been caused by cross contamination of sampling equipment, and this problem has been corrected. In both cases, the well was resampled and the exceedances were not confirmed. The exceedance of dieldrin in well 37332 likely was related to the effluent exceedance in January 2003. Well 37332 was resampled 1 month later and the concentration was below the PQL. The effluent exceedance was caused by short-circuiting of the carbon adsorber and operational procedures were changed to pulse the carbon more frequently and prevent a recurrence. The conformance monitoring network was developed and approved by the Regulatory Agencies in the Off-post OU Remediation Scope and Schedule (HLA 1996). No downgradient plumes have been detected above CSRGs/PQLs since prior to the RODs. The CSRG exceedance monitoring network was developed in the LTMP in 1999 and approved by the Regulatory Agencies. Because there had not been any CSRG exceedances downgradient of the NWBCS for a number of years prior to 1999, no off-post wells other than the NWBCS conformance wells were included in the exceedance monitoring network. The exceedance monitoring network be reviewed as part of the Well Network Update for the LTMP in 2007. The RVO believes that the existing monitoring network is adequate for monitoring the effectiveness of the NWBCS. Other than a single detection of dieldrin in well 37332 during the review period, no actual exceedances occurred. The cause of the dieldrin exceedance (i.e., short-circuiting of the carbon adsorber) was identified and remedied. System modifications to prevent recurrence of the problem are documented in the 2004 OAR.

c. The OARs for the NWBCS provide the detailed information of how capture was achieved and the goals of the system met.

Comment 107. **<u>Section 7.1.5, North Boundary Containment System, Pages 119 and 120</u>.** This subsection discusses the NBCS. The following are comments on this subsection:

a. The text indicates that detailed analysis of the performance of this system can be found in the OARs for FY 2000, 2001, 2002, 2003, and 2004, and lists the references for these documents. However, at this writing, the OARs for FY 2003 and 2004 have not been produced. Therefore the references provided are not adequate to document the performance of this

system during the FYR period. The FYRR should provide the pertinent data and evaluation of the performance of this system.

b. The first paragraph in this subsection states, "The NBCS is identified in both the On-Post and Off-Post RODs as an integral part of the selected remedy by ensuring that elevated levels of 29 contaminants potentially in the groundwater don't migrate off-post." However, the FYRR does not provide detailed discussion of whether the NBCS system has been effective in ensuring that these 29 contaminants have not migrated off-post. In fact, after more than twenty years of operation, monitoring data included in the 2002 and 2004 off-post groundwater exceedance maps indicate that dieldrin, DIMP and fluoride are migrating off-post in sufficient quantity to form contaminant plumes above the CSRGs. The 2002 OAR suggests that six of the ten conformance monitoring wells downgradient of the NBCS show concentrations above the CSRGs for COCs other than sulfate and chloride (PMRMA 2005).

c. All water quality data available to EPA that was collected from wells within a quarter mile downgradient of the NBCS slurry wall were evaluated for the FYR period, regardless of well purpose or category. This evaluation resulted in the following observations: seven wells downgradient of the slurry wall had multiple detections of DIMP above the CSRG; eight wells downgradient of the slurry wall had multiple detections of dieldrin above the CSRG; dieldrin data from a number of these wells show an increasing trend; of the 23 wells that were monitored downgradient of the slurry wall for fluoride, all but seven had detections above the CSRG; and in a number of the 23 wells, fluoride is increasing in concentration. This technical assessment of the water quality data results in the identification of the following Issues:

    1) The NBCS is not achieving the containment objective set forth in the On-Post ROD and, therefore, not functioning as intended.

    2) Increasing trends in contaminant concentrations for compounds such as dieldrin and fluoride indicate that contamination north of the NBCS slurry wall is not residual contamination and, instead, is increasing bypass of the containment system.

    3) The frequency and distribution of water quality monitoring well locations being sampled downgradient of the NBCS are insufficient to determine that the containment system is effective.

    The FYRR should discuss these Issues along with an evaluation of the monitoring results obtained during the FYR period.

d. The third paragraph in this subsection suggests that the sulfate natural attenuation goal at the NBCS has been achieved. This is true for the

effluent water quality from the NBCS. However, sulfate concentrations continue to be above CSRGs in upgradient monitoring wells, downgradient monitoring wells, and in three extraction wells. Natural attenuation of chloride and sulfate should be demonstrated for the plumes, not the treatment plant effluent. The text also suggests that more information regarding sulfate and chloride attenuation will be discussed in the FY2004 OAR. Because this report has not been produced as of this writing, the pertinent monitoring data and evaluation of this natural attenuation remedy should be discussed in the FYRR.

e. The fourth paragraph discusses various improvements to the NBCS system during the FYR period. However, the water quality evaluation involving wells screened in the unconfined Denver formation was not discussed. The results of that investigation suggest that underflow of contaminated groundwater below the slurry wall is occurring in the unconfined Denver formation in at least two locations (PMRMA 2005). This subsection should be revised to include discussion of the investigation project.

f. The text suggests that decreases in influent concentrations at the NBCS indicate a well functioning system performing as intended. It is not clear how the reduction in influent concentrations confirm that the treatment system is functioning properly. The FYRR should discuss the criteria under which the functioning of the system is being determined.

Response:

a. Please refer to response to Comment # 102 a.

b. Based on a careful evaluation of historical chemical and hydrogeological data for the areas upgradient and downgradient of the NBCS, as well as NBCS operational history, RVO does not believe the plumes north of the NBCS or CSRG exceedances in conformance wells represent bypass of the system. As discussed in the Water Team working session on 11/30/05, the system is considered to be working effectively if the hydraulic gradients are acceptable and the conformance wells show generally decreasing trends. A reverse gradient has been consistently maintained in the alluvium and the contaminant concentrations in the conformance wells show decreasing trends for most of the contaminants. Although there are CSRG exceedances in some of the conformance wells, they do not represent bypass of the system. The text has been revised to include summary explanations of the trends, and a detailed evaluation of hydrogeology, CSRG exceedances in downgradient conformance wells, and system effectiveness are included as Appendix B of the FYRR.

c. Dieldrin is more persistent than other, more mobile, contaminants (DIMP, chloroform, PCE, etc.) because of lower solubility and higher partition

coefficients. Higher organic carbon concentrations are present in the aquifer sediments north of the NBCS than in other areas of RMA, including in downgradient well 37338. This facilitates greater sorption and retardation of dieldrin migration and extends the duration of desorption back into the aquifer. These properties of dieldrin and of the aquifer north of the NBCS, plus the fluctuating water levels in the recharge trenches caused by flow in First Creek explain the slower cleanup of the dieldrin plume in this area. Thus, the exceedances of dieldrin in NBCS conformance wells do not reflect bypass and therefore are not considered reason for concern. The latest OARs for the NBCS and NWBCS, which were issued in early December 2005, include documentation on how containment is achieved and evaluated. Per discussions with the EPA Regional Hydrogeologist, Appendix B has been included in the FYRR to address EPA's issues and explain why the remedy is protective.

d. As discussed in the response to EPA comment 107 b., the exceedances EPA refers to are, as explained in the revised report text and Appendix B , not caused by bypass of the system, and the RVO maintains that the NBCS is performing as intended in the RODs. As described in the "Development of Chloride and Sulfate remediation Goals for the North Boundary Containment System" (MK and FWENC 1996), chloride and sulfate CSRGs will be met in the NBCS effluent primarily by decreasing groundwater flow from the former Basin F area. The referenced chloride and sulfate analysis and compliance time-frame predictions for the ROD were conservative in that meeting the CSRG goals at the NBCS was not dependent on concentrations decreasing in upgradient wells. Even though upgradient concentrations may actually increase, the overall contaminant mass flowing toward the NBCS is expected to decline. Consequently, the conclusions concerning meeting the CSRGs are based primarily on NBCS influent/effluent concentration trends. The trends in upgradient monitoring wells were also evaluated for completeness. The text has been revised to include information about the data evaluation that led to these conclusions.

e. The NBCS discussion has been expanded in the revised text. Detailed information that explains why the RVO has concluded there are no underflow issues at the NBCS has been added as Appendix B

f. A summary of the evaluation has been included in the text.

Comment 108. **<u>Section 7.1.5, Operation of Off-Post Groundwater Intercept and Treatment System, Pages 120 and 121</u>**. This subsection discusses the OGITS. The following are comments pertaining to this subsection:

a. The text on Page 120 states that detailed analysis of the performance of this system can be found in the OARs for FY 2000, 2001, 2002, 2003, and

2004, and lists the references for these documents. However, as of this writing, the OARs for FY 2003 and 2004 have not been produced. Therefore, the references provided are not adequate to document the performance of this system during the FYR period. The FYRR should provide the pertinent data and evaluation of the performance of this system.

b. Evaluation of the groundwater data collected at the Northern Pathway portion of the OGITS during the FYR period clearly identifies that bypass of the extraction system has occurred on both the western and eastern ends of the system. DIMP is bypassing the system on the east side and fluoride is bypassing the system on the west side. The Off-Post ROD indicates that the OGITS is intended to operate as a containment system and, based on the bypass, is not functioning as intended by the decision documents. The FYRR should discuss the contaminant bypass at the OGITS and provide the rationale for not characterizing these bypass plumes and modifying the OGITS to achieve capture of these plumes. Because of this contaminant bypass, EPA does not agree that the groundwater remedy is functioning as intended by the decision documents.

c. Evaluation of the groundwater data collected at the First Creek portion of the OGITS indicates that bypass of the extraction system has occurred on the east side during the FYR period. The 2002 and 2004 off-post exceedance maps document the bypass, and DIMP has consistently been above the CSRG in wells downgradient of the extraction/recharge system. Wells 37084, 37070, 37041 have consistently shown DIMP concentrations above the CSRG, and wells 37396, 37407 and 37343 have exceeded the DIMP CSRG at least once during the FYR period. Fluoride has occasionally been above the CSRG in downgradient wells during the FYR period. The Off-Post ROD indicates that the OGITS is intended to operate as a containment system and, based on the bypass of the First Creek extraction system, is not functioning as intended by the decision documents. The FYRR should discuss the contaminant bypass at the First Creek portion of the OGITS and provide the rationale for not characterizing these bypass plume and modifying the system to achieve capture of these plumes. Because of this contaminant bypass, EPA does not agree that the groundwater remedy is functioning as intended by the decision documents.

d. A review of the monitoring wells downgradient of the First Creek system shows that there are no monitoring wells downgradient of the west side of the extraction system. The FYRR should discuss the rationale for not monitoring downgradient of the west side of the system and how this impacts the remedy's ability to function as intended.

Response:

a. The remaining OARs for this FYR period (FY03 and FY04), which were issued in early December 2005, include the pertinent information for the evaluation of system performance.

b. The objectives of the OGITS are clearly defined in the Decision Document (HLA 1989) as:

- Mitigate migration of contaminants in alluvial groundwater as soon as practicable.
- Treat contaminated alluvial groundwater to provide a beneficial impact on groundwater quality.

There is no containment goal since OGITS was designed as a mass reduction system with the objective of extracting and treating groundwater to reduce the contaminant mass in the off-post area. While the Off-Post ROD states that the system "would be constructed to contain, remove, treat and recharge groundwater," the final remedy was developed based on the off-post decisions later presented in the On-Post ROD, which incorporated the OGITS IRA as it was originally designed and relies on institutional controls, including restrictions on water use and provisions of a water supply, for the remedy.

c. Please refer to response to Comment #108 b.

d. Well 37110 is located downgradient of the west side of the First Creek system, is monitored annually for DIMP and Volatile Organic Compounds (VOCs) and has been monitored twice in five years for the OGITS CSRG list. The off-post monitoring well network has been continuously evaluated during the off-post land development process to ensure that it provides adequate well coverage to meet the exceedance monitoring requirements of the RODs. The effectiveness of the OGITS is measured by its mass removal efficiency and ability to meet the effluent CSRG requirement. The text has been revised to clarify why the remedy is currently functioning as intended, and that the off-post exceedance monitoring network will be updated in the spring of 2006 to address current and future monitoring needs based on the most recent information on off-post residential and commercial developments.

Comment 109. **Section 7.1.6, Access and Institutional Controls, Pages 121 and 122.** This section describes access and ICs. The following are comments pertaining to this subsection:

a. This section does not include a complete assessment of the ICs, including access restrictions that are currently in place at RMA. This section should be revised to assess the effectiveness of the IC program based on documented observations and monitoring of the ICs, including access

control, according to the three questions in Chapter 4 of the *Guidance* (EPA 2001). As required for five-year reviews, the assessment should be done on a site-wide basis including areas that have been deleted from the NPL site such as WTP, the Surface Deletion and Perimeter deletion areas (now Refuge and/or transferred for road widening), as well as the Off-Post OU. This assessment should include a discussion of the observations made during the FYR inspection conducted on May 10, 2005.

b. During the FYR site inspections for Institutional Controls conducted May 10, 2005, EPA observed that key remedy projects (Basin A and Lime Basins) were not identified by project signs. These project signs are an essential component of an access control program at CERCLA sites as it ensures that on-site workers and visitors are made aware of potentially hazardous conditions and do not violate exclusion zones or other work areas. The FYRR should be revised to discuss the lack of these signs as part of the IC assessment. Based upon the anticipated revision of this section, EPA expects that the lack of project signs at Basin A and Lime Basins will be identified as an Issue in Section 8.0 with follow-up actions recommended in Section 9.0.

c. In addition, EPA recently transmitted comments via email on September 2, 2005 on the revised IRMAICP. While review of the revised IRMAICP and preparation of these comments falls outside of the FYR period, many of these comments are based on review of the IRMAICP against a draft guidance document issued by EPA on February 19, 2003, entitled, *Institutional Controls: A Guide to Implementing, Monitoring, and Enforcing Institutional Controls at Superfund, Brownfields, Federal Facility, UST and RCRA Corrective Action Cleanups.* The IC guidance addresses ICs at NPL sites in a comprehensive fashion, unlike the IRMAICP, which is focused on only the deleted areas of RMA. In comments submitted September 2, 2005, EPA recommended that the IRMAICP be expanded to encompass all requirements identified in this guidance. This guidance defines ICs as non-engineered instruments, such as administrative and/or legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a remedy. ICs are used when contamination is first discovered, when remedies are ongoing, and when residual contamination remains onsite at a level that does not allow for unrestricted use and unlimited exposure after cleanup. The National Contingency Plan (NCP) emphasizes that ICs are meant to supplement engineering controls and that ICs will rarely be the sole remedy at a site (EPA 2005b). The February 2003 draft guidance states that, the policy threshold for determining whether ICs are appropriate at a site is whether the site can support unlimited use and unrestricted exposure (regardless of the reasonably anticipated future land use or whether an engineered remedy requires protection). The FYRR assessment should consider this guidance and the overall objective of ICs at RMA, and this section should be revised accordingly. In addition,

recommendations for the appropriate revisions to the IRMAICP should be developed and addressed in Section 9 of the FYRR.

Response:

a. The text has been revised to include discussion of the Interim Institutional Control Plan in Section 6.3.11. The discussion in Section 6.3.11 sets a baseline that is then used to make project-specific institutional control assessments in Section 7 as required by guidance..

b. Appropriate signs are being prepared. No further action is required.

c. Comment noted. The revised Interim Institutional Control Plan has been updated, approved by the EPA and referenced in the Final FYRR.

Comment 110. **Section 7.1.7.2, Optimization, Page 123.** This section describes opportunities for optimization of the remedy. Section 4.1.2 and Appendix E of the *Guidance* indicate that in response to Question A, the FYRR should discuss whether opportunities exist to improve the performance of monitoring, sampling, and treatment systems (EPA 2001). This is one of the review standards that should be answered for operating or completed remedial action projects, where appropriate. While some examples provided in this section, such as the replacement of the Irondale Treatment System with the Railyard System, nearer to the remaining source, are good examples of optimizing the remedy, many of the other examples in this section, such as use of a particular experienced contractor, actually appear to be actions that optimized the implementation of the remedy, but do not optimize the remedy itself. Other good examples of optimizing the remedy are the use of HRC in the NBE project, the proposal to use the CERCLA WWTU to treat the benzene plume, and modification of the remedy to eliminate construction of some covers by conducting additional sampling and removing all known contamination. These optimization opportunities and others should be discussed in Section 7.1 as part of the technical assessment for answering Question A.

Response: Consistent with the 2001 EPA guidance, the separate section for Optimization has been deleted and optimization opportunities addressed, as appropriate, in the project-specific assessments of Question A in Section 7.

Comment 111. **Section 7.1.8, Early Indicators of Potential Remedy Failure, Page 124.** This section describes early indicators of potential remedy failure. This is one of the review standards that should be answered for operating or completed remedial action projects, where appropriate, as required in Section 4.1 and Appendix E of the *Guidance* (EPA 2001). Section 7.1.8 states, "No evidence was uncovered that would lead to the conclusion that there is a potential failure of the remedy." However, DIMP has been detected in the HWL LDS. An explanation for the appearance of DIMP in the LDS should be provided in Section 7.1 under the evaluation of the HWL remedy.

In addition, EPA has identified areas of potential remedy failure throughout our comments, especially those regarding Sections 7.0 through 10.0 and Volume II of the FYRR. These indicators are primarily associated with the groundwater remedy at the NBCS, NWBCS, and OGITS. This subsection should be revised to include discussion of each of these items.

Response: Consistent with the 2001 EPA guidance, the separate section for Early Indicators has been deleted and early indicators have been addressed, as appropriate in the project-specific assessments of Question A.

Comment 112. **Section 7.2, Remedy Assessment, Question B, Pages 124 to 140.** This section is intended to address Question B. The following comments pertain to this section:

a. Section 7.2 is the former Section 6.0, "Five-Year Review Findings," that EPA provided comment for in March 2005 (EPA 2005a). Little has changed to indicate EPA comments were considered. In fact, the comment about the disturbing trend of Practical Quantitation Limits (PQLs) going up as CBSGs are going down continues to be a concern, as Table 5 in the draft FYR shows four analytes where the PQLs are higher than originally reported in the earlier draft. EPA's comments in March 2005 should be addressed (incorporated into the FYRR and written responses provided by RVO). In addition, the FYRR should be revised to address the PQL and CBSG Issue.

b. This section does not fully incorporate all the review standards in the *Guidance* (EPA 2001). The emphasis in the FYRR is on changes to ARARs and To-Be-Considered (TBCs). However, all of the other questions in Exhibit 4-2, Page 4-4 of the *Guidance* regarding changes to exposure pathways are not addressed (e.g., changes in land use such as partial deletions, or newly identified contaminants or contaminant sources such as the SCL and North Plants petroleum contamination). The changes in land use related to partial deletions from the NPL should include the WTP (now Prairie Gateway and Kroenke Soccer Stadium/fields), and the Surface Deletion and Perimeter deletion areas (now Refuge and/or transferred for road widening). In addition, the significant increase in residential development immediately north of RMA should be discussed as this affects exposure pathways

   Section 7.2 should be revised to follow the *Guidance* when responding to Question B.

Response:

a. The ARAR update language of Section 7.2 was presented informally by RVO to the working group in the spring of 2005. As such, the RVO did

not respond formally to the EPA comments. The EPA comments, as appropriate, have been incorporated into the revised FYRR.

b. The RVO disagrees with the need to further address development. At the time of the ROD, agricultural, residential, commercial and industrial land uses were all present immediately adjacent to the RMA. Although agricultural use is transitioning into residential, commercial and industrial uses, these are land use/reasonable maximum exposure scenarios that were specifically contemplated when considered in the development of the ROD.

Comment 113. **Section 7.2.1.1, PQLs, CRLs and MRLs, Pages 125 to 128.** This section discusses the PQLs, CRLs, and MRLs. The following are comments on this section:

a. Paragraph 1 on Page 125 indicates that PQLs are assigned by the decision document or ROD. However, the ROD states that the certified reporting limit or limit readily available from a certified lab, not specifically the Colorado PQLs, should be used (FWENC 1996a). Only when State standards are more restrictive than CSRGs should state standards apply. This paragraph should be revised appropriately.

b. In reference to the "process" outlined in Section 7.2.1.1 concerning potential changes in ARARs, TBCs, and PQLs/MRLs, the text should be clarified. At present, the process is ambiguous as demonstrated by the late notification of changes to quantitation limits that the Army implemented nearly 4 years ago. More specifically, there is the appearance that more effort is given to changing those standards that have gone up as compared to those that have gone down. For the latter, the text states, "adoption of these limits will be considered during the next five year review." This suggests that the Army will wait until 2010 and will only "consider" whether to adopt more protective standards or quantitation limits. However, there is a clear obligation to evaluate and make any changes to ARARs and TBCs (including PQLs, MRLs, etc.) in as timely a manner as possible. See comments on Section 9 for further discussion.

c. This section does not discuss compounds other than the COCs specific to a treatment plant. Page E-7 of the *Guidance* on Page E-6 indicates that new contaminants should be considered for Question B (EPA 2001). Other comments on the FYRR indicate that dieldrin concentrations exhibit an increasing trend in the vicinity of the NBCS. It is unclear how the RVO assesses whether other, currently non-COC compounds, may also be exhibiting increasing trends, especially to the point at which they would be considered a COC. The section should be revised to discuss how the potential presence of new contaminants is assessed.

d. The last paragraph on Page 126 states, "In the event that lower quantitation limits become available, adoption of these limits will be considered during the third FYR." However, it is unlikely that lower quantitation limits will become available if the laboratories are not instructed to pursue lower quantitation limits, if laboratory contracts do not specify lower target values, and if laboratories are only required to meet ROD-specified quantitation limits. As stated elsewhere in these comments, lower quantitation limits may be achievable for several of the RMA COCs for which current RMA quantitation limits are greater than the CSRGs. The FYRR should discuss how lower quantitation limits were pursued during the FYR period covered by this report, and how they will be pursued in the next FYR period. In addition, the EPA expects that new quantitation limits will be adopted if available and technically achievable, in as timely a manner as possible, not that they will be "considered" and implemented "during the third FYR."

e. This paragraph also states, "As has been the case in the past in obtaining analytical services, laboratories will be required to meet ROD-specified quantitation limits." However, this statement presumes that no advances in achieving lower quantitation limits have been made since the ROD, which is not the case. As indicated in the comments on Table 5, lower quantitation limits for selected COCs may be achievable. This statement should be revised to state that laboratories will be required to meet the lowest quantitation limits technically achievable.

Response:

a. The text has been revised to be consistent with the ROD. The statement regarding application of state standards only when they are more restrictive than the CSRGs is incorrect, as most CSRGs are based on CBSGs.

b. Per discussions in the Water Team meetings in November 2005, the text has been revised to clarify the process used by the RMA laboratory in developing MRLs and aiming to achieve lower values.

c. During the process of revising the LTMP in 2007, the CSRG lists will be reviewed and evaluated for possible modification. This information has been included as a recommendation in Section 9 of the FYRR.

d. Please refer to response to general Comment #9e. The text has been revised to include information on the RMA laboratory certification process, requirements, and the ongoing work to achieve lower MRLs.

e. The statement regarding ROD-specified quantitation limits has been removed from the text to reflect that RMA is working toward lowering the MRLs that exceed state standards.

Comment 114. **Table 5, Pages 127 and 128.** This table provides the proposed updated quantitation limits for the water treatment systems. The PQLs proposed do not reflect standard CERCLA practice to meet ARARs when detection limits are higher than the ARARs. Specifically, "detection limits should not be the sole factor for deviating from the starting point, such as the 10^{-6} cancer risk level, unless special analytical services have been investigated and it is technically infeasible to detect the chemical at the desired concentration" (*Remedial Actions for Contaminated Groundwater at Superfund Sites;* EPA, 1988). The report should discuss what special analytical services were investigated during this FYR period to obtain PQLs less than the CSRGs. The following are comments on the quantitation limits:

a. For all chemicals listed in Table 5, the PQL or MRL is higher than the CSRG, and several chemicals listed in the table show higher quantitation limits in 2005 than those reported in 2000. For example, the MRL for aldrin has increased from 0.025 to 0.037 ug/l at the NBCS, OGITS, and the CERCLA WWTU, whereas the CSRG for aldrin is 0.0021 ug/l. The report should explain how the increased quantitation limits achieve the expected progress towards meeting remediation goals (risk-based CSRGs) as required by Question B, "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?" If the remediation goals are not being met, this section should include a discussion of potential impacts to the protectiveness of the remedy. EPA expects RVO to exercise due diligence in achieving quantitation limits that approach or are below CSRGs.

b. The quantitation limits shown in Table 5 reflect PQLS that, for the most part, have been achievable since 1988 and may not be as low as can be technically achieved. EPA's Groundwater Guidance on Page 4-9 (EPA 1988) states, "However, in some situations, such as when the quantification limit is higher than the cleanup level, it may be appropriate to use special analytical methods to achieve lower quantification limits." EPA's contract laboratory, Columbia Analytical Services, Inc. (CAS), indicates that the MRLs for aldrin and dieldrin are both 0.0005 ug/l with large volume injection technique using Method 8081 and the MRLs for 1,2-Dichloroethane (1,2-DCA) and carbon tetrachloride are both 0.02 ug/l by Method 8260 selective ion monitoring (SIM). These MRLs are less than the current CSRGs and the methods are readily available from a certified laboratory which meets the requirements of the ROD. While it is acknowledged that the actual MRLs in RMA groundwater may be higher than these values, RMA groundwater-specific MRLs should be developed using these or equivalent methods.

The use of de facto remediation goals (PQLs/ MRLs) that are greater than the CSRGs, particularly when lower PQLs are achievable, should be identified as an Issue in Section 8.0 because it reduces the likelihood that the treatment facilities will be protective of human health and the

environment. In addition, because they are used as de facto remediation goals, these high PQLs adversely affect accurate delineation of the extent of boundary and off-post plumes, as well as decisions regarding when extraction wells and treatment plants may be shutdown. Section 9.0 of the FYRR should continue with recommendations and a schedule for follow-up actions addressing this Issue.

c. CAS has also indicated that the MRL for NDMA is 0.002 ug/l by Method 8270C SIM with isotope dilution. This value is still above the CSRG of 0.00069 ug/l, but is substantially lower than the RMA current reporting limit of 0.033 ug/l. It is believed that the RVO is currently using method 8270C SIM. The section should indicate whether this method is, in fact, in use and the rationale for its continued use.

d. Table 5 only identifies 2000 and 2005 quantitation limits. However, quantitation limits other than those limits shown in Table 5 have been used during the 2005 FYR period. For example, the quantitation limit for 1,2-dichloroethane increased from 0.2 ug/l to 0.299 ug/l at the NBCS and OGITS, and decreased from 1.1 ug/l to 0.299 ug/l at the BANCS, as communicated in a DOA letter dated October 12, 2004 (DOA 2004). The FYRR should identify all of the quantitation limits used during the previous five years.

e. In addition, the 2005 quantitation limits shown in the Table for 1,2 DCA at NBCS, OGITS, and BANCS are not consistent with the Army letter dated October 12, 2004. EPA has not received notice, nor approved, any proposed changes to the existing quantitation limits. The FYRR should clearly indicate the quantitation limits that are currently in use and any proposed changes to those limits.

f. Table 5 for the LWTU also identifies the analytes for which the PQLs are greater than the CSRGs. The PQLs for the semi-volatile organic compounds seem reasonable because they are similar to the estimated quantitation limits identified in SW-846, 8270C. However, the quantitation limits for the volatile organic compounds (VOCs), with the exception of DBCP, are greater than those potentially achievable as indicated in SW-846 8260B. In addition, the quantitation limits for the OCPs and NDMA, for which SW-846 does not identify specific quantitation limits, are greater than the MRLs at other RMA treatment plants. Many of the VOC and OCP PQLs, as well as the NDMA PQL, are identified in the CCD (EPA 1998b). However, the CCD also states, "PQL is defined as the lowest reliably measurable concentration of a constituent. These limits may however be revised as necessary by EPA." While it is acknowledged that the actual MRLs at the LWTU may be higher than MRLs at other plants or values in the SW-846 methods due to matrix and interference effects, RMA MRLs should be used, or developed for these methods. The quantitation limits at the LWTU should be revised to use

MRLs when the MRL is lower than the Colorado PQL, and the MRLs should be based on methods that provide the lowest limits that can be technically achieved. EPA expects the use of Colorado PQLs at the LWTU for VOCs, OCPs, and NDMA should be identified as an Issue because the PQLs are greater than the CSRGs, the PQLs are used as de facto remediation goals, and discharge from the LWTU is to First Creek, which flows offsite.

g. Table 5 indicates that at the LTWU, three compounds do not have a Colorado PQL. However, the type of quantitation limit shown in the "Quantitation Limit" column is "Colo PQL". The type of quantitation limit should be revised to "MRL" for these compounds.

h. Table 5 shows that the quantitation limit for DBCP is 0.5 ug/L. However, the Colorado PQL guidance indicates that the PQL is 0.05 ug/l (CDPHE 2005a). In addition, the table indicates that the Colorado PQL is 1.0 ug/l for Bis (2-chloroethyl) ether. However, the Colorado PQL guidance does not include Bis (2-chloroethyl) (CDPHE 2005a). The table should be revised accordingly for both compounds.

i. This table is intended to show those compounds that have PQLs greater than the CSRGs. However, two compounds at the LTWU, total trihalomethanes and methyl chloride are not shown on the table, and do not have a Colorado PQL or a PQL identified in the CCD. The table should be revised to include these compounds, if their MRL is greater than the CSRG.

j. The 2005 PQLs for carbon tetrachloride and dieldrin at the CERCLA WWTU are higher than the 2000 PQLs. This increase appears to be related to setting the PQLs to the PQLs identified in Colorado's PQL Guidance Document (CDPHE 2004) because it is an "internal" treatment system. However, quantitation limits for these compounds less than the CSRGs may be achievable (see previous comments). Because CSRGs are identified for these compounds at the CERCLA WWTU, efforts should be directed to lower the MRL/PQL to the CSRG, rather than to raise them. EPA believes that the "internal" treatment system distinction is meaningless. The table should be revised to show that MRLs will be used to determine the quantitation limits for these compounds at the CERCLA WWTU and reflect the lower limits for these compounds.

k. The 2005 PQL for NDMA at the LTWU is higher than the 2000 PQL. Again, this increase appears to be related to the fact that Colorado's PQL Guidance indicates a value of 10.0 ug/l for NDMA (CDPHE 2004). Other RMA treatment systems have an MRL for NDMA of 0.033 ug/l. Although the LTWU discharges to surface water, rather than groundwater as do the other treatment systems, it has a very similar, and low, CSRG of 0.00069 ug/l. It is understood that the RVO is currently using method

8270C SIM for analysis of NDMA at other treatment plants. This section should be revised to provide the MRL for NDMA using method 8270C SIM.

Response:

a. Corrections have been made to Table 7.4.1.1-1 , which replaced Table 5, in the revised FYRR and 1,2-dichloroethane is no longer included for the boundary and off-post systems as its MRL is below its CSRG. Explanation of the other changes has been included in the text and information has been added on how RVO exercises due diligence to lower MRLs.

b. The revised text includes an explanation of the certification required for laboratories to meet the RMA Quality Assurance/Quality Control (QA/QC) requirements. For a laboratory to be available to do work for RMA it has to pass the certification process. It should also be noted that a MRL is different from a Method Detection Limit (MDL) in that statistical methods have been applied to ensure that the MRL can be consistently met, while an MDL represents a detection value that cannot necessarily be achieved for all samples. It is imperative that the established MRLs and PQLs can be consistently achieved for this value to represent a remediation goal.

c. The lowest reported MDL for a compound typically applies to a clean water sample and cannot be compared with the value that can be achieved for a more complex contaminant matrix. The NDMA method used at RMA is 8270 SIM.

d. As stated above, Table 7.4.1.1-1 has been corrected and 1,2-dichloroethane removed. The FYRR has not been revised to include all the values used during the five-year period, as notifications of any increases have been provided, but the corrections and accompanying text provide the necessary clarifications.

e. As stated above, since the 1,2-dichloroethane MRL is below the CSRG (i.e., CBSG) for these systems, the compound has been removed from the table as the change in MRL does not affect the evaluation of performance for these systems.

f. As stated previously and explained in the revised text, the RMA MRLs were developed under the RMA QA/QC requirements and for the RMA water matrices. For these reasons, it is reasonable that RMA MRLs are higher than the MDLs that can be achieved in clean water samples.

g. The requested revision has been made.

h. The table has been corrected in accordance with the 2005 PQL Guidance.

i. Methyl chloride has a 30-day average discharge standard of 4.6 ug/l and a PQL of 0.833 ug/l, and therefore does not belong on the list. This PQL for methyl chloride is reflected in the CERCLA Compliance Document (CCD) Amendment No. 2 executed by the EPA and RVO on March 10, 2006. Total trihalomethanes do not have a PQL and an MRL has not yet been established. This situation will be addressed with the development of the procedure described in response to Specific Comment 9e.

j. The RVO considers the internal system distinction important, because of the agreed-upon point of compliance being defined as the RMA boundary. The CDPHE PQLs will continue to be used for the internal systems.

k. The PQL for NDMA of 10 ug/l is reflected in the CCD Amendment No. 2 executed by the EPA and RVO on March 10, 2006, so no further clarification should be necessary.

Comment 115. **Tables 6 through 11, Pages 129 to 133.** These tables present the proposed changes to the treatment system ARARs. A footnote to the tables indicates that in some instances the quantitation limits are higher than the ARAR. However, the CBSGs for aldrin, carbon tetrachloride, and 1,2-DCA have decreased by a factor of 10 to 1,000, while at the same time the quantitation limits for these compounds have increased. The impact of these new groundwater standards on the protectiveness of the remedy should be explained.

Response: The RVO has noted the change in ARARs in the Tables. Because there is no consumption of groundwater, the remedy remains protective.

Comment 116. **Table 11, Pages 132 and 133.** This table lists ARAR changes for the LWTU. The following are comments on Table 11:

a. One compound shown on the monitoring list in the CCD, endrin aldehyde, has also had a change in the standard. The table should be revised to include endrin aldehyde.

b. For 32 of the 36 compounds in Table 11 the Colorado Basic Standards for Surface Water (CBSSWs) have been reduced, while the 2005 quantitation limits for two of the chemicals (benzo(a)pyrene and pentachlorophenol) have been reduced and the rest remain the same. The text should include a discussion of how these new surface water standards affect the protectiveness of the remedy.

Response:

a. Endrin aldehyde has been included as requested.

b. The RVO has noted the change in ARARs in the Tables. Because there is no consumption of groundwater, the remedy remains protective.

Comment 117. **Section 7.2.3.1, NAAQS as ARAR, Page 136 and 137.** The section discusses the issue of National Ambient Air Quality Standards (NAAQS) as an ARAR and the necessity to continue monitoring PM-10. This section should be re-written to incorporate the understanding reached at a July 2005 ACG meeting.

Response: A new Section 7.4.3.1 has been provided.

Comment 118. **Section 7.2.5, Other Media ARARs and TBCs, Page 139.** This section dismisses all other changes to chemical-specific, location-specific, and action-specific ARARs and TBCs in the past five years. As stated in previous comments, the methodology for assessing these changes to ARARs and TBCs must be presented, along with a thorough list of the changes to ARARs in the RODs, and any newly promulgated standards that affect RMA. Two examples are given below:

a. 40 CFR Parts 260, 264, and 271, Amendments to the Corrective Action Management Unit (CAMU) Rule; Final Rule issued January 22, 2002 (67 FR 2961). EPA identified six changes to the CAMU Rule, including the establishment of treatment requirements for wastes that are placed in CAMUs. The FYRR should discuss the applicability of these changes in this action-specific ARAR for the management of remediation wastes.

b. 40 CFR Part 122.26, Storm Water Discharges. Storm water discharges associated with small construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than one acre and less than five acres are subject to storm water effluent limitation guidelines. The FYRR should explain how this change in the action-specific ARAR for storm water management is implemented at RMA and how it affects the protectiveness of the remedy.

Response: The RVO disagrees that the methodology for assessing ARARs "must" be presented. The EPA 2001 guidance does not require any presentation of the review process. In fact, the FYRR relies upon experts to review and report on many subject matter areas. If EPA or CDPHE experts know of ARAR changes relevant to the FYRR, these comments should be presented as above.

a. The changes to the CAMU regulation are not applicable as older, approved CAMUs were grandfathered. These units were protective and are considered to remain protective despite the new, more stringent CAMU requirements. Since the changes do not affect RMA, they were not included.

b. The change to the Stormwater Discharge requirements had no effect at RMA because the RVO implements the stormwater requirements for all projects regardless of size. Since the change did not affect RMA, it was not included.

Comment 119. **Section 7.3, Remedy Assessment, Question C, Page 140.** This section states, "Besides information discussed in Questions A and B above, no other new information has come to light during the FYR that calls into questions the protectiveness of the Remedy." However, the FYRR should include a complete list of new information that has come to light during the FYR period and then evaluate the implications of the new information to determine whether the remedies remain protective. The information in Section 4.3 and the checklist in Appendix E of the *Guidance* should be followed (EPA 2001). In addition, because of the somewhat unique situation at RMA where visitors are allowed access to designated areas during implementation of the remedy, new information should be evaluated with respect to a potential impact to visitors. Examples of new information that should be described and evaluated in this section are described below:

a. The discovery of petroleum contamination and associated free product waste at the North Plants area.

b. The discovery of contamination on the banks of the SCL that borders the USFWS Visitor Center complex and the north shore of Lake Ladora, and extends north along the western boundary of the grounds of the DOA Administrative Building 111. HHE and Biota soil was discovered along the banks of the SCL in 2004. HHE and Biota soil was confirmed to extend beyond the TRER site in Section 2 and into Section 35 along the banks of the SCL in March 2005. A previously deleted area overlaps a portion of this contamination in Section 2. In addition, soil along the banks of the lateral in Section 35 was excavated as Priority 1 and Biota soil, prior to the discovery of contamination and sampling that indicates contamination is still present in these areas. The section should discuss whether and how it may be determined that HHE soil may have been transported to Basin A. This discussion should include consideration that an area of contamination was deleted and other ditches that may also have contamination present on their banks.

c. The discovery of more extensive HHE contamination, staining and odors than expected in a cover-deletion area within the Section 36 BOA project.

d. OE (or MEC) findings, including the M139 bomblets, at several locations not previously thought likely to contain OE at RMA since the last FYR.

e. Groundwater plumes that are not contained by the boundary systems.

As the complete technical assessment of the remedy is conducted in Section 7, any other new information that is identified should be addressed in Section 7.3 in response to Question C.

Response: RVO does not agree with EPA's interpretation of the FYRR guidance. Specifically Section 4.3 of the guidance states: *(y)ou should consider any*

other information that comes to light that could call into question the protectiveness of the remedy. ***It is expected that most considerations related to the protectiveness of the remedy will be addressed by Questions A and B.*** *However, in some instances, there may be other factors about the remedy or the site that you should consider during the review* (emphasis added).

In simple terms, Question C is not a place to reiterate every topic encountered over the past five years. All of the topics listed by EPA have been discussed and evaluated elsewhere in the FYRR.

Comment 120. **Section 8.0, Conclusions, Pages 140 to 141.** This section provides a general conclusion for the 2005 FYR at RMA. The following are comments on this section:

a. The *Guidance* states that Section 8 should be entitled, "Issues" and consist of a discussion regarding Issues identified through the technical assessment process (which should be in Section 7). Specifically, per Exhibit 3-3 of the *Guidance* the following information should be included Section 8:

   1) Issues that were identified during the technical assessment and other five-year review activities (e.g., site inspections)

   2) A determination of whether Issues affect current or future protectiveness

   3) A discussion of unresolved concerns or items raised by support agencies and the community (EPA 2001).

   Section 8.0 of the FYRR should be substantially revised. The title should be changed to "Issues", and this section should be restructured to include a complete list of Issues identified through the technical assessment of the remedy. This list of Issues should be reviewed to determine if current or future protectiveness is affected as shown in Appendix E of the *Guidance*. The rationale for the protectiveness determination should be provided for each Issue. Section 8 should also summarize agency and community concerns, describe resolution of those concerns, and identify which concerns are not resolved.

b. Section 8 of the FYRR makes the broad statement, "All immediate threats to human health and the environment have been properly mitigated by both the access and ICs in place as well as by the successful implementation of the IRAs and ROD projects. All completed, ongoing, and O&M projects have been, or are being, implemented in a manner to ensure protectiveness of human health and the environment." However, the FYRR does not include a complete technical assessment or sufficient data and information to support this statement. As stated in previous comments, there appears to be insufficient information to complete the

technical assessment. Comments have been provided that the lack of information and evaluation are Issues to be identified.

c. As stated in previous comments, the FYRR should be revised to follow the *Guidance* and provide a technical assessment of the remedy (Section 7), identify Issues and determine whether those Issues affect current or future protectiveness (Section 8), and develop recommendations and follow-up actions to ensure protectiveness (Section 9) based on the results of Section 7 and 8, in accordance with the *Guidance*.

Response:

a. Section 8 has been revised as requested.

b. Comment noted. The RVO feels sufficient information has been included in the final FYRR to support this statement.

c. The FYRR has been revised as requested.

Comment 121. **Section 8.1, Deficiencies, Pages 140 to 141.** This section describes deficiencies identified in the first FYR for RMA. Two deficiencies are noted, one of which is repeated from the last FYRR (Basin F Wastepile) and the other an EPA finding during the site inspections (monitoring wells). The following are specific comments on these deficiencies:

Basin F Wastepile

a. The cause of the deficiency is not mentioned and compliance with Basin F Wastepile monitoring requirements that were presented in the 2000 FYR is not discussed. This information should be provided in the FYRR.

b. Section 8.1.1 states, "The Basin F Wastepile is not operating as designed as detailed in Section 7.1.4." However, Section 7.1.4 does not provide details regarding the Wastepile's operation. A technical assessment should be provided in Section 7 of the Wastepile operation.

c. Section 8.1.1 states, "All evidence indicates that this is not resulting in an impact to the groundwater and it should be noted that leachate volume currently being generated is dramatically less than it has been in the past due to the gradual dewatering of the waste." Gradual dewatering of the waste does not preclude impacts to the groundwater. Evidence should be provided to support a conclusion regarding impacts to groundwater. Monitoring wells should be identified and data provided to support this conclusion.

Off-post Monitoring Wells

a. EPA has conducted additional off-post investigations and discovered that several additional monitoring wells are damaged and not adequately protected indicating that protection of monitoring wells is a programmatic and widespread deficiency.

Response:

a. Basin F Wastepile - The RVO does not believe a more substantial discussion of the wastepile is warranted, given the fact that it was taken out of service in early 2006. The current text reflects the major uncertainty about the unit.

b. Basin F Wastepile - See response to Comment # 121a.

c. Basin F Wastepile - As requested in Comment 36 b., the language related to groundwater has been deleted.

a. Off-post Monitoring Wells - The two wells that were not in the monitoring well network were closed by the RVO. The two wells that were in the monitoring well network were repaired. These activities were completed in September 2005. Locks were added to the wells this spring. The RVO disagrees that this is a widespread and programmatic deficiency.

Comment 122. **Section 8.2, Conclusions Related to Optimizing Implementation of the Remedy, Page 141.** This section states that there are no conclusions that may result in optimizing the implementation or the remedy. However, Section 7.1.7.2 discusses several remedial optimization activities (see specific comment on Section 7.1.7.2). In addition, lessons learned from the past five years of designing, constructing, and operating major remedial projects must have resulted in many optimization opportunities. For example, there were "Lessons Learned" from the M-1 Pits project related to forecasting meteorological conditions to control odor and the blue haze that were subsequently applied to the South Plants Soil Remediation project. There were also "Lessons Learned" from the South Plants Soil Remediation project regarding chemical budgets and Air Action Levels that are being used to revise the SWAQMP so spike events do not shut down the Basin F projects. These optimization opportunities and others should be discussed in Section 7.1 as part of the technical assessment for answering Question A and should also be used to develop recommendations and follow-up actions in Section 9 of the FYRR, as stated in Section 4.4.2 and Page E-30 of the *Guidance* (EPA 2001). Discussion of recommended follow-up actions to optimize the remedy should be moved to Section 9.0 of the FYRR.

Response: Consistent with the 2001 EPA guidance, Section 8.2 was deleted. The comment was addressed, as appropriate, in project-specific Question A assessments.

Comment 123. **Section 9.0, Recommendations and Follow-Up Actions, Page 141.** Based on documents and data available to EPA, EPA has conducted its own document review, data review and evaluation, and technical assessment of the RMA remedy in accordance with the *Guidance*. This has resulted in EPA's development of several recommendations and follow-up actions, as identified in our comments regarding Sections 7.0 through 10.0 and Volume II of the FYRR. A partial list of the more significant follow-up actions is provided below.

a. The LTMP should be revised to establish:

1) The monitoring program, including monitoring goals and objectives, for the next FYR period,

2) Monitoring wells downgradient of wells that have CSRG exceedances,

3) Wells in areas in which the off-post plumes are poorly defined,

4) The number of monitoring wells and the frequency of monitoring appropriate to determine the nature and extent of the on-post groundwater contaminant plumes,

5) An off-post monitoring network that is complementary but not dependent on the private well network.

6) Identification of a monitoring program to enable evaluation of the natural attenuation of chloride and sulfate within the estimated 30 year and 25 year attenuation period, respectively.

7) Well maintenance program to ensure that repairs or replacement of wells are conducted in a timely manner. This maintenance program should include requirements for locking and replacing well caps.

8) Monitoring objectives, individual monitoring programs, and FYR evaluation criteria for soil remedy projects such as Shell Trenches, Complex Trenches, Manhole/Sewer plugging, etc.

9) Monitoring objectives, individual monitoring programs, and FYR evaluation criteria for surface water monitoring including South Lakes, First Creek, Off-Post, etc.

10) Required submittal deadline for annual OARs.

b. The shutdown rationale and criteria for the boundary treatment systems should be evaluated in light of EPA's comments, and revised as appropriate to ensure the intent of the ROD and specific actions required to successfully achieve shutdown of extraction wells are clear and unambiguous.

c. Site-wide and regional contaminant plume maps should be generated to replace the 1994 plume maps that are still in use to make decisions regarding the protectiveness of the remedy and assess changes in the on-post groundwater plumes.

d. Characterization and treatment alternatives evaluation to support remedy selection for the newly discovered fuel oil waste plume near North Plants.

Response:

a. The LTMP will be revised in 2007 and its specific content will be discussed at that time.

b. The shutdown criteria have been clarified in the revised text and procedures for extraction well and system shutoff monitoring are being developed by RMA.

c. There was never intent to use on-post plume maps to assess the protectiveness of the remedy. Changes in flow conditions that might affect capture are addressed through the water level monitoring program. Operational water quality and water level monitoring is conducted to optimize system performance.

d. The plan for addressing the North Plants Free Product issue had not been developed during the five-year review period covered by the 2005 FYRR. As noted in Table 2.0-2, the issue is currently being addressed under the North Plants Soil remediation project.

Comment 124. **Section 9.1, Quantitation Limits for Upcoming Five-Year Period, Pages 141 through 143.** This section provides recommendations regarding quantitation limits for the forthcoming five-year period. The following are comments on this section:

a. The section does not identify recommendations to modify the process for evaluating quantitation limits implemented as part of the 2000 FYR. Based upon EPA's assessment of the process over the past five years, EPA has identified several modifications needed to improve the effectiveness of the process. These modifications include, but are not limited to the following considerations:

1) The current process distinguishes PQLs and MRLs, and the PQLs are generally Colorado PQLs. However, the process should be modified to indicate the MRLs should be used whenever and wherever possible.

2) The process indicates that laboratories will be required to meet ROD-specified quantitation limits. However, as indicated elsewhere in these comments, quantitation limits lower than the ROD-specified quantitation limits may be technically achievable. Therefore, the

process should be modified to indicate that laboratories will be required to meet the lowest technically achievable quantitation limits where necessary to obtain quantitation limits less than, or as close as possible to, the CSRGs.

3) Currently, the composition of the FYR Team conducting the review of a new MRL is not clearly identified, and the process by which an increase in an MRL is instituted does not appear to identify that written approval is required by the Regulatory Agencies prior to implementation of the change.

   This section should be revised to include the process for evaluating and instituting changes to the quantitation limits, including the revisions stated above, and other revisions identified by the FYR Team.

b. This section presents Table 15 and states, "By implementing the process identified in Section 9.1.1 of the 2000 FYR, the following new quantitation limits are implemented as of the date of the issuance of this report." However, it is unclear how the simple identification of new proposed MRLs in this report has met the process identified in the 2000 FYR. These limits are being proposed in the FYRR without properly including the Regulatory Agencies in the quantitation limit review process. In addition, as expressed in the previous comment, the process by which MRLs are selected requires modification.

   This section states, "The table also provides the initial (per the RODs) and newly adopted (as appropriate) quantitation limits for the upcoming five-year cycle." It is unclear what is meant by the phrase, "as appropriate" because increases in quantitation limits, when lower limits appear to be achievable are not consistent with CERCLA and therefore unacceptable.

Response: a.

1) The RVO does not intend to switch from Colorado PQLs to MRLs where the PQLs apply.

2) The text has been revised to explain how the RVO is working toward lowering RMA MRLs as feasible.

3) The process for establishing new MRLs has been clarified in the revised text. A new RVO procedure will define how PQLs for groundwater are established.

b. The Agencies are commenting at present on the quantitation limit review process in the context of this FYRR. The language associated with Table 15 was carefully crafted and agreed upon for the 2000 FYR. Regardless, the phrase "as appropriate" was deleted.

Comment 125. **Section 9.2, Basin F Wastepile, Page 143.** This section provides a recommendation regarding the Basin F Wastepile deficiency. The recommendation is to monitor leachate levels on a daily, to near daily basis, depending on leachate volume generation trends. Leachate monitoring should be conducted on a daily basis as required by the 2000 FYRR until the Wastepile is excavated and placed in the ELF.

Response: Leachate monitoring has been implemented in accordance with the revised O&M Plan and reported monthly to the Regulatory Agencies since the 2000 FYRR. The wastepile is now in closure, during which it will be excavated and transported to the ELF for disposal. Only limited leachate monitoring will be conducted in accordance with the Basin F Wastepile Closure Plan reviewed and approved by the Regulatory Agencies.

Comment 126. **Section 9.4, ARAR Changes, Page 143.** This section describes ARAR changes. The last sentence of this section states that the Air Coordination Group (ACG) will revise the program plans to phase out NAAQS monitoring. Instead, this section should be re-written to incorporate the understanding reached at a July 2005 ACG meeting to use NAAQS as a TBC.

In addition, this section states that ARAR changes will take effect upon approval of the FYRR. However, the FYRR is not a decision document, and furthermore, changes to the ARARs are changes to the performance criteria, which EPA guidance indicates should be an ESD (EPA 1999). *Guidance* also indicates that the more stringent standard should be adopted through the appropriate decision document (EPA 2001). The document should be revised to indicate that the change in ARARs are proposed changes that will take effect upon approval of an ESD that will be prepared to document these changes to the ROD.

Response: The RVO does not believe that an ESD is required to implement changes to the ARARs, unless those changes trigger "significant" modifications to the remedy.

Comment 127. **Section 10.0, Protectiveness Statement, Pages 143 and 144.** This section addresses protectiveness. The following are comments on this section:

a. Neither the structure nor the content of this section follows the *Guidance*. Section 4.5 of the *Guidance* provides information on how to determine protectiveness and explains that protectiveness should be determined based on the technical assessment of the remedy in response to Questions A, B, and C. This section also indicates that the rationale for the protectiveness determination should be documented (EPA 2001). Section 10.0 should be revised to follow the guidance for determining protectiveness.

b. Section 4.5.1 of the *Guidance* strongly encourages the use of the protectiveness statement in Exhibits 4-6 and 4-7 (EPA 2001). However, the FYRR does not use these statements. The FYRR should be revised to use the model protectiveness statements in the *Guidance*.

c. This section includes a site-wide protectiveness statement for both the On-Post and Off-Post RODs. However, Section 4.5.1 of the *Guidance* states that a comprehensive site-wide protectiveness statement should not be included until construction completion (EPA 2001). Therefore, a site-wide protectiveness statement is not appropriate at this time because the remedy has not been completed. It is recommended that a protectiveness statement be developed for each implementation project or ROD medium group, based on the details of the technical assessment. These individual protectiveness statements should be used to make an overall determination for the OU.

d. The protectiveness statements for On-Post/Off-Post RODs must be supported by compelling evidence. For example, the analytical evidence presented in Section 9.0, Table 15, does not support the statement for the Off-Post OU that, "Groundwater contamination is being treated to ROD remediation goals at both the RMA boundary and the Off-Post Groundwater Intercept and Treatment System (OGITS)," because, in some instances, COCs are only being treated to the PQLs. The new quantitation limits for several chemicals in the NBCS, the NWBCS, and in the OGITS are 2 to 50 times higher than the CSRGs established in the ROD (see specific comments on Section 7.2).

e. For much of the FYRR discussion, there is a lack of data evaluation or references to data evaluation that supports the conclusions and protectiveness determinations stated. As a result, EPA is unable to validate the conclusions regarding remedy effectiveness or protection.

Response:

a. The report has been revised in accordance with EPA Guidance.

b. The protectiveness statements in the Final FYRR uses the model language in Exhibit 4-6 on page 22 of the guidance..

c. RVO evaluated alternative approaches to grouping projects for protectiveness determinations and decided to develop protectiveness statements for completed remedies and operating groundwater remedies as groups.

d. The remedy remains protective as there is no exposure to any contaminated groundwater attributable to RMA.

e. Comment noted. The RVO has added detail and references, where necessary, to sufficiently support the statements of protectiveness.

Comment 128. **Section 10.0, Protectiveness Statement, Pages 143 and 144.** Based on the technical assessment performed by EPA and the follow-up actions identified in Comment 122 above, EPA has developed the following protectiveness determinations regarding the RMA site.

a. On-Post Groundwater Remedy: As discussed in several of the comments regarding groundwater monitoring, the data indicates that there is bypass or underflow occurring at the OGITS, NWBCS, and NBCS facilities. As a result, migration of contaminants is uncontrolled and the potential exists for exposure at levels above the ROD treatment criteria (CSRGs). The CSRGs are based upon a carcinogenic risk level of $1x10^{-6}$ for protection of human health. Unless there are additional data available that EPA has not considered in its assessment, EPA cannot agree that the groundwater portion of the remedy is adequately protective of human health and the environment.

b. Off-Post Groundwater Remedy: As discussed in several of the comments regarding groundwater monitoring, the data indicates that there is bypass or underflow occurring at the OGITS, NWBCS, and NBCS facilities. As a result, migration of contaminants is uncontrolled and the potential exists for exposure at levels above the ROD treatment criteria (CSRGs). The CSRGs are based upon a carcinogenic risk level of $1x10^{-6}$ for protection of human health. Unless there are additional data available that EPA has not considered in its assessment, EPA cannot agree that the groundwater portion of the remedy is adequately protective of human health and the environment.

Response:

a. The RVO does not agree with EPA's protectiveness determination. Specifically, Section 4.5 and Table 4-5- Section 2 Operating Remedies, second example, makes it clear that the RMA groundwater remedies are protective by virtue of the ICs on well drilling and no evidence of exposure. Additionally, the RVO has provided data to EPA that support the RVO conclusion that there is no bypass or underflow of concern at any of these systems. A summary of this information has been included in the Final FYRR.

b. Please refer to first part of the response to Comment 128 a.

Comment 129. **Volume II, Five-Year Review Revegetation Inspection Summary.**

Note: (No page numbers are included in document)

a. There are several project sites that were visited by the EPA and the RVO representatives that are not listed on the summary table. The project sites not listed should be added to the summary table.

b. The project sites should be referred to by their SAR site names. The summary should be revised to include the SAR site names.

c. The EPA representative assessed the condition of the revegetation by the same broad condition categories as the RVO. Some of the condition assessments made by the EPA Representative and the RVO Representative do not concur. Below find the sites for which opinions of the EPA and the RVO Representatives differ.

Project	RVO Condition	EPA condition
1. Secondary Basins Sec. 26	Good	Good/Fair
2. BT Sec.20	Good	Fair
3. ESL, Sec. 36	Good	Fair
4. Sec. 35 Soils	Good	Fair
5. TRER 26SW-1	N/A	Poor
6. TRER 30SW-3	N/A	Poor
7. TRER 31EC-2	Good	Fair
8. TRER 35WC-4	N/A	Poor
9. TRER 35SW-2	N/A	Poor
10. TRER 35SW-3	N/A	Poor
11. TRER 1WC-1	(Too early to judge)	Poor

This information should be documented in the FYRR.

d.. The revegetation inspection identified several areas where follow-up action will be required in order for these areas to meet revegetation criteria. Until an ESD to remove revegetation requirements in non-cover areas is approved, the FYRR should include a technical assessment of the revegetation efforts documented in the inspection and identify follow-up actions and a schedule for implementation.

This information should be included or referenced and explained in Volume I of the FYRR.

Response:

a. Sites have been added as requested.

b. The requested revisions have been made.

c. The requested information has been added to the summary table.

d. The Revegetation ESD has been approved.

Comment 130. **Volume II, Complex Army Trenches Slurry Wall Inspection.** The EPA FYR site inspection report attached to the inspection checklist identified two follow-up actions:

a. Identify any reports that document slurry wall/dewatering performance (i.e., water level measurements and pumping rates) that document the effectiveness of the project.

b. Identify the O&M Plan that governs operation of the Complex (Army) Trenches system, including frequency of monitoring, modifications to the system, or repair requirements.

This information should be included or referenced and explained in Volume I of the FYRR.

Response:

a. Performance summaries for the Complex Trenches are reported in the OARs. The information provided includes hydrographs showing the paired wells across the slurry wall (this monitors the reverse gradient), the conformance wells (36216 and 36217), and chemical quality of the influent from section 36 (Bedrock Ridge and Complex Trenches) to the Basin A Neck treatment plant.

b. O&M for the Complex (Army) Trenches System is covered under the BANCS O&M Manual. Flows are recorded as part of normal BANCS operations, and are recorded in the Water Management Program database.

References to the OARs have been included in the FYRR.

Comment 131. **Volume II, Hazardous Waste Landfill Leachate Wastewater Treatment System Site Inspection.** The EPA FYR site inspection report attached to the inspection checklist identified a follow-up action to: identify the DCNs that document the changes or modifications to the operation of the LWTS over the last five years. This information should be provided or referenced and explained in Volume I of the FYRR.

Response: The referenced changes or modifications to the operation of the Landfill Wastewater Treatment System have been documented and reviewed/approved by the Regulatory Agencies within previous documentation that includes discharge monitoring reports, incident reports, and operations reports and correspondence. The RVO does not believe that including this level of detail is necessary to make the protectiveness determinations..

Comment 132. **Volume II, Sanitary Sewer Manhole and Chemical Sewer Plugging Project Site Inspection.** The EPA FYR site inspection report attached to the inspection checklist identified several follow-up actions, including:

a. Identify the final disposition of those South Plants sanitary sewer manholes that could not be located prior to the demolition project because of their proximity to buildings or location under concrete slabs. Provide citations for the reports, which document the disposition of these manholes.

b. Verify the disposition of the manholes shown on the record drawings in the southern end of the South Plants area and east of the Basin F Wastepile. Discussion of the ROD-required "aboveground warning signs" for the manholes in these areas should be included in Section 4.0, 5.0, and 7.0 through 9.0. As observed during the project inspection, these signs were no longer visible aboveground and should be identified as not functioning as intended by the ROD.

This information should be provided or referenced and explained in Volume I of the FYRR.

Response:

a. and b. The RVO has undertaken actions necessary to address many of the substantive observations provided by the EPA in the site inspection reports.

Comment 133. **Volume II, Lake Ladora Dam Reconstruction Project Site Inspection.** The EPA FYR site inspection report attached to the inspection checklist identified several follow-up actions, including:

a. Verify if the gate to the discharge structure is locked and properly secured.

b. Provide documentation of dam inspections and maintenance actions in the past five years.

This information should be provided or referenced and explained in Volume I of the FYRR.

Response:

a. The requested information has not been added as the RVO does not consider this information to be relevant to the FYRR.

b. The requested information has not been added as the RVO does not consider this information to be relevant to the FYRR.

Comment 134. **Volume II, Groundwater Extraction and Treatment System Site Inspections.** The EPA FYR site inspection reports attached to the inspection checklists identified follow-up actions on all of the groundwater extraction and treatment systems, including:

a. Identify any changes or modification to the operation of the treatment plants and extraction/injection systems over the last five years and provide reports that document these changes.

This information should be provided or referenced and explained in Volume I of the FYRR.

Response: The requested information is provided in the OARs, which are referenced in the revised FYRR.

Comment 135. **Volume II, Institutional Controls Site Inspection.** The EPA FYR site inspection report attached to the inspection checklist identified follow-up actions for interim instructional controls, including:

a. Identify any changes or modifications to the interim institutional control plan and provide written documentation to the Regulatory Agencies that enacted these changes.

b. Identify actions to be taken to prevent access by workers and the public to the Sand Creek Lateral project such as remediation project signs, trained personnel stationed at the Egli House to ensure adherence with signs, changes in maps handed to the public/workers, etc.

c. Identify a schedule for revising and finalizing a Wildlife Management Plan that is accepted by the Regulatory Agencies.

This information should be provided or referenced and explained in Volume I of the FYRR.

Response: a. Revisions to the IICP were approved by EPA in March 2006.

b. The same protocol has been used for the SCL Project as with all other RMA remedy projects to limit access to the work site during active remediation (i.e., establishing exclusion zones, signs, hazard tape, etc.). In addition, where necessary the U.S. Fish and Wildlife Service will relocate some of the weekday visitor service activity during portions of the project. Although these actions will be taken, this information does not need to be included in the FYRR.

c. The Wildlife Management plan will be part of the Environmental Management System which will be completed sometime before the end of the surface remedy.

Remediation Venture Office's (RVO) Responses to U.S. Environmental Protection Agency's (EPA) December 7, 2006 Technical Comments on the Final Five-Year Review Report (FYRR)

GENERAL COMMENTS

Comment 1. Five-Year Review Report Format. The *Final 2005 Five-Year Review Report* (FYRR) has been revised to follow the general report format and topic headings of the U.S. Environmental Protection Agency (EPA) *Comprehensive Five-Year Review Guidance* (*Guidance*) with the exception of Section 7.4, the Technical Assessment for Question B (EPA 2001). The title should state the complete question as presented in Exhibit 3-3 of the *Guidance*, "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?" Section 7.4 should be revised to state Question B in its entirety.

In addition, in some sections of the FYRR contains convoluted and confusing technical discussions that are repeated in multiple chapters. For example, the discussion of the water treatment systems in Section 4 should contain only a summary of the selected remedy components at the Site, the system objectives, the status of their implementation, and a brief description of the system operation and the monitoring that is used to evaluate the system performance. The technical evaluation of the system, including system performance and monitoring results, should be presented in Section 7. Section 4.1.2.3 is one of the better discussions that is an appropriate level of detail for this section. Section 4.1.2.8, in contrast, does not describe the system configuration or the performance monitoring network.

Response: The requested revisions have been incorporated.

Comment 2. Technical Assessment for Question A. Section 7.0 has been reorganized to discuss Question A of the *Guidance* for remedial projects under construction (Section 7.1), operating remedial projects (Section 7.2), and completed projects (Section 7.3). Each section begins with a list of discussion topics from the *Guidance* that are relevant to the construction status. However, the topics for assessing remedial action performance, systems operations, and operation and maintenance (O&M) are not consistently applied. Details are provided in other general and specific comments below.

Each subsection regarding treatment system performance in Section 7.0 should summarize the system performance and monitoring results and provide a concluding statement. Any extenuating circumstances should be discussed here. Prior reports with supporting data should be referenced, or, if prior reports are not available, an appendix with the supporting data should be provided.

Response: The requested revisions have been incorporated.

Comment 3. Technical Assessment for Question B. Section 7.4 of the FYRR does not include all of the appropriate elements for assessing Question B, as provided in Chapter 4.2 of the *Guidance*. The section discusses primarily applicable and relevant and appropriate requirements (ARARs) and to-be-considered criteria (TBCs) for the environmental media and worker exposure. Section 7.4 should be revised to include a discussion of changes in land use, new contaminants and/or contaminant sources, and expected progress towards meeting RAOs in order to present a complete technical assessment of the remedy assumptions.

Response: The requested revisions have been incorporated.

Comment 4. Issues. The FYRR evaluates the implementation and performance of the remedy with respect to the *Record of Decision for the On-Post Operable Unit* (On-Post ROD) and the *Rocky Mountain Arsenal Offpost Operable Unit, Final Record of Decision* (Off-Post ROD) at the Rocky Mountain Arsenal (RMA). The FYRR identifies issues and associated follow-up actions. However, not all of the issues identified in General Comment 9 of the EPA's Technical Comments submitted September 26, 2005 on the Draft Final FYRR have been identified as issues in this Final FYRR. The Remediation Venture Office's (RVO's) general response to EPA Comment 9 states in part, "The RVO does not agree that all of the items identified in Comment 9 are key issues that require identification in Section 8." One issue identified by EPA in General Comment 9 that remains an issue is the Bomblets Discovery. The discovery of the bomblets and related activities is presented in Sections 6.3.1 and 6.3.13, both of which are subsections under Section 6.3, Documentation Reviewed. In addition, these sections are referred to in the technical assessment of the Miscellaneous RMA Structures Demolition and Removal Phase 1, in Section 7.3.17. However, assessment of whether the discovery of the bomblets, particularly with respect to visitor access, affected current or future protectiveness is not discussed. Specifically, the FYRR does not discuss the status of the Visitation Plan during the initial and subsequent discovery of the bomblets, whether and when visitors were on-site relative to the chronology of the finding and securing of the bomblets, and when visitation was curtailed. In a meeting held August 3, 2006 with RVO to discuss selected EPA comments on the Draft Final FYRR, EPA indicated that the discussion regarding visitation and the bomblets should be included in the discussion of activities conducted and in the section on whether any new information has come to light (i.e., Section 7.5, Question C), which could reference the discussion in the previous sections. The FYRR should be revised to assess the discovery of bomblets with respect to visitor access, identify it as an issue in Section 8 and identify follow-up actions in Section 9. It is also noted that much of the language regarding the discovery of the bomblets and their destruction is more appropriately included in Section 4.4.2.3, rather than in Section 6.3.1 and 6.3.13, as had been indicated in the August 3, 2006 meeting.

In addition, EPA identified other Issues in Specific Comments on the Draft Final FYRR. Not all of these issues have been discussed or resolved as completely as expected within the FYRR. Comments on other issues are contained throughout these General and Specific Comments.

Response: The assessment of the bomblets discovery, including impacts on visitation is presented in the context of the associated implementation project in Section 7.3.18. The assessment is appropriately cross-referenced to the underlying factual information presented in Sections 6.3.1 and 6.3.13. The Army does not believe any issue remains for inclusion in Section 8.0. No changes are contemplated in response to this comment.

Comment 5. Lake Level Maintenance and South Lakes Monitoring. Comments on the discussion of the Lake Level Maintenance and South Lakes Monitoring throughout the document are provided in this general comment to facilitate tracking of comments on this issue in one place.

a. Five-Year Review Summary Form. This section identifies South Lakes Lake Level Maintenance as an issue. However, the text does not specify that the issue is lake level maintenance was not formally performed during the FYR period, primarily because performance criteria had not been established to determine how lake level maintenance would be performed. This primary aspect of the issue should be included in the discussion. In the "Recommendations and Follow-up Actions" section, it is appropriate to discuss the results of the South Lakes groundwater study that supported the conclusion that lake level maintenance was not an effective remedy for South Lakes groundwater plume management. The text should also explain that although the *Explanation of Significant Differences (ESD) for Groundwater Remediation and Revegetation Requirements* (Groundwater and Revegetation ESD) removed the ROD requirement for lake level maintenance, it also explained that "lake-level maintenance is still required to support aquatic ecosystems in Lake Ladora, Lake Mary and Lower Derby Lake. In addition, groundwater monitoring will be conducted to assess any change in future conditions" (TTECI 2006c).

b. Section 4.1.3.5, Page 25. This section discusses the South Lakes Plume groundwater monitoring and lake level maintenance. The second paragraph states that during the FYR period, a groundwater monitoring program was implemented to confirm that South Plants plumes were not migrating into the lakes at concentrations exceeding the Colorado Basic Standards for Groundwater (CBSGs). However, the ROD requires the use of lake level maintenance or other means of hydraulic containment or plume control to achieve the objective using groundwater monitoring to demonstrate compliance. Details are discussed below:

   i. This section does not discuss the lake level maintenance program or the results with respect to ensuring that the ROD requirement was met. The text should identify that performance criteria were not developed for managing the lake levels to mitigate plume migration. This program should be discussed independent of the Lake Ladora groundwater study because the groundwater study did not suspend the ROD requirement for lake level maintenance.

   ii. A groundwater study was performed to evaluate the potential for contaminants to enter Lake Ladora at levels above the CBSGs in groundwater. The South Lakes groundwater monitoring study is referenced in this section, but only one of the two objectives of the study are discussed. Both objectives of the study

should be identified and a discussion included on whether the results of the study indicate that the two objectives were met.

iii. In addition, this section on the South Lakes Plume Monitoring is included within Section 4.1.3 titled, "Completed On-Post Groundwater Remedies." However, the ROD remedy to maintain lake levels was not completed until the Groundwater and Revegetation ESD was signed in 2006. In addition, the Groundwater and Revegetation ESD clarified that groundwater monitoring would be conducted to assess any change in future conditions. Therefore, the discussion regarding South Lakes Plume Monitoring should be relocated to Section 7.2, "Operating On-Post Groundwater Remedies."

c. Section 7.3.28, Page 175. This section discusses the South Lakes Plume monitoring. The following are comments on this section.

i. The first paragraph indicates that the South Lakes Groundwater Monitoring project was completed during the FYR period. However, this paragraph should also indicate that the ESD that removed the ROD requirement for lake level maintenance was not completed during the FYR period. As commented previously regarding Section 4.1.3.5, the results of the ROD-required lake level maintenance program should be discussed.

ii. In addition, the text should identify that even though the ROD requirement for lake level maintenance to prevent plume migration was removed by the Groundwater and Revegetation ESD, the requirement to conduct groundwater monitoring of the South Lakes plumes was retained "to assess any change in future conditions."

iii. The South Lakes groundwater monitoring study is also referenced in this section, but only one of the two objectives of the study are discussed. Both objectives of the study should be identified in the discussion and the remedy assessed with respect to the two objectives.

d. Section 8.7, Page 187. This section identifies South Lakes Lake Level Maintenance as an issue. However, the text does not specify that the issue is lake level maintenance was not formally performed during the FYR period primarily because performance criteria had not been established to determine how lake level maintenance would be conducted. This primary aspect of the issue should be included in the discussion. It is then appropriate to discuss the results of the South Lakes groundwater study, which supported the conclusion that lake level maintenance was not an effective remedy for South Lakes groundwater plume management.

e. Section 9, Pages 189 through 192. This section discusses follow-up actions. However, a follow-up action associated with South Lakes Lake Level Maintenance is not discussed. The results of the South Lakes groundwater study that supported the conclusion that lake level maintenance was not an effective remedy for South Lakes groundwater plume management should be discussed. The text should also explain that groundwater monitoring, and not lake level maintenance, will be performed as the ROD remedy for the South Lakes plumes. In addition, the text

should indicate that the Institutional Control Plan has established lake level performance criteria for the future, but only for the HHE soil and aquatic ecosystems ROD requirements. (EPA 2006b)

Response:

a. The FYRR relies on the RDIS to define the scope of each project. To better align the FYRR with the RDIS, the Section headings for Sections 4.1.2.9, 7.1.2.7, 8.7 and have been changed to "South Lakes Plume Management". Hopefully this will also eliminate confusion as to the scope of the South Lakes Plume Management project. Specifically, as a separate and independent part of the remedy, the Interim Institutional Control Plan has established lake level performance criteria for both preventing human exposure to the remaining HHE sediments in the bottom of Lower Derby Lake and for maintaining a healthy aquatic ecosystem. As a separate and independent parts of the remedy, the lake level performance criteria are tracked in Sections 6.3.11 and 6.4.3.1 and assessed throughout Section 7. In addition, the text throughout the document has been revised to reflect the reason why lake level maintenance was not performed. The reason is that lake level fluctuations were necessary to respond to remediation water needs. The ESD is discussed in the revised text which also refers to the ecological component of the South lakes remedy.

b. i) Please refer to response to General Comment 5. a. ii) The lake level maintenance issue was addressed through the monitoring program design in the SAP. It is important to note that the purpose of both objectives combine to ensure that contamination was not migrating into the South Lakes at levels exceeding CBSGs. iii) Text has been relocated as requested.

c. i) The text describing the project as complete has been deleted. ii) The ROD requirement for South Lakes was completed through the monitoring program specifically designed to determine if contamination was migrating into the South Lakes and removal of the ESD. Any future monitoring in this area will be conducted as part of the Site-Wide Groundwater Monitoring Program for other purposes. iii) Please refer to response to General Comment 5b.ii.

d. Please refer to response to General Comment 5a for an explanation for why lake level maintenance was not performed. The issue has been addressed accordingly in the text.

e. EPA's statement that "lake level maintenance was not an effective remedy for South Lakes groundwater plume management" is incorrect since it was never implemented and consequently could not be evaluated. It should also be noted, as stated in response to General Comment 5c.ii that the South Lakes Plume Management Project as required by the ROD and the RDIS has been completed and any future monitoring in this area would be conducted for other purposes. The separate and independent ecological component of the ROD is referred to in the text.

Comment 6. North Plants Fuel Release. Comments on the discussion of the North Plants Fuel Release throughout the document are provided in this general comment to facilitate tracking of comments on this issue in one place.

a. Five-Year Review Summary Form. This section identifies the North Plants Fuel Release as an issue. The section indicates that the need for additional monitoring and/or remediation has not been resolved. However, this source still remains to be fully characterized, not just monitored. The issue should state, "At the close of the FYR period, the need for additional characterization and/or remediation of the light nonaqueous phase liquid (LNAPL) was still being evaluated."

   In addition, under the follow-up action, the Army recommends that the fuel oil free product be addressed under the North Plants Soil Remediation project and the *Final Long-Term Monitoring Plan for Groundwater* (LTMP). However, the LTMP is not the appropriate document to address remediation projects which require a remedial design. In addition, the free product waste is a new contaminated media and any remedial action will likely require a different remedy than the cover construction or minor soil excavation required by the ROD for the North Plants Soil project. Therefore, the free product waste should be identified as a separate project under CERCLA. This section should be revised accordingly.

b. Section 4.4.2.4, Pages 99 through 102. This section discusses the discovery of the North Plants fuel oil contamination. However, the discussion does not adequately describe the background and time frame in which the fuel oil contamination was discovered or the actions taken. The section should be revised to include a more complete discussion of the fuel oil discovery beginning with the initial Contamination Assessment Report (CAR) and following through the *North Plants Soil Remediation Project Petroleum Release Evaluation Report* (PRER) (TTFWI 2004d).

c. Section 6.4.1.2, Pages 136 through 140. This section describes Water Quality Tracking and states on Page 139 that fuel oil contamination was discovered in North Plants in Well 25055. However, this section does not provide an adequate discussion of the monitoring activities associated with the discovery of the fuel oil free product waste. The section should be revised to include a more complete discussion of the fuel oil discovery around 2001-2004.

d. Section 7.3.23, Page 174. This section discusses the discovery of the fuel oil free product waste. This discussion should be moved to Section 7.4 from Section 7.3, because it is more appropriate to Question B of the *Guidance*, which includes the question, "Are there newly identified contaminants or contaminant sources?" (EPA 2001, Exhibit 4-2). In addition, the section should be revised to discuss the fuel oil discovery within the context of Question B such as that provided below:

   Free product associated with groundwater was first delineated in the North Plants area in 2001 as part of the North Plants Groundwater Monitoring project. During this time, a small amount of free product was removed from Well 25055. During the North Plants Structure Demolition and Removal project, petroleum-contaminated soil was encountered during sewer removal. That discovery triggered a series of characterization efforts designed to establish the extent of both soil contamination and free product and is documented as part of the North Plants Structure and Demolition Removal Project, #42. The discovery of the free product waste plume is considered a

new contaminant source. The EPA guidance, *A Guide to Principal Threat and Low Level Threat Wastes,* categorizes free product as principal threat waste (EPA 1991). The issue has been identified in Section 8.0.

e. Section 8.10, Page 188. This section identifies the free product waste discovery as an issue. However, the second paragraph discusses groundwater contamination and not the free product waste contaminated media. The focus of the issue should be the free product waste contamination. The section should be revised in accordance with a free product waste contamination focus.

f. Section 9.8, Page 191. The section discusses follow-up actions for the fuel oil free product waste discovery and suggests that the fuel oil free product be addressed under the North Plants Soil Remediation project. As discussed previously, however, the free product waste should not be included with the North Plants Soil Remediation project, but instead should be identified as a separate project under CERCLA. The text should include a discussion to continue monitoring/ characterization until the full extent of the waste is identified and the method for remediation, if any, is determined.

Response:

a. The requested revisions have been incorporated. The appropriate project assignment will be proposed and resolved in the context of the RDIS.

b. The requested revisions have been incorporated.

c. The requested revisions have been incorporated.

d. As requested the discussion has been moved to Section 7.4, although the Army does not believe the fuel oil contamination impacts the protectiveness of the remedy. As discussed in Section 8.10 and 9.10 the "need to perform additional characterization and/or remediation of the fuel oil derived light non-aqueous phase liquids was being evaluated." For that reason it is premature to label the fuel oil contamination as "principal threat" in the FYRR and that discussion and citation has been removed..

e. See response to 6.d.

f. The reference to the North Plant Soil remediation project has been removed. See 6.a, above. Otherwise, the requested revisions have been incorporated.

Comment 7. Shell Disposal Trenches Dewatering Goal. Comments on the discussion of the Shell Disposal Trenches dewatering goals throughout the document are provided in this general comment to facilitate tracking of comments on this issue in one place.

a. Five-Year Review Summary Form. The Five-Year Review Summary Form identifies as an issue that the dewatering goal of achieving water levels below the bottom of the trenches had not been met. This assessment appears to be correct. However, the issue does not identify that the ability to make conclusions about whether the remedy was effective during the FYR period could only be made after the FYR period because the LTMP wells used for this determination were either not

sampled, and/or some of these wells were not maintained appropriately so that the monitoring could be performed. The lack of required monitoring in compliance with the LTMP and the design, and the lack of timely well maintenance, which includes unrepaired damage and lack of well development, should be included in this issue

In addition, the "Recommendations and Follow-up Actions" section should be revised to ensure that the required quarterly water level monitoring will be performed for the interior monitoring wells in the future so that remedy effectiveness can be determined during the next FYR period.

b. Section 4.1.2.1, Pages 8 through 10. This section discusses the Shell Disposal Trench Slurry Walls project. The text does not identify that the quarterly water level monitoring required by the *Complex Trenches and Shell Section 36 Trenches Groundwater Barrier Project, 100% Design* Package (RVO 1997) and the LTMP (FWENC 1999) was not performed for the ten wells in the interior to the Shell Disposal Trenches slurry wall from the period May 1998 to July 2003. Because of this lack of monitoring, a determination could not be made as to whether the water levels were below the level of the waste during a significant portion of the FYR period. Instead, interpretations are made in this section based on linear interpolation of water levels taken before and after the FYR period to assess whether the water levels were below the waste during the FYR period. The text should indicate that these interpolations are an approximation of water level conditions during the FYR period and were necessary because of a lack of available data.

c. Section 7.2.1.1, Page 158. This section discusses whether the Shell Disposal Trenches Slurry Wall remedy is functioning as intended. However, the section does not discuss the time gap in quarterly water level measurements. The text should identify that there was a 3.5-year gap in quarterly water level measurements for the ten interior slurry wall wells during the FYR period. Because of this, conclusions on whether the remedy was functioning as intended, as evidenced by water levels remaining below the level of the waste, could not be determined for this period.

d. Section 8.6, Page 187. This section discusses the issue that the design dewatering goal for the Shell Trenches Slurry Wall remedy had not been met. Because there was a 3.5-year gap in quarterly water level measurements for the ten interior slurry wall wells during the FYR period, conclusions on whether the remedy was functioning as intended, as evidenced by water levels remaining below the level of the waste, could not be determined with certainty. The lack of required water level data should be added to the issue discussion.

e. Section 9.5, Page 190. This section identifies the recommendations and follow-up actions for the Shell Disposal Trenches issue. However, the section doesn't identify that the required quarterly water level monitoring will be followed. The section should be revised to indicate that an additional follow-up action should be to ensure that the required quarterly water level monitoring will be performed for the interior monitoring wells in the future so that remedy effectiveness can be determined during the next FYR period.

Response:

a. While the monitoring hiatus was an oversight, it was not discovered that well 36536 contained sediment until June 2005, after the FYR period. The RVO cleaned out the well and evaluated the data in a timely manner in order to include conclusions about achieving the dewatering goal in this FYRR. Thus, the well-maintenance element of EPA's comment will not be included in the issue. The other comments will be incorporated in the text, however.

b. The linear interpolation in this section refers to the method of drawing the water table contours on Figure 4.1.2.1-1 from which it is surmised that the water level was above the bottom of a trench at one boring location. The text will indicate that the lack of available data limited the RVO's ability to evaluate attainment of the dewatering goals for the whole FYR period.

c. The text has been revised to incorporate the comment.

d. The text has been revised to incorporate the comment.

e. The text has been revised to incorporate the comment.

Comment 8. Complex (Army) Trenches Dewatering Goal. Comments on the discussion of the Complex (Army) Trenches dewatering goals throughout the document are provided in this general comment to facilitate tracking of comments on this issue in one place.

a. Section 4.1.2.2, Pages 10 through 12. This section discusses the Complex (Army) Trenches dewatering remedy. The following are comments on this section:

i. The text indicates that the complex trenches dewatering goal will probably not be accomplished until the RCRA-equivalent covers are in place. However, the *Complex Trenches and Shell Section 36 Trenches Groundwater Barrier Project 100% Design* (RVO 1997) does not identify that the performance of the dewatering system depends on the RCRA-equivalent covers. In fact, the caps and covers were not simulated in the groundwater model used to predict the operating parameters for the dewatering system. The *Complex Army Trenches Groundwater Barrier Project* Construction *Completion Report* (CCR) (FWENC 2001) references an RVO-internal "Flow Rate Analysis" report (GWB-ETW-QA99-FW.3.14) for statements that the RCRA-equivalent covers may be needed for lowering the water levels to target levels. But the "Flow Rate Analysis" report only evaluated the performance of the dewatering trench to achieve the design flow rate and did not evaluate the effect of infiltration or the covers with respect to the design goal. The *Complex Army Trenches Groundwater Barrier Project Groundwater Extraction System Operational and Functional Report* (OFR) (RVO 2002) was written after the CCR, and states, "When the CCR (FWENC 2001) was written, the extraction system was not operational." The OFR presents operational data for the extraction system collected after the "Flow Rate Analysis" test was conducted. The OFR data indicates that the system had not been operated at the design flow rate prior to the time the CCR was issued. Therefore, any statements in the CCR about requiring the RCRA-equivalent covers to be in place for system performance were premature. The OFR does

not indicate that the RCRA-equivalent covers are necessary for system performance, and actually concludes the opposite, "the system is readily capable of meeting the dewatering goal at flow rates of 3 gpm, or possibly less." This section should be revised to indicate that the OFR validated that the design goals for the Complex (Army) Trench dewatering system could be achieved without the need for the RCRA-equivalent covers.

ii. The text also indicates that the timeframe for achieving the water level target elevations was not specified in the *Complex Trenches and Shell Section 36 Trenches* Groundwater *Barrier Project 100% Design*. However, the 100% Design indicates that, based on the modeling performed, at a pumping rate of 2 gpm the groundwater dewatering goal would be met within five years or less (RVO 1997). The OFR (RVO 2002) presents hydrograph data that is tied to the extraction flow rates used during initial operation of the system. By extrapolating the trend line for the 3 gpm period upwards on these hydrographs, the data suggest that the target elevation would have been reached within a one-year period in Monitoring Well 36216, and within an eighteen-month period for Monitoring Well 36217. The OFR (RVO 2002) states, "... the target elevations likely would have been reached [i.e. below the trench bottoms] during calendar year 2002 if the flow rate had been maintained at 3 gpm." Therefore, there is every indication from the OFR that with the system operating as designed, the target groundwater elevations could have been achieved during the FYR period. This section should be revised to provide the results of the OFR data analysis and present the timeframes for achieving the dewatering goals estimated from the data analysis.

iii. The text also discusses operational problems that have complicated the achievement of the design goals. One problem discussed is that pumping rates had to be reduced because of the treatment capacity at Basin A Neck Containment System (BANCS) during the FYR period. However, the 100% Design determined that there was 10 gpm excess capacity at BANCS for treating this groundwater. Also, the North of Basin F extraction well was shutdown in 2000, which would have increased the excess treatment capacity of the BANCS by at least 1.5 gpm. Therefore, it is unclear how that treatment capacity became so constricted between the time of the 100% Design and the time of implementation of the Complex (Army) Trenches dewatering system. The text should discuss the discrepancy in treatment plant capacity.

iv. Other reasons given in the text for the reduced flow rate from the Complex (Army) Trenches are a lowered groundwater table causing pump cycling and possible reduction in capacity of the dewatering trench. Review of the water level data from the dewatering well (36305) and Monitoring Well 36217 for the 2000 through 2006 period indicates that fluctuations in water levels in the dewatering well do not track with water level fluctuations in Well 36217, even when the water levels in the dewatering well indicate that there is significant drawdown in the well. However, comparison of water levels in Monitoring Well 36216 with Dewatering Well 36305 indicates that water level fluctuations track between these two wells. This suggests that the dewatering well may not be

having a significant effect on the water levels in Well 36217 and that the ability of the dewatering well to lower water levels in Well 36217 is questionable. The text should be revised to indicate that problems dealing with pump cycling and reduced capacity of the dewatering trench may indicate that the system cannot perform as designed.

b. Section 7.2.1.2, Pages 158 and 159. This section discusses whether the Complex (Army) Trenches Slurry Wall dewatering remedy is functioning as intended. The text indicates that the inability to achieve the design flow rate is due to factors beyond RVO's control and that achieving the dewatering goal depends on placement of the RCRA-equivalent covers. The *Complex Trenches and Shell 36 Trenches Groundwater Barrier Project 100% Design* and the OFR do not identify the need for the RCRA-equivalent covers. If the Complex (Army) Trenches dewatering remedy now requires the RCRA-equivalent covers for the remedy to be effective, this calls into question whether the remedy, as designed, is performing as intended. In addition, the problems with maintaining the extraction rate have all been within the RVO's control. The OFR clearly demonstrates that the dewatering level could have been achieved within the FYR period. In addition, review of the water level data from wells in the Complex (Army) Trenches area raises questions as to whether the dewatering well is adequately lowering water levels in Well 36217 regardless of the pumping rate. This section should be revised to reflect this information. In addition, RVO should identify the inability to achieve the dewatering goals as an issue in Section 8.0 of the FYRR.

c. Section 8.0, Page 185. This section discusses the issues identified during the FYR period. This section should include the potential inability of the Complex (Army) Trenches Slurry Wall dewatering system to achieve the dewatering goals established in the *Complex Trenches and Shell 36* Trenches *Groundwater Barrier Project 100% Design* as an issue. In addition, the need for assessing the performance of the RCRA-equivalent covers as part of the Complex (Army) Trenches Slurry Wall dewatering project design is also a component of the issue. This revised discussion should also be added to the Five-Year Review Summary Form.

d. Section 9.0, Page 189. This section discusses recommendations for follow-up actions. However, because the Complex (Army) Trenches Slurry Wall dewatering project's inability to achieve dewatering goals was not identified as an issue in Section 8.0, this section does not include recommendations and follow-up actions for that project. This section should identify that follow-up actions for the Complex (Army) Trenches Slurry Wall dewatering system involve 1) evaluating the current dewatering system to determine the expected performance of the system as a component of the remedy and 2) providing additional analysis to demonstrate the necessity for including the RCRA-equivalent covers into the Complex (Army) Trenches Slurry Wall dewatering remedy, and determining the contribution that the covers will provide to achieving the dewatering remedy. These follow-up actions should be completed in calendar year 2007.

Response:

a.

i. The groundwater model was used in the Design Document to estimate drawdown as a function of pumping rates and time in order to estimate the time required to lower water levels below the trenches under specific conditions and assumptions relative to the water level conditions that existed in 1996. The resulting timeframe estimate was not intended to be used as a requirement or standard for achieving the dewatering goals. When the dewatering system started up in 2001, the water levels were higher than in 1996, and the conditions during operation of the dewatering system (e.g., pumping rate and recharge) were different than what were assumed in the model. Although the model was reasonably accurate in its predictions, these changes in conditions increased the time needed to meet the dewatering goals compared to the model estimate. The text has been revised to include additional discussion of the groundwater modeling assumptions and results and dewatering system operational and precipitation data, as agreed in the January 23, 2007 FYR issues resolution meeting.

ii. The estimates and conclusions in the CAT OFR only pertain to the first year and a half of operation of the dewatering system (through August 2002). The water-level response to dewatering was greatly affected by the severe drought in 2002 in which the annual precipitation was only 55% of normal. Consequently, determining whether the OFR validates the design goals should consider that context because the estimates and conclusions in the OFR in 2002 were not valid for the entire FYR period. The information in the OFR is discussed in the text in the proper context of the entire FYR period and compare the operational and precipitation data before, during, and after the drought year.

iii. The treatment and recharge capacity limitations were interrelated and were based both on water quality and quantity. The Complex Trenches groundwater has high manganese concentrations, and manganese bacteria were plugging the recharge trenches such that there was very little available recharge capacity in 2001 when the Complex Trenches system started up. Additionally, the Complex Trenches flow was fouling the piping and air stripper with a manganese precipitate. Thus, the initial flow rate was reduced to between 0.7 and 1.0 gpm until the treatment and recharge concerns were partially resolved. The flow rate was increased to 3 gpm for a few months in 2002, but had to be lowered to 1.5 gpm because of the recharge capacity limits. In 2004, the air stripper was replaced and additional recharge trenches were installed. These changes resolved the treatment and recharge capacity limitations. This information has been added to the text.

iv. The RVO strongly disagrees with EPA's assertion that the ability of the dewatering well to lower water levels in well 36217 is questionable. The groundwater model accurately predicted that there would be less drawdown

in well 36217 than in 36216. Additionally, well 36217 is located farther from the dewatering trench than well 36216, so less drawdown in well 36217 is not unexpected. The water level in well 36217 may not be tracking the dewatering well as closely as does well 36216 because well 36217 appears to be located closer to recharge sources than 36216. Runoff was reported to collect in surface depressions near the slurry wall south of well 36217. This standing water would increase recharge in this area and affect the water levels in well 36217. Additionally, the maximum drawdown in well 36217 has exceeded that estimated in the model simulations to be required to meet the dewatering goal, and was within only 0.3 feet of the target elevation. Therefore, EPA's concerns about the dewatering system's ability to achieve the goals in well 36217 are unfounded.

The evaluation of the dewatering well and trench in 2007 will determine if the capacity has decreased to less than the design flow rate. However, whether the dewatering system can still achieve the design flow rate may be irrelevant. A lower water level in the dewatering trench and resulting lower flow rate may indicate that dewatering is successfully occurring. The operational data show that when recharge is reduced, such as during the drought year (2002) or when the RCRA-equivalent covers are installed, a flow rate significantly less than the design flow rate of 3 gpm and less than the flow rate of 2 gpm used in the model simulations will be able to achieve the dewatering goals. In 2001/2002 the average flow rate was only 1.3 gpm, and the water levels were rapidly approaching the goals. This information will be included in the text.

b. As agreed in the January 23, 2007 FYR issues resolution meeting, the text has been revised to include additional discussion of the groundwater modeling assumptions and results, dewatering system operational and precipitation data, and indicate that the dewatering system is performing as expected in the ROD and Design Document.

c. The text has been revised as indicated in Response b.

d. The text has been revised as indicated in Response b. The evaluation of the capacity of the dewatering system will also be discussed.

Comment 9. Off-Post Groundwater and Intercept Treatment System. Comments on the discussion of the Off-Post Groundwater and Intercept Treatment System (OGITS) dewatering goals throughout the document are provided in this general comment to facilitate tracking of comments on this issue in one place.

a. Section 4.2.1.1, Pages 26 through 28. This section discusses the remedy for the OGITS. The following are comments on this section:

v. The second paragraph of this section on Page 26 states that the OGITS is a mass removal system. Because discussions are continuing on the

performance of the OGITS, the sentence should indicate instead that the OGITS was operated as a mass removal system during the FYR period.

vi. The discussion of the First Creek extraction system does not include the bypass of the DIMP plume on the eastern side of the system. Although the exceedances in Well 37009 are discussed, it is not identified as bypass. This comment (Specific Comment 105c) was made on the Draft Final FYRR. Bypass is an indication that the engineering controls put in place are not performing as indicated by the design (for either mass removal or containment objectives). The text should include a discussion of the bypass.

vii. The discussion on the Northern Pathway System (NPS) does not include the bypass of the DIMP plume on the eastern side of the system, nor does it discuss the bypass of the fluoride plume on the west side. This comment (Specific Comment 105b) was made on the Draft Final FYRR. Bypass is an indication that the engineering controls put in place are not performing as indicated by the design (for either mass removal or containment objectives). The text should include a discussion of the bypass.

viii. The fourth and fifth paragraphs on Page 27 discuss the modifications to the OGITS and states that it is expected that the modifications will "expedite" cleanup and the system has been designed to "meet or exceed the contaminant removal of the old system." However, these modifications were not made during the FYR period, and the text does not discuss how the system will expedite the cleanup or how it will meet or exceed the contaminant removal of the old system. These statements should be removed from the discussion, or additional information should be presented to support these claims.

ix. The text indicates that four of the original NPS extraction wells were shutdown for hydraulic purposes. However, these wells were shutdown using the ROD shutdown criteria that require five-year water quality monitoring. The text should be changed to reflect the correct shutdown approach.

x. The first paragraph on Page 28 discusses the Containment System Remediation Goal (CSRG) exceedances for NPS monitoring wells during the FYR period. The text indicates that the O'Brian Canal is responsible for the arsenic exceedance in Well 37008. However, arsenic is a CSRG for the NPS and other NPS wells have had arsenic exceedances. This statement should either be removed from the FYRR or data from the O'Brian Canal should be provided or referenced to support this conclusion.

b. Section 7.2.2.1, Pages 161 and 162. This section discusses the evaluation of the remedy for the OGITS. However, the section does not discuss the bypass of contaminants at the NPS and First Creek system. The discussion should discuss the observed bypass of contaminants at both the NPS and First Creek systems and indicate that bypass is a component of the OGITS issue that is discussed in Section 8.0.

c. Section 8.8, Page 187. This section discusses issues regarding the OGITS performance objectives. The identification of the issue should include the observed bypass of contaminants at both the NPS and First Creek systems because contaminant bypass is a component that should be considered when establishing the performance objectives for the system, regardless of whether the system is a containment or mass removal system.

d. Section 9.6, Page 190. This section discusses follow-up actions for OGITS issues identified in Section 8.0. This section should include discussion of the proposed follow-up actions regarding contaminant bypass at the First Creek system and the NPS. For the NPS system, the discussion should indicate that the planned modifications to the system may address the bypass of contaminants on the east side of the system and that the effectiveness of the modifications will be evaluated during the next FYR period. For the First Creek system, the text should indicate that the need for an additional extraction well(s) on the east side of the system to help mitigate the bypass will be determined during the next FYR period.

Response:

a. i) The text reflects the agreement reached with the agencies that OGITS has been operated as a mass removal system in the past and will be operated as such in the future. A clarification of the confusion caused by the use of the words contain or containment to describe OGITS in the Off-Post ROD and other documents is also included in the text. ii) As discussed and agreed in 01/23/07 meeting with the regulatory agencies, the term bypass is not compatible with a mass removal system, which was designed to remove mass rather than capture the entire plume. Consequently, bypass is not discussed in the FYRR. iii) Please refer to response to previous comment. iv) As for other post-FYR period actions where documents have been published after the cut-off date, information from the design document is included. The RVO does not see a problem with sharing system expectations, supported by design information, with the general public. v) The four wells were shut down for hydraulic reasons, as stated, so no correction is necessary. vi) The statement has been removed from this section. It should be noted that the CSRGs apply to the OGITS effluent rather than the NPS influent.

b. Please refer to response to General Comment 9a.ii.

c. The system's mass removal effectiveness was the primary consideration in the original design as well as in the Northern Pathway modifications. The original Northern Pathway and First Creek Pathway systems were not designed for complete capture as they are components of the entire off-post remedy. Other than the Northern Pathway System modifications, no additional extraction wells are planned.

d. Please refer to responses to General Comments 9 a, b, and c above.

Comment 10. Operation and Maintenance Costs. Section 4.0 discusses remedial actions and indicates that the FYRR does not discuss actual O&M costs. The *Guidance* specifically indicates that O&M costs should be included in the assessment of whether the remedy is performing as intended (EPA 2001, Section 4.1.2). Failure to assess O&M costs results in the possibility that an element of the remedy that is not performing as expected could be overlooked. The FYRR should be revised to include and discuss O&M costs. Groundwater treatment costs comprise the majority of O&M costs. The O&M costs that have been included in the Operational Assessment Reports (OARs) should be included as an estimate of the total O&M project costs and evaluated in the FYRR as indicated by the *Guidance*. In addition, O&M costs should be included for any years in which the OARs did not provide O&M costs. If the RVO is unable to assess these costs, the FYRR should identify that as an issue, and indicate the recommendations and follow-up actions to that issue.

Response: O&M costs have been included in Sections 4.1.2 and 4.2 of the revised FYRR. The O&M cost for years that were not included in the OARs are as follows:

FY 2000 and FY 2001 Boundary Systems Annual Costs

Fiscal Year	Plant NWBCS	NBCS	OGITS	A Neck	ICS/ RailYard
2000	$620,575	$896,880	$491,948	$521,716	$182,507
2001	$744,250	$752,414	$668,527	$547,318	$471,867

Comment 11. Assessment. Sections 7.2 and 7.3 indicate that Institutional Controls (ICs) is one of the topics considered in the assessment of the remedy. The assessment of each ongoing or completed remedial action typically includes the statement, "RMA site access restrictions and project-specific health and safety measures ensured the safety of workers and visitors. Implementation of the recent revisions to the RMA institutional controls (PMRMA 2006a) continues to satisfy the Refuge Act and ROD requirements." However, details of which specific access controls and ICs are in place for a particular project where contamination is left in place, such as at the South Plants Central Processing area, are not identified. Although ICs are also discussed in Section 6.3.11, that discussion is in the context of reviewed documents and is also general in nature. The section should be revised to identify the specific ICs and access controls that apply to individual projects where contamination is left in place.

Response: As requested, a more detailed discussion specific access controls and ICs for the South Plants Balance of Areas and Central Processing Area Soil Remediation Project where contamination has been left in place have been provided. See Section 7.3.21.

Comment 12. The FYRR describes the ROD remedies for soil projects. However, the ROD remedy of revegetating areas disturbed during remediation with locally adapted perennial vegetation is not identified for the projects, even though the revegetation status is discussed. The *Explanation of Significant Differences (ESD) for Groundwater Remediation and Revegetation Requirements, Rocky Mountain Arsenal Federal Facility Site* (Groundwater

and Revegetation ESD) was approved after the FYR period covered by the report ended and only clarified, not eliminated, the ROD remedy revegetation requirement (EPA 2006b). The Groundwater and Revegetation ESD, as discussed in Section 6.3.12, indicates that the EPA requires certification from the U.S. Fish and Wildlife Service (USFWS) that revegetation has been completed or that a USFWS-approved vegetation plan is being implemented, and that the site's habitat is being or will be restored to achieve the statutory purposes of the Refuge. Accordingly, the sections pertaining to soil remedies should be revised to identify the ROD remedy for revegetation, when applicable.

Response: As requested, the ROD remedy for revegetation has been added to sub-sections of Section 4 that pertain to soil remedies.

Comment 13. The FYRR does not document the construction pertaining to the additional contingent soil volume (CSV) removal associated with the unbackfilled Human Health Exceedance (HHE) soil excavation area for the Existing (Sanitary) Landfill (ESL) Remediation Section 1 project. Although Section 6.3.8 indicates that SAR Site SSA-4 in the ESL Section 1 Remediation project was excavated and resampled, Section 6.3.8 only pertains to documentation reviewed and does not provide the actual documentation of construction completion. The FYRR should be revised to document and assess the additional CSV removal associated with the unbackfilled HHE area for the ESL Section 1 Remediation project.

Response: The requested revisions have been incorporated.

Comment 14. The FYRR still includes instances where important documentation related to the remedy is not referenced. For example, Section 4.1.1.1 discusses the *Explanation of Significant Differences for the Section 36 Bedrock Ridge Groundwater Plume Extraction System, Rocky Mountain Arsenal Federal Facility Site*, but does not provide a citation for the ESD. In addition, Section 4.4.2.1 discusses CCRs related to Post-ROD removal actions, but does not provide citations for all of the CCRs, such as the O&M Asbestos CCR. In addition, EPA approval dates are not provided for these CCRs. There are other instances where important documentation is not referenced. The FYRR should be revised to provide or reference all changes to the remedy, CCRs, and EPA approvals.

Response: The O&M Asbestos CCR was included in the original text. The requested EPA approval dates have been incorporated.

Comment 15. The FYRR includes the Shell Disposal Trenches Slurry Wall (construction) and the Complex (Army) Disposal Trenches Slurry Wall (construction) projects within the section for completed on-post groundwater remedies (Section 4.1.3). However, the installation of the slurry walls for these projects is part of the on-going soil remedy in the On-Post ROD (FWENC 1996). In addition, although Page 6 of the FYRR indicates that the list of projects is keyed to Appendix B of the Remediation Design and Implementation Schedule (RDIS), Appendix B of the RDIS Fiscal Year 2006 update does not show these projects as groundwater remedies (PMRMA 2005). The FYRR

should be revised to show projects within the section corresponding to the type of remedy identified in the On-Post ROD.

Response: The requested revisions have been incorporated.

Comment 16. RVO's responses to EPA Comments on the Draft Final FYRR are not always consistent with the Final FYRR. For example, RVO's response to EPA Comment 116b regarding ARAR changes at the Landfill Wastewater Treatment Unit (LWTU) indicates that the remedy remains protective because there is no consumption of groundwater. However, this response is not consistent with the discussion regarding protectiveness in Section 7.4.1.2. In addition, the LWTU discharges to surface water, not groundwater. RVO's responses to EPA Comments on the Draft Final FYRR should be reviewed and revised, as applicable, to be consistent with the text of the Final FYRR, and vice versa.

Response: The RVO responses to EPA comments will be reviewed and revised to address the identified discrepancy.

Comment 17. Treatment Effectiveness. The RVO did not identify treatment effectiveness as an issue because the concentrations of arsenic and fluoride above CSRGs at the OGITS and the North Boundary Containment System (NBCS) identified in EPA's comments on the Draft Final FYRR (Specific Comment 102d) were not representative of actual effluent concentrations due to analytical method problems that affected the analyses. However, the data were not qualified as part of the laboratory validation/verification process and were reported in OARs. Although this issue is discussed in RVO's response, it is not discussed in the FYRR. The use of these problematical laboratory methods should be discussed in Sections 4.1.2.8 and 4.2.1.1 of the FYR. The fact that RVO identified the analytical problems and made the appropriate changes to the analytical methods should be discussed as part of the assessment for these systems in Section 7.0.

In addition, RVO's response to Specific Comment 102d indicates that a post lab qualification procedure to further qualify questionable data will be prepared. Because this procedure has not been discussed with the regulatory agencies, the FYR should indicate that this post lab qualification procedure will be provided to the regulatory agencies for review and comment prior to implementation.

Response: Since the system evaluations were moved to Section 7, the analytical problems are discussed in the revised text in Sections 7.2.1.6 and 7.2.2.1 as requested by EPA. The RVO procedure will be finalized and ready for implementation in March 2007.

Comment 18. Factual Inaccuracies. The FYRR contains several factual inaccuracies that could confuse future users of Site documents. The factual inaccuracies identified below should be corrected.

a. The FYRR shows several projects (Section 26 Human Health and Biota Exceedance Excavation, Miscellaneous Northern Tier Soil Remediation, and Miscellaneous Southern Tier Soil Remediation) as complete even though the Addenda documenting the remedial activity were not approved by EPA until after

the March 31, 2005 cutoff date. Rather than separate the discussion of the original project and the Addendum, the discussion for these projects should be revised to state that the additional CSV soil excavation will also need to be discussed in the next FYRR because construction was complete after March 31, 2005.

b. Section 3.0, Page 5. This section describes the background and indicates that 127 acres near the RMA boundaries were transferred to several different entities. However, the number of acres identified for each entity sum to 126 acres.

c. Section 4.1.2.6, Page 16. This section discusses the North of Basin F Groundwater Plume Remediation System. The fourth paragraph indicates that approval of the CCR is scheduled for 2007, but the CCR was approved by EPA in 2005 (EPA 2005a).

d. Section 4.1.2.8, Pages 18 through 20. This section discusses the NBCS. The discussion in the second paragraph regarding chloride and sulfate results uses the wrong units of measure (micrograms per liter (ug/l)). The units should be corrected to indicate that the values are in milligrams per liter and not ug/l.

e. Section 4.3.1.4, Pages 35 through 42. This section discusses the South Plants Balance of Areas and Central Process Area Soil Remediation Phase 2, Part 1 and 2. The bullets on Page 38 summarize the *Explanation of Significant Differences for South Plants Balance of Areas and Central Processing Area Soil Remediation Project* (South Plants ESD) (RVO 2000b). Bullet 3 states, "Removal of the requirement to excavate Biota soil from under the South Plants Balance of Areas cover area." However, the South Plants ESD only removed this requirement for the three-foot cover area, not the one-foot or four-foot cover areas (RVO 2000b). The bullet should be revised to identify that the removal of the requirement to excavate Biota soil applied to the three-foot cover area only

f. Section 4.3.3.3, Pages 57 and 58. This section describes the remedy and remedial activities for the Section 26 HHE and Biota Exceedance Soils Removal project. The section indicates that an Addendum to the CCR was approved on March 9, 2004 for additional CSV soil excavation. However, that Addendum was only transmitted - not approved - on March 9, 2004. The EPA approved the update to the Addendum and accepted the project as complete on March 30, 2006 as part of the approval and acceptance of the Residual Ecological Risk Soil Remediation – Part 1 (EPA 2006a).

g. Section 4.3.3.6, Pages 61 through 64. This section describes the remedy and remedial activities for the Existing (Sanitary) Landfills project and indicates that the ESL sites in Section 4 yielded 7,747 bcy of HHE soil. However, the *Existing (Sanitary) Landfills Remediation Section 4 Construction Completion Report* indicates that the actual HHE volume was 11,408 bcy (FWENC 2000b).

h. Section 4.3.3.8, Pages 66 through 68. This section describes the remedy and remedial activities for the Lake Sediments Remediation project and indicates that a total of 17,969 bcy of HHE soil was disposed in the HWL. However, this volume appears to include the CSV of 157 bcy because the *Lake Sediments Remediation Project Construction Completion Report* indicates that the actual

HHE volume was 17,812 bcy (FWENC 2000a). This section subsequently identifies the 157 bcy of CSV separately. Because the CSV is identified separately, consistent with the CCR, the volume of HHE soil should be revised to 17,812 bcy, consistent with the CCR.

i. Section 4.3.3.9, Pages 68 through 70. This section discusses the Burial Trenches Soil Remediation Part I and Part II project and indicates on Page 70 that a total of 17,370 cy of waste was excavated by the Burial Trenches Part II project. However, the *Burial Trenches Soil Remediation Project Final Construction Completion Report, Part II* indicates that 6,203 bcy of HHE soil, 12 bcy of CSV, 5,615 bcy of munitions debris soil, 247 bcy of Biota soil, and 688 bcy of miscellaneous debris was excavated, which do not sum to 17,730 bcy (TTFWI 2004c).

j. Section 4.3.3.11, Pages 72 through 74. This section describes the remedy and remedial activities for the Miscellaneous Northern Tier Soil Remediation project. The section indicates that 11,134 bcy of CSV soil was excavated from NCSA-8b. However, the *Miscellaneous Northern Tier Soil Remediation Project, Construction Completion Report, Addendum 1* indicates that 11,133 bcy of CSV soil was excavated (RVO 2006).

k. Section 4.3.3.12, Pages 74 through 77. This section describes the remedy and remedial activities for the Miscellaneous Southern Tier Soil Remediation project. The section references a 2005 Addendum that documents additional work related to excavation of soil exceeding acute Site Evaluation Criteria. However, the Addendum approved by EPA is dated March 2006.

l. Table 2.0-2. Table 2.0-2 identifies the projects and their remedial status, and cross-references their location in the report. The following are comments on this table:

    i. The table does not provide a color key to indicate the color coding used in the columns entitled, "Status", "Forecast Start", and "Forecast or Date of Final CCR and 2005 FYRR cross reference." The table should be revised to include a color key for these columns.

    ii. The heading for the last column is "Forecast or Date of Final CCR and 2005 FYRR cross reference". However, the dates provided in this column for completed projects are the dates of EPA approval. The heading should be revised to correctly reflect that the dates shown in this column for completed projects are the dates of approval by EPA.

    iii. One of the subprojects shown for #18 is Post-ROD Removal Actions for Structures – Asbestos Interim Remedial Action. However, the asbestos activity discussed in the text appears to be contained within the *Administrative Area Asbestos Remediation Projects, Final Construction Completion Report, Revision 4* (PMRMA 2003). The asbestos-related projects, including IRA summary reports, that have been completed and documented during this FYRR should be checked, and this subproject should be revised to document EPA approval of all applicable construction

completions. The text in Section 4.4.2.1 should also be revised, as necessary, to clarify the asbestos-related activity that is being documented.

iv. The CCR-approval date shown for project # 18, Post-ROD Removal Actions for Structures – Interior Building Chemical-Related Activities is September 30, 2000. However, EPA's approval letter is dated September 29, 2000 (EPA 2000). The CCR-approval date should be revised.

v. The description for project #20, ESL Remediation Section 1, indicates that the project was discussed in the 2000 FYR and that the additional excavation of unbackfilled HHE area is discussed in Section 6.3.8. However, Section 6.3.8 only indicates that additional soil was excavated, and does not document the work, the volumes removed, or EPA approval of the Addendum. This project discussion should be revised in accordance with the general comment that the FYRR should be revised to document the additional unbackfilled HHE excavation for the ESL Remediation Section 1 project.

vi. The date shown for approval of the CCR for project #22, ESL Remediation Section 30, is August 16, 2005. However, Section 4.3.1.2 indicates that the CCR was approved on July 28, 2005. These dates should be checked and the section of the FYRR in error should be revised.

vii. Project # 64, South Lakes Plume Monitoring/Lake Levels, is shown as a completed project. However, the only element of lake level maintenance closed out by the Groundwater and Revegetation ESD was with respect to the need to maintain a hydraulic gradient to control plumes. The Groundwater and Revegetation ESD did not change either the monitoring requirements or the other two elements of lake level maintenance, aquatic ecosystem protection and covering HHE sediments (TTECI 2006c).

Response:

a. The requested revisions have been incorporated.

b. The requested revisions have been incorporated.

c. The text has been corrected with the proper reference information.

d. Comment noted. The units have been corrected.

e. The requested revisions have been incorporated.

f. The requested revisions have been incorporated.

g. The volume of HHE and trash and debris provided in the CCR was 10, 990 and 43,165 respectively. These changes were made to the FYRR.

h. The requested revisions have been incorporated.

i. The requested revisions have been incorporated.

j. The requested revisions have been incorporated.

k. The requested revisions have been incorporated.

l. i. The requested revision has been incorporated.

ii. The requested revision has been incorporated.

iii. The requested revision has been incorporated.

iv. The requested revision has been incorporated.

v. The requested revision has been incorporated.

vi. The requested revision has been incorporated.

vii. Consistent with the date of the ESD, the project is now identified as operating.

The other independent topics noted in the comment have no relation to this RDIS subject matter. Lake level maintenance will be evaluated in the future FYRRs in the context of the institutional controls and Aquatic Ecosystem Monitoring will be evaluated in future FYRRs in that context.

SPECIFIC COMMENTS

Comment 19. **Five-Year Review Summary Form.** This section summarizes the Issues and Recommendations and Follow-up Actions. In addition to the General Comments regarding issues, the following are comments on this section.

a. The follow-up actions identified for Extraction Well and Extraction System Shut-Off Criteria indicate that the Army recommends that more detailed and objective shut-off criteria be provided in the LTMP. The continued discussion identifies shut-off criteria that will be considered in the LTMP. However, this further discussion isn't required and the considerations might or might not be included within the LTMP. This section should be revised to delete the continued discussion after the recommendation that more detailed and objective shut-off criteria be provided in the LTMP. Section 9.2 should be revised similarly.

b. The Five-Year Review Form identifies follow-up actions for site-specific Practical Quantitation Limits (PQLs) and states that PQL studies will be conducted in accordance with soon-to-be published State of Colorado PQL Guidance. However, these PQL studies will also be conducted in accordance with EPA regulations and guidance. The follow-up action should be revised to indicate that the PQL studies will also be conducted in accordance with EPA regulations and guidance.

   In addition, the follow-up discussion states, ". . .this issue has not affected remedy protectiveness because the Method Reporting Limit (MRL) process was already sufficient, and resulted in reporting levels at or below CSRGs for all but 3 of 36 constituents." Having MRLs less than the CSRGs for "most" of the contaminants of concern (COCs) does not demonstrate that the process was sufficient. The sentence is not necessary and should be deleted from the discussion. In addition, Sections 8.4 and 9.3 in which this same language is used should also be revised accordingly.

c. In addition to the follow-up action corresponding to site-specific PQLs, there is a follow-up action for "Quantitation Limits, Applicable or Relevant and Appropriate

Requirements and To-Be-Considered Criteria Changes" that does not appear to correspond to a specific issue. In addition, this follow-up action discussion is contradictory to the discussion included within the "Site-Specific Practical Quantitation Limits" follow-up action. The follow-up action for "Quantitation Limits, Applicable or Relevant and Appropriate Requirements and To-Be-Considered Criteria Changes" should be deleted from this section.

Response:

a. The discussion has been revised as requested.

b. EPA regulations are referred to in the revised text as well as in the PQL Guidance. The RVO thinks it appropriate to inform the public about whether issues affected protectiveness and will retain a modified version of this statement.

c. RVO agrees that the language regarding follow-up on quantitation limits in Section 9.12 is unnecessary and this language is deleted. RVO also agrees that follow-up regarding ARAR changes is unnecessary. Consistent with Section 7.3.1 of EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Documents*, the ARARs changes are non-significant or minor and the FYRR accomplishes the requirement to record the changes in the post-ROD site file.

Comment 20. **Section 4.1, Page 7.** Each subsection dealing with the treatment systems needs to provide a brief description of the monitoring network for each system. Also, the technical evaluation for each system should be clarified and summarized in Section 7.0.

Response: The monitoring networks are too extensive to be discussed in detail in this report, so the reader is referred to the LTMP for this information.

Comment 21. **Section 4.1.1.1, Page 8.** This section discusses the modifications to the Section 36 Bedrock Ridge Groundwater Barrier Plume Extraction System during the FYR period. The following are comments on this section.

a. The second sentence in the second paragraph indicates that the data that formed the basis for adding an additional extraction well was presented in Water Team Meetings. However, the monitoring results and the data analysis should also be included in the FYR as has been done for all of the other operating extraction systems.

b. The last sentence of the second paragraph indicates that the effectiveness of the system will be addressed in subsequent OARs and FYRs. The text should also indicate that an operational and functional analysis will be performed to establish that the system is functioning as intended.

Response:

a. References to the 2003 and 2004 OARs have been provided.

b. The plan to include an operating properly and successfully determination in the final CCR is now in the text.

Comment 22. **Section 4.1.2, Page 8.** This section introduces the operating on-post groundwater remedies and references the OARs for information on the remedies included in subsequent sections. However, the Shell Disposal Trenches Slurry Wall dewatering project presented in Section 4.1.2.1 is not discussed in the OARs produced during the FYR period. The text should identify that the operation (i.e., monitoring) of the Shell Disposal Trenches dewatering project is not in the OARs. In addition, because this is a groundwater remedy project that involves groundwater level control, it should be discussed in future OARs.

Response: Other references are provided for the Shell Disposal Trenches. Data reporting for this project will be addressed in the revised LTMP.

Comment 23. **Section 4.1.2.3, Pages 12 and 13.** This section discusses the site-wide groundwater monitoring program. The following are comments on this section:

a. The introductory paragraph suggests that the section is misnamed because site-wide groundwater monitoring is discussed in Section 6.4.1. The title of the section should be revised to "Groundwater Treatment Systems Monitoring."

b. This section serves as an introduction for the discussions of the individual treatment systems that follow in Sections 4.1.2.4 through 4.1.2.8. However, these sections are not referenced. This section should identify that it is providing introductory discussion for these sections and the sections should be referenced to provide clarification.

c. The text indicates that shutoff monitoring will be discussed in this section. However, extraction wells that have been shut off during the FYR period are not discussed and should be included in the discussion of the individual treatment systems in Sections 4.1.2.4 through 4.1.2.8.

d. The first bullet on page 13 states that the purpose of the monitoring and reporting is to ensure that the systems continue to meet CSRGs. This statement is misleading as neither monitoring nor reporting can ensure that systems meet CSRGs. The extraction systems are operated in order to ensure that the effluent and conformance wells meet CSRGs.

e. The last paragraph in this section seems out of place. This paragraph should be replaced with one that states the monitoring conducted during this FYR period is summarized in Section 6.4.1.

Response:

a. The requested title change has been made.

b. The requested references have been added to the text.

c. This issue should be addressed through the references in response to Specific Comment 23 b.

d. EPA's statement is correct with regard to the effluent but not for conformance wells for which CSRG compliance does not apply. The text has been revised accordingly.

e. The requested revision has been made.

Comment 24. **Section 4.1.2.4, Pages 13 and 14.** This section discusses the Rail Classification Yard and Motor Pool Area Treatment Systems. However, the section does not discuss the presence of trichloroethylene (TCE) above CSRGs during the shutdown period. The discussion of the shutdown of the Motor Pool Area Treatment System should be expanded to discuss the shutdown monitoring and the presence of TCE above the CSRGs during the shut-down monitoring period. RVO's response to a previous EPA comment on the Draft Final FYRR (Specific Comment 104b) indicated that the discussion of shutdown monitoring would be included in this section of the report. The FYR should include the discussion as indicated in the RVO's response.

Response: The requested information has been included in the text.

Comment 25. **Section 4.2, Pages 25 and 26.** This section discusses the Off-Post OU and quotes the RAOs from the *Off-Post Operable Unit Endangerment* Assessment/*Feasibility Study* (HLA 1992). However, this section should quote the remedial objectives from the Off-Post ROD to be consistent with other remedies where the ROD is referenced.

Response: The reference was used because the RAOs were not called out in the ROD, only mentioned in the document.

Comment 26. **Section 4.3.1.5, Pages 42 through 45.** This is a new section that discusses the remedy and remedial activities for the Section 36 Balance of Areas (BOA) Soil Remediation project that was omitted from the Draft Final FYRR. The following are comments on this section:

a. The ROD standards identified for the project do not include the standard applicable to chemical sewers. The section should be revised to include this standard.

b. The types of remediation conducted at the Section 36 BOA sites are identified on Page 44. Dash 3 states, "removal of chemical sewer lines and designated HHE soil and disposal in the on-site HWL." However, plugging of Chemical Sewer Lines 1, 2, 3, and 10 was identified in the scope of the *Section 36 Balance of Areas Soil Remediation Project, 100 Percent Design* (FWENC 2003a). Dash 3 should be revised, as appropriate, to include plugging as well as removal of chemical sewer lines.

c. In addition, the discussion of remediation on Page 44 does not discuss backfill of chemical sewer excavations and other applicable excavations as required by the ROD. The section should be revised accordingly.

d. The second paragraph on Page 44 indicates that a portion of the Section 36 BOA project area was transferred to the Shell Disposal Trenches project via an ESD for

the Shell Disposal Trenches project. However, the date and a citation for the ESD is not provided. Because the ESD documents transfer of an area of the Section 36 BOA project, the section should be revised to reference the ESD.

e. Page 44 also discusses confirmatory soil samples and the CSV sampling. However, because the Section 36 BOA project is a remedy under construction, it is unclear why the exact number of confirmatory samples and volume of CSV is discussed. In addition, the number of samples (87 of 271) and the CSV (1,939 bcy) appear to be taken from the Executive Summary of the *Section 36 Balance of Areas Soil Remediation Project – Part 1, Construction Completion Report, Draft* (TTECI 2006b); however, EPA Comments submitted May 9, 2006 on this document pointed out that the number of confirmatory samples and volume of CSV in the Executive Summary were inconsistent with the main text. The section should be revised to delete the paragraph that discusses confirmatory samples and CSV.

f. The section indicates that a CCR has been prepared for the Section 36 BOA project and approval is expected in early 2007. However, a Draft CCR covering only part of the project has been submitted to the Regulatory Agencies and it is understood that the CCR will be revised to include the entire project. The section should be revised to discuss the status of the CCR consistent with the current CCR plans for the project.

Response:

a. The ROD standard for plugging chemical sewers is already included.

b. The requested revision has been made.

c. The requested revision has been made.

d. The requested revision has been made.

e. The language has been deleted.

f. The language has been revised to state that the CCR has not yet been prepared.

Comment 27. **Section 4.3.2.3, Pages 50 and 51.** This section describes the remedy and remedial activities for the operation of Basin A. However, the section does not discuss the unexploded ordnance (UXO) remedy or remedial activities associated with the overall Basin A remedy. The section should be revised to include the Basin A ROD remedy for UXO and discuss whether any remedial activities occurred with respect to UXO.

Response: UXO management is discussed in Section 4.5.1.3. Project specific details are not relevant to the protectiveness determinations.

Comment 28. **Section 4.3.3.2, Pages 55 through 57 and Section 4.3.3.4, Pages 59 and 60.** These sections describe the remedy and remedial activities for construction of the hazardous waste landfill (HWL) cells and identify the applicable ROD standards. However, the sections do not identify the ROD standard that the liner meet or exceed all RCRA, TSCA, and state requirements (FWENC 1996). The sections should be revised to include this additional standard.

Response: The requested revision has been made.

Comment 29. **Section 4.3.3.9, Pages 68 through 70.** This section discusses the Burial Trenches Soil Remediation Part I and Part II project. However, the description of the *Explanation of Significant Differences for Burial Trenches Soil Remediation Project, Rocky Mountain Arsenal Federal Facility Site* (Burial Trenches ESD) does not discuss the fact that 34 sites were added to the project after the ROD (TTFWI 2004a). The description of the Burial Trenches ESD should be revised to identify that 34 sites were added to the project.

Response: The requested revision has been made.

Comment 30. **Section 4.3.3.13, Pages 77 through 80.** This section describes the remedy and remedial activities for the Buried M-1 Pits Soil Remediation project. However, the standard pertaining to excavation has been omitted. The On-Post ROD identifies the Buried M-1 Pits Soil Remediation project as one of the projects to which the excavation standard applies (FWENC 1996). The section should be revised to include the excavation standard.

In addition, although the section discusses a "Treatability Study goal" in the note to the first standard, the section does not identify the ROD goal that states, "Design treatability testing to achieve a 90 percent reduction in contaminant concentrations in leachate (FWENC 1996)." The section should be revised to include the ROD goal.

Response: The requested revision has been made.

Comment 31. **Section 4.3.3.17, Pages 89 through 92.** This section describes the ROD remedy and remedial activities for the Section 35 Soil Remediation project. The last paragraph on Page 90 discusses additional CSV excavation as a result of soils exceeding acute Site Evaluation Criteria. However, this work is not documented and the Regulatory Agencies are unaware of this type of work occurring in the Section 35 Soil Remediation project. The applicability of this activity to the Section 35 project should be checked, and either documented, deleted, or moved to another section, as applicable.

Response: Sites HH-1, HH-2 and HH-3 identified in Section 1.5.2 Secondary Basins Drainage Ditch (NCSA-5b) resulted from the "Deep Acute" identification process. As such, it is appropriate to identify this CSV volume separately.

Comment 32. **Section 5.2.7, Pages 113 and 114.** This section discusses the private well network and indicates that some of the private confined flow system (CFS) wells identified in the 2000 FYRR for specific monitoring were not available for sampling during the 2000 to 2005 FYR period. The *Well Networks Update for Well Retention and Closure, Water Year 2003* (FWENC 2003b) includes these wells and indicates that the Off-Post ROD requires annual monitoring of CFS wells that are located within 500 feet of a groundwater contamination plume that originated at RMA. The implication from the 2000 FYRR and 2003 Well Networks Update is that these wells have been identified to provide important information on the nature and extent of the off-post contaminant plumes. However, because these are private wells, there is no guarantee that the wells

will be available for monitoring. RVO's response to EPA Specific Comment 98 in the Draft Final FYRR indicated that the entire network of wells will be reviewed as part of the revision to the LTMP. The section should be revised to state that approach.

Response: EPA appears to have misunderstood the purpose of the private CFS wells, which were included in the monitoring program to identify poorly constructed wells, not to determine the extent of the shallow (UFS) contamination. RVO will make an effort to get monitoring data from those wells for which this monitoring program has not be completed, but will not replace these wells. Additional information on the status of the monitoring program is provided in the revised FYRR.

Comment 33. **Section 6.2, Page 116, Paragraph 3.** This section presents the community involvement and public notification process for the FYR. The third paragraph of this section discusses how public input was solicited and concludes with an incomplete sentence about comments received during the initial public notification period. The sentence should be completed to include a reference to Appendix A, Public Comments Received and Responses to Comments.

Response: Paragraph 3 will be revised as requested.

Comment 34. **Section 6.2, Page 116, Paragraph 4.** This paragraph discusses the public notification and public comment period for the draft final report (i.e., the latest revision of the FYRR that will be released to the public) and includes placeholders for the dates for public comment and presentations to interested community organizations. The paragraph should include a reference to an appendix where public comments and responses will be presented.

Response: Paragraph 4 may only be completed immediately prior to final publication. For that reason it is being deleted for the time being and replaced with a placeholder. The reference to Appendix A will be included in the final version.

Comment 35. **Section 6.3.12, Pages 128 through 130.** This section discusses the Vegetation Management Plan and, in the last paragraph, discusses the certifications that have occurred since the Groundwater and Revegetation ESD was signed. However, these certifications occurred after March 31, 2005 and apply to soil remedies for which CCRs have not yet been submitted. Therefore, this information is not applicable to the FYR period covered by this report and should be deleted.

Response: The language remains in the FYRR as it highlights the relationship of the Vegetation Management Plan to the ESD.

Comment 36. **Section 6.4.1.1, Pages 134 through 136.** This section discusses the results of the LTMP groundwater level tracking program and utilizes the water level comparison map (Figure 6.4.1.1-1) as part of the discussion. The map is composed of the 2004 site-wide water level contours overlain onto water level contours from 1999. However, this map is very difficult to evaluate based on the map scale and the number of contours involved. EPA recommends that maps in future FYRRs should not overlay the contours between years

but should contour the difference in water table elevations between years. This water level change map would readily indicate areas where water levels have risen and lowered during the FYR period and be easier to understand.

Response: Comment noted.

Comment 37. **Section 6.4.1.2, Pages 136 through 140.** This section discusses the water quality tracking component of the LTMP groundwater monitoring program. The following are comments on this section:

a. Previous EPA comments (e.g., Specific Comment 95g on the Draft Final FYRR) regarding site-wide groundwater monitoring have indicated that the groundwater plumes appear to be attenuating near the site boundaries to a greater extent than the source areas. This is contrary to the ROD shutdown criteria for the boundary systems, i.e., the source area groundwater would clean up before the boundary area groundwater. This observation indicates that the groundwater remedy is not functioning as expected, and that a site-wide monitoring program developed around this incorrect conceptual model may not be adequate to determine if the remedy is functioning as intended. RVO comment responses indicate that water level tracking is the main component of the site-wide monitoring program and not water quality tracking. However, water level tracking will not provide data to determine if the attenuation described above is occurring. The On-Post ROD (FWENC 1996) states, "Where human health exceedances are left in place at soil sites, groundwater will be monitored as necessary, to evaluate the effectiveness of the remedy." The RVO has already established groundwater monitoring programs for these HHE source areas and these programs use water quality sampling as a component of the programs. Therefore, RVO's statement that the location of plumes near the source areas upgradient of the boundary systems is not a component of the ROD remedy is incorrect, because the plumes emanating from the HHE exceedances were used to determine the monitoring locations for these areas. The text should discuss the need to evaluate the monitoring program assumption with respect to the observed plume attenuation.

b. The section references Figure 6.4.1.2-1 that identifies the well locations for many, but not all of the wells discussed in this section. For example, Well 27171 discussed in the text is not shown on the figure. The figure should include the location of all of the wells discussed.

c. A number of wells discussed in this section are termed "information wells" or are indicated to be used for informational purposes, but neither the LTMP nor the FYR discuss this category of well. A review of the Well Networks Table in the Rocky Mountain Arsenal Environmental Database (RMAED) suggests that these wells have been assigned an LTMP category. The text should be revised to use the LTMP category name, where applicable. For wells that do not have an LTMP category, they should be assigned a category in the LTMP update.

d. The fourth paragraph on Page 136 indicates that Confined Flow System Well 23193 could not be sampled in 2004 because the well was damaged and could not be

repaired. However, this well is in the LTMP network and should be repaired or replaced. The text should identify when the well was damaged and explain why it was not replaced, and that it will be replaced in the next FYR period.

e. The second full paragraph on Page 137 indicates that n-nitrosodimethylamine (NDMA) is present in groundwater at Well 23200 and that levels have increased during the FYR period. However, the well is identified as an "informational" well and the text indicates that NDMA is not one of the indicator compounds for this well. The LTMP does not have an "informational" well category so that the data quality objectives for this well are unknown. The text should identify the LTMP category for well 23200, which is "operational" and not "informational". In addition, given that NDMA levels are increasing in this well, consideration will be given to adding NDMA to the list of indicator analytes for this well in the revised LTMP.

f. The text states that Tables 6.4.1.2-1 and 6.4.1-3 include the planned monitoring frequency and actual sampling dates for individual monitoring wells as well as any deviations from the plan. This information is not provided in the table; rather it is provided in text form. This is adequate, provided the sampling frequency and general description of the compounds analyzed is included in the introductory section (6.4.1 Groundwater).

g. The FYRR should provide a summary table listing the wells with exceedances in this FYR period for each of the COCs. This table could easily be generated with a database query listing well number, sample date, and result (if above PQL/CSRG) for each COC.

Response:

a. The RMA groundwater monitoring programs will be reviewed and evaluated during development of the revised LTMP. Contamination from the HHE exceedance areas continue to be tracked through water level and water quality tracking monitoring programs. The need to revisit the current monitoring programs is identified in the FYRR text, but the RVO does not see a need for additional discussion on this topic in the FYRR.

b. The figure has been updated to include all the wells discussed in this section. The RVO assumes that EPA intended to request inclusion of well 24171 rather than 27171.

c. The term "informational" was used to indicate that the data are collected for general trend information and do not have compliance, remedy protectiveness, or other more significant connotations. The text has been be revised to include the LTMP categories.

d. The CFS well network includes alternate wells where possible in recognition of the risk of causing deep contamination when installing deep wells in contaminated areas. According to the CFS text in the 1999 LTMP, "If any well is damaged beyond repair, it will be closed, and one alternate well will be added to the network if an acceptable substitute well is available. Alternate wells have been identified in the South Plants area. Three wells in the South Plants/Basin A area have been identified

as alternates for wells in this area in case of damage, but no such wells are available in Basin F or Basin A." Consequently, well 23193 will not be replaced.

e. The term "informational" was used to indicate that the data are collected for general trend information and do not have compliance, remedy protectiveness, or other more significant connotations. The text has been revised to include the LTMP category. The addition of NDMA to the list of indicator analytes for well 23200 will be considered in the revised LTMP.

f. The text has been revised to reflect what information is presented in the table and in the text, respectively.

g. The RVO considers the information provided sufficient for on-post water quality tracking for which no compliance standards exist.

Comment 38. **Section 6.4.1.4 Page 142**. This section discusses the NDMA monitoring program near the NBCS. The last sentence in this paragraph indicates that the 2000 Five-Year Groundwater Summary Report recommended the incorporation of this monitoring project into other existing programs. However, the text does not indicate whether this was done. The text should discuss whether this monitoring program was incorporated into the LTMP or other programs.

Response: The programs listed in the text include NDMA monitoring. A statement has been added to clarify this.

Comment 39. **Section 6.4.1.5, Pages 142 through 145.** This section discusses the off-post exceedance monitoring program. The following are comments on this section.

a. The text discusses many wells used for the off-post monitoring, but the FYRR does not provide a figure showing the location of these wells. A figure should be provided showing the location of these wells.

b. The fourth dash of the second paragraph on Page 144 indicates an arsenic exceedance is suspected to be caused by the O'Brian Canal, but no data from the canal is presented to support this position. Unless data is provided to prove the impact from the canal, this statement should be removed from the text.

c. The fourth dash in the third paragraph on Page 144 indicates that DIMP in Well 37407 was above the CSRG for two years and below the CSRG for three years. The text should specify the years that relate to the DIMP exceedances.

d. The fourth paragraph on Page 144 indicates that dicyclopentadiene concentrations exceeded the PQL in two wells within the First Creek System, but does not identify which wells. The text should identify the wells with exceedances for dicyclopentadiene.

Response:

a. A figure has been added that shows the exceedance monitoring network.

b. The statement has been removed from the text.

c. The text has been revised as requested.

d. The well information has been added.

Comment 40. **Section 6.4.2, Pages 146 and 147.** This section discusses the results of the surface water monitoring program. However, this section does not include the Off-Post ROD remedy for surface water monitoring. This section should be revised to provide the Off-Post ROD remedy for surface water.

In addition, this section references the report, *Surface Water-Quality and Water-Quantity from Selected Urban Runoff-Monitoring Sites at Rocky Mountain Arsenal* (USGS 2005), which was published by the U.S. Geological Survey (USGS). The "Summary and Conclusions" section of this report states, "The existing surface-water sampling program was not designed specifically to target storm runoff and therefore does not characterize water quality for all hydrologic regimes, most notably storm runoff. As a result, the existing data may not represent potential contaminant transport onto RMA."

The "Summary and Conclusions" section goes on to state, " These types of transient runoff [i.e., storm] events make water quality sampling difficult, and none of the sites have a safe place to sample the highest flows that occur in any given year. As a result, most of the surface-water-quality samples were collected after the flow had decreased substantially from the peak flow, which may have transported much of the chemical contaminant load through the stream. Thus, the quality of the streamflow during the initial storm-water runoff period in the First Creek and Irondale Gulch Basins is not well characterized. In addition, brief periods of high concentrations of contaminants harmful to the health of the aquatic ecosystem could occur but go undetected with the existing twice-per-year sampling regime for surface water quality."

The *Surface Water Program Sampling and Analysis Plan* (RVO 2000a) states that storm event sampling is required for four upstream sites and two downstream sites at RMA. Two of these sites (SW24002 and SW24004) are identified in the *Remediation Scope and Schedule for the Off-Post Operable Unit* (HLA 1996) for surface water monitoring. The conclusions discussed in the USGS report call into question both the adequacy of the storm event monitoring program and the representativeness of the storm event data that has been collected to date. The FYRR should be revised to discuss these aspects of the surface water program. In addition, Section 7.0 should be revised to include an assessment of the surface water program, including the manner in which monitoring of surface water during storm events affects the surface water program. In addition, the upcoming revisions to the LTMP should identify that the surface–water-monitoring program should be thoroughly re-evaluated in light of the conclusions reached in the USGS report.

Response: The requested revisions have been made. It should be noted that the USGS conclusions identified in this comment only apply to the sites upstream of RMA, and do not apply to the sites located downstream of RMA.

Comment 41. **Section 6.4.2.2, Page 149**. This section discusses an off-post area potentially affected by DIMP. The second sentence indicates that surface water in an off-post area could be affected by DIMP emanating from First Creek. However, it is generally understood that the DIMP in First Creek originates in groundwater. If that is correct, the text should be changed accordingly.

Response: The requested revisions have been made.

Comment 42. **Section 6.4.3, Page 150.** This section discusses the Biota Monitoring at RMA and acknowledges that, in all study cases to date, "studies determined and continue to support the fact that wildlife at the RMA is exposed to contaminants in the soil in some areas of the site." However, the statement that "IRAs [Interim Remedial Actions] and cleanup projects completed since 2000 appear to have broken major exposure pathways to wildlife" is not supported by citations to any specific references. Specific references should be cited to support these statements. In addition, the discussion should note that a long-term biota monitoring program will continue at RMA. In particular, a reference to and discussion of the "*Long-Term Contaminant Biomonitoring Program for Terrestrial Ecological Receptors At Rocky Mountain Arsenal, Rev 0*" (BAS 2006) should be included in this section. Although this document was just approved by the Biological Advisory Subcommittee on November 3, 2006, it has relevancy with respect to the long-term biota monitoring program. The discussion should note that the purpose of the "*Long-Term Contaminant Biomonitoring Program for Terrestrial Ecological Receptors At Rocky Mountain Arsenal, Rev 0*" is to help evaluate the efficacy of the remedy in accordance with the requirements of Section 9.7 of the ROD, i.e., that "monitoring activities for biota will continue by USFWS in support of evaluating the effectiveness of the selected remedy." The discussion should also note that the long-term biomonitoring program is just beginning, indicate its timeframe, and note that conclusions from it will be incorporated into the next FYRR. In addition, a reference to the "*Long-Term Contaminant Biomonitoring Program for Terrestrial Ecological Receptors At Rocky Mountain Arsenal, Rev 0*", including its purpose and timeframe, should be included in Section 7.2.3.5.

Response: The references are provided at the beginning of Section 6.4.3. The discussion has been revised to discuss long-term biomonitoring.

Comment 43. **Section 6.4.4, Pages 151 through 153.** This section discusses air monitoring. The section is unchanged from the text provided in the Draft Final FYRR with the exception of an additional paragraph regarding a dust event. EPA Specific Comment 58 on the Draft Final FYRR pertained to the need to discuss revisions to the Site-Wide Air Quality Monitoring Program (SWAQMP) and the reasons for those revisions because of weaknesses in the site-wide plan. RVO's response indicates that no revision to the section was necessary because of RVO's belief that revisions to the SWAQMP were proactive responses. However, EPA disagreed with that explanation in comments on the SWAQMP, Revision 1 with the result that the rationale regarding revisions to the SWAQMP was deleted from the text altogether (TTECI 2006a). In addition, it is noted that the EPA did not approve the SWAQMP, Revision 2 because of other issues with the

document (EPA 2006c). This comment also applies to Section 7.2.3.6. No revision of the text or response to this comment is required.

Response: As stated, no response required.

Comment 44. **Section 7.0, Pages 153 through 185.** The technical evaluation of treatment system performance and monitoring results provided in Section 4.0 should be summarized in this section for each of the treatment systems.

Response: The requested revision has been made.

Comment 45. **Section 7.1.7, Page 156.** This section discusses the assessment of the Section 36 BOA Soil Remediation project and states, "As an excavation project, long-term O&M is only relevant to the small portion of the project area where future cover construction is planned." However, this statement is unclear because the Section 36 BOA Soil Remediation project does not include construction of covers. The statement should be revised to state that long-term O&M is applicable to that portion of the project within the Army-maintained area.

Response: The requested revision has been made.

Comment 46. **Section 7.2.2.2, Page 162.** This section discusses the Off-Post Private Well Network and indicates that the monitoring is conducted by Tri-County Health Department (TCHD). The text should be changed to clarify that the private well monitoring is conducted by TCHD for the Army.

Response: The text has been revised as requested.

Comment 47. **Section 7.2.3.7, Page 164.** This section discusses site-wide groundwater monitoring. The following are comments on this section

a. The text indicates that the technical assessment for site-wide groundwater monitoring issues is done in Section 6.4.1. However, conclusions identified elsewhere in the document need to be included in this section to address Questions A, B and C of the Guidance. Currently, background information for some of the issues identified in Section 8.0 is not clearly developed in Sections 4.0 and 6.0, and elsewhere. Section 7.0 needs to provide a bridge between the data analysis discussed in Sections 4.0 and 6.0 and the discussion of issues in Section 8.0.

   In the case of groundwater monitoring, the guiding document for that assessment is the LTMP and any design documents that include a groundwater monitoring component. This section needs to summarize the assessment of the monitoring program and in those instances when that assessment results in the identification of issues, those issues should be identified in order to be linked to Section 8.0.

b. The expanded evaluation of the groundwater and surface water monitoring results in Section 6.0, Appendix B, and elsewhere in the document have provided significant improvement to the five-year data review required by the LTMP.

However, the FYRR is not an appropriate place to report this information given the level of detail required. Instead, EPA recommends that a separate groundwater evaluation report(s) be prepared for future FYRRs. A determination of the proper format and scope for the groundwater data evaluation report(s) should be a component of the upcoming LTMP revision.

Response:

a. Comment noted. Relevant information has been included in Section 7 as requested.

b. Comment noted. Future reporting requirements will be addressed in the revised LTMP.

Comment 48. **Section 7.3.12, Page 170.** This section discusses the assessment of the Burial Trenches Soil Remediation Part I and II project and states, "Clearly, the ROD anticipated possible UXO in a number of medium groups and subgroups at RMA, and contemplated use of geophysical methods to locate and recover these items." However, it is unclear how this explanation applies to the majority of the additional sites that were added to the project, because they were not discovered by geophysical means, but by final revegetation activities conducted by the USFWS. This section should be revised to assess the remedy in light of how these sites were discovered.

In addition, the section states, "As noted in Section 4.3.3.9, the additional sites were added. . ." However, Section 4.3.3.9 discusses only those sites added to the project during implementation and does not discuss those sites added during the design phase. As commented on Section 4.3.3.9, a total of 34 sites were added to the project after the ROD. It is unclear whether the assessment applies to all the sites added post-ROD, or only to those sites added during implementation. The section should be revised to indicate that 34 sites were added to the project post-ROD and assess the project in terms of all of the sites added to the project, not just those added during implementation.

Response: The language was modified consistent with Section 3.2 of the Burial Trenches ESD.

Comment 49. **Section 7.3.15, Page 171.** This section discusses the assessment of the Miscellaneous Southern Tier Soil Remediation project and states, "The issue was evaluated for all unbackfilled HHE excavation areas and additional sampling and excavation was performed." While that statement is true for other unbackfilled HHE excavations, it does not apply to the unbackfilled HHE excavations in the Miscellaneous Southern Tier Soil Remediation project because neither sampling nor additional excavation was conducted. This section should be revised to discuss the assessment of the unbackfilled HHE excavation consistent with the discussion in Section 4.3.3.12.

In addition, this section does not discuss the assessment of the presence of contaminated soils along the Sand Creek Lateral within the Select Perimeter deletion parcel. RVO's response to EPA Specific Comment 81e pertains to the deep acute soil, but EPA's comment was related to the discovery of the additional contamination discovered along the Sand Creek Lateral. The section should be revised to discuss the assessment of the

discovery of HHE contaminated soil along the Sand Creek Lateral in a previously deleted area.

Response: The requested revisions have been made.

Comment 50. **Section 7.4.1.1, Pages 176 to 179.** This section discusses water treatment system ARARs, TBCs, and PQL/MRLs. The following are comments on this section.

a. The section does not discuss or reference the follow-up action identified in the Five-Year Review Summary Form at the beginning of the report regarding the site-specific PQLs. This section should be revised to discuss the follow-up action for consistency in the FYRR.

b. The discussion appears to be a mixture of text from the Draft Final FYRR, interim text provided to the Regulatory Agencies on January 19, 2006, and new text. However, the text is inconsistent in many places. For example, the first complete paragraph on Page 178 states, "Table 7.4.1.1-1 also provides the initial (per the RODs) and newly adopted (as appropriate) quantitation limits for the upcoming FYR cycle." This is inconsistent with the approach for determining site-specific PQLs identified in Decision Document, DD-RMAPQL-11. The section should be revised for consistency.

c. Many of EPA's comments (e.g., Specific Comments 112, 113, and 114) on the Draft Final FYRR and on the interim text have not been fully addressed. For example, RVO's response to EPA Comment 113e states that the statement regarding ROD-specified quantitation limits has been removed from the text to reflect that RMA is working toward lowering the MRLs that exceed stated standards. However, the last sentence on Page 177 states, "As has been the case in obtaining analytical services, laboratories will be required to meet ROD-specified quantitation limits." The section should be revised in accordance with previous EPA comments submitted on September 26, 2005 for the Draft Final FYRR and on February 20, 2006 for the January 19, 2006, interim text.

d. The last paragraph (a new paragraph) on Page 176 states, "For the BANCS which is an internal system, 'PQL' is interpreted to mean the Colorado PQLs. As such, Colorado PQLs were listed in the CSRG table for carbon tetrachloride and dieldrin." However, these statements are inconsistent with the first paragraph of this section and Table 7.4.1.1-1, both of which indicate system-specific PQLs, not Colorado PQLs, are associated with the BANCS. See also subcomment j below.

e. The first and fourth paragraphs on Page 177 indicate that the PQLs are now contained under the *Colorado Interim Practical Quantitation Limit Guidance* dated March 9, 2005. However, the Colorado PQLs were removed from the regulations last year and the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division has not yet issued a revised PQL guidance document. These paragraphs should be revised to be consistent with the current status of the State of Colorado PQLs.

f. The fifth paragraph (new) on Page 177 states, "The RVO plans to re-evaluate both the programs and the procedures for establishing PQLs during the next FYR period." However, this statement is not consistent with the fact that the process for establishing PQLs has already been included in Decision Document, DD-RMAPQL-11, approved by the Regulatory Agencies on October 26, 2006. This paragraph should be revised to be consistent with DD-RMAPQL-11.

g. The sixth paragraph appears to be largely retained from the Draft Final FYRR. EPA's Comments 113b, 113d and 113e on this section and paragraph have not been addressed even though RVO's responses indicate that the discussion has been revised. It is noted that "next" has replaced "third" in the statement, "In the event that lower quantitation limits become available, adoption of these limits will be considered during the next FYR." However, that change doesn't substantively change the sentence. This paragraph should be revised according to EPA's Comments 113b, 113d and 113e on the Draft Final FYRR, should indicate that laboratories will be instructed to achieve quantitation limits lower than the CSRGs (not "in the event that lower quantitation limits become available"), and should be consistent with the October 26, 2006 Decision Document.

h. The first complete paragraph on Page 178 states, "By implementing the process identified in the 2000 FYR, the quantitation limits presented in Table 7.4.1.1-1 are implemented as of the date of the issuance of the report." As EPA Comment 124b on Section 9.1 of the Draft Final FYRR indicated, simple issuance of this report by the Army does not mean that EPA is accepting the revised quantitation limits. This statement should be revised in accordance with EPA Comment 124b on the Draft Final FYRR. Section 9.12 of this FYRR should also be revised.

i. The third paragraph on Page 178 states, "Reductions in both the dieldrin and aldrin MRLs were achieved in January 2005, but since fluctuations have previously occurred, it was decided to use a standardized approach for redefining the PQLs rather than react to method variations." However, it is unclear what standardized approach was in place in January 2005. It is also unclear how this approach was in accordance with the process outlined by the 2000 FYR. If fluctuations cause an increase in MRLs, and revisions to the MRLs are made based on those increases, such as communicated in the October 2004 letter by the Army, then the MRLs should also be revised when those fluctuations produce decreases. The January 2005 MRLs should be communicated to the EPA in a letter notifying them of the MRL change, and these MRLs should remain in effect until the quantitation limits are determined by the process outlined in the October 26, 2006 letter. This section should be revised to be consistent with those actions.

j. The fourth paragraph on Page 178 discusses the quantitation limit for carbon tetrachloride and indicates that preliminary results suggest that a MRL less than the CSRG is likely to be implemented in 2006. However, the DD-RMAPQL-11 signed by the parties on October 26, 2006 states explicitly that the reporting level for carbon tetrachloride was lowered to 0.2 ug/l, which is below the CSRG of 0.27 ug/l. This section should be revised to communicate the most recent information regarding the MRL for carbon tetrachloride.

In addition, a letter regarding notification of this lower MRL has not been received by the Regulatory Agencies. It is unclear what date the laboratory accepted and began using the revised MRL. EPA Comment 113b indicated a need for timely notification of proposed revisions to the MRLs. The RVO should submit notification to the Regulatory Agencies regarding the revision to the MRL for carbon tetrachloride.

k. The fifth paragraph on Page 178 indicates that higher quantitation limits were assigned to compounds at the BANCS because this is an internal system. EPA Comment 114j on the Draft Final FYRR indicated that the distinction of an internal treatment system is meaningless. RVO's response indicated that the point-of-compliance is the RMA boundary and therefore the Colorado PQL will be assigned. However, CSRGs are identified for the BANCS in the ROD (FWENC 1996) and MRLs should be less than the CSRGs, if possible. In addition, the 2004 quantitation limit for 1,2-DCA at the BANCS was 0.299 ug/l, which is less than the CSRG of 0.4 ug/l. The section should be revised to indicate that site-specific quantitation limits will be applied at the BANCS.

Response:

a. The requested information has been added.

b. Until the new procedure has been established and the PQL studies have been conducted, in accordance with the October 26 Decision Document, the current ROD requirements and the approach established in the 2000 FYRR apply.

c. The text has been revised to reflect the current approach and path forward.

d. The On-Post ROD, Table 9.1.4, established different and higher PQLs, for BANCS, because it is an internal system.

e. It is true that the State PQL Guidance is under revision and that State PQL values may change. However, the Current Interim Guidance and PQL values should be used as TBCs until a replacement document and values are available.

f. The text has been revised to reflect the agreement in the Decision Document.

g. The text has been revised to be consistent with the Decision Document and laboratory practices and quality requirements.

h. Comment noted. Please refer to response to Specific Comment 50 b.

i. The standardized approach refers to the need to establish a procedure that follows industry practice as has been agreed to through the Decision Document.

j. The lower carbon tetrachloride value was achieved after the cut-off date for the FYRR, but a footnote has been added to the table to clarify this. .

k. The distinction between boundary and internal systems with regard to PQL values was established in the ROD. Further evaluation of the systems and the PQLs will be included in the next FYRR after the new RVO procedure has been implemented and new State PQL Guidance is in place.

Comment 51. **Section 7.4.1.2, Pages 180 through 181.** This section discusses ARARs for the containment and treatment systems. However, the section does not discuss whether these changes affect the protectiveness of the remedy. The first paragraph in Section 7.4 indicates that there are no significant changes to the assumptions used at the time of the remedy selection that call into question the protectiveness of the remedy, but this statement does not appear to pertain to ARARs.

RVO's response to EPA Specific Comment 115 states, in part, "Because there is no consumption of groundwater, the remedy remains protective." However, this statement is not supported in the FYRR. Engineering and institutional controls are not the only protectiveness elements of the On-Post and Off-Post RODs; the containment and treatment systems were required to treat COCs to CSRGs, which often corresponded to an ARAR. The section should be revised to discuss the protectiveness of the remedy with respect to the change in ARARs, in particular with respect to whether each treatment and containment system can meet the new ARARs. Any discussion of whether consumption of groundwater occurred, beyond those statements pertaining to the engineering and institutional controls that are in place, should be supported with documentation. In addition, RVO's response to EPA Specific Comment 115 should be revised to be consistent with the revisions of this section.

In addition, Section 7.4.1.2 includes a discussion of the LWTU and states that the protectiveness appears adequate. However, this discussion is inconsistent with RVO's response to EPA Specific Comment 116b. RVO's response to EPA Specific Comment 116b should be revised to be consistent with the discussion provided in Section 7.4.1.2.

Response: These sections have been revised to discuss changed ARARs, impacts on treatment system performance and any impacts on remedy protectiveness. During the course of the FYR evaluation no evidence indicating actual or potential consumption of groundwater was identified. The Army does not believe it is necessary to prove a "negative". For that reason, no change to the Army response to EPA Specific Comment 116b is required. For further discussion, see the response to Comment #56.

Comment 52. **Section 7.4.6, Page 184.** This section discusses the changes in exposure assessment variables. However, there is no discussion of the change, or potential change, in property use that deletions and property transfers have had on the exposure assessment. Section 4.5.2.1 regarding the Western Tier Parcel deletion indicates that the impacts of the change in land use on exposure pathways will be assessed in a general sense in Section 7.4.6. The section should be revised to discuss the assessment of the deletions and property transfers on the exposure assessments.

Response: The requested revisions have been made.

Comment 53. **Section 8.0 Issues**. This chapter should include subsections for the on-post and boundary groundwater systems and recommend clarifications to the systems' objectives and development of specific performance criteria.

Response: The need for system performance objectives and criteria have been included as part of the Monitoring Networks issue.

Comment 54. **Section 8.1, Page 186.** This section discusses the issue of the Basin F Wastepile not operating as designed. The third sentence states, "The[re] is no evidence that the secondary sump system is leaking." Conclusive evidence of the functioning of the secondary sump system will not be apparent until the Basin F Wastepile Excavation Project is completed and the sumps are excavated. This statement should be revised to indicate that currently there is no evidence that the secondary sump and liner are leaking, but soils beneath the secondary sump system will be monitored for leaks during the Basin F Wastepile Excavation Project and reported in the next FYRR. In addition, this section states that because the remediation project began during preparation of the FYRR no follow-up is required. This is inconsistent with the *Guidance* and the summary in the technical assessment, Question A, found in Section 7.2.3.12, which correctly states that the Basin F Wastepile operation will be included in Section 8 of the next FYRR for closeout of this issue. Section 8.1 should be revised to make the statement that the Basin F Wastepile operation will be included in the next FYRR.

Response: The requested revisions have been made.

Comment 55. **Section 8.2, Page 186.** This section deals with off-post well security. However, the lack of timely maintenance and security is a broader issue than identified in the discussion. The title of this issue should be changed to "Monitoring Well Maintenance and Security." The issue should be expanded to identify that during site inspections, a number of wells both on-post and off-post were observed to have been damaged and were not repaired in a timely manner. In addition, a significant number of off-post wells that were supposed to be secured with locks did not have locks and/or the protective casing could not be secured due to damage.

Response: The Army has included Well Maintenance and Security as an issue in the FYRR and will ensure that such issues are corrected in accordance with RMA policies and procedures in the next FYR period. Inspections of off-post and on-post monitoring wells will be conducted and reported in accordance with the revised LTMP.

Comment 56. **Section 8.4, Page 186.** This section discusses site-specific PQLs and states, "Because there is no consumption of contaminated surface water or groundwater associated with RMA, the establishment of site-specific PQLs does not affect the current or future protectiveness of the remedy." However, the On-Post and Off-Post RODs identify CSRGs for the COCs that are based on ARARs or risk assessments. The RODs do not depend solely on ICs to ensure protection of human health and the environment. The section should be revised to consistently indicate that protectiveness may potentially be impacted by having MRLs greater than the CSRGs.

Response: The RVO disagrees that protectiveness may potentially be impacted where PQLs are greater than CSRGs or CBSGs. Just because a PQL exceeds a CSRG/CBSG does not mean that it is not protective. For example, CBSGs are risk-based and based on an

incremental lifetime cancer risk of 1 x 10^{-6}. PQLs up to 100 times the CBSG would still be within the EPA acceptable risk range of $10^{-4}$to 10^{-6}.

When a PQL (approved by the Water Quality Control Division) exceeds a CBSG, the PQL becomes the basis for any regulatory action (5 CCR 1002-41.5.C.3, Table A, footnote 4). Since the current RMA PQLs are all within the acceptable risk range, there is no impact on protectiveness if PQLs are used to determine when remedy goals have been met.

Institutional controls are in place to prevent exposure until the CSRG/CBSGs are attained. The groundwater remedy as it currently exists is therefore protective. When either the CSRG/CBSG or the PQL is attained, institutional controls can be removed and the remedy will remain protective.

Comment 57. Section 8.11, Page 188. This section discusses the issue involving changes to monitoring networks. The first paragraph in this section discusses damaged Army wells, which have resulted in changes to the off-post monitoring network. The second paragraph indicates that these changes did not affect the RVO's ability to track and map the plumes. However, this conclusion is not fully supported by the FYRR. The text should be expanded to provide the rationale for this conclusion or clearly identify where potential weaknesses in the monitoring program may exist due to the reduced well monitoring network.

Response: A statement regarding the shrinking plumes off post has been added as further explanation to the text, which already refers to the revised off-post monitoring network that was accepted by the regulatory agencies in 2003.

Comment 58. Section 8.12, Page 189. This section discusses the OAR schedule issue. The following are comments on this section:

a. The text indicates that the lack of timely preparation of the OARs is an issue due to regulatory concerns. However, the untimely completion of these reports is an issue because the *Remediation Scope and Schedule for the Off-Post Operable Unit* (HLA 1996) states that the OARs will be "published in the year following the reporting period." The text should be changed to correctly identify the issue.

b. The text also indicates that the delays did not affect protectiveness determinations because the operational data in the OARs are provided to the regulatory agencies at monthly status meetings. However, only average flow rates for the treatment systems are provided to the regulatory agencies at monthly status meetings. The text should be corrected to indicate that, to date, the monitoring data has not been presented to the regulatory agencies in a format other than the OARs.

Response:

a. The text has been changed to correctly identify the issue based on the RS/S schedule.

b. While the handouts provided in monthly status meetings focus on flow rates, any contaminant problems and operational issues are also addressed in these meetings or working sessions. Additional documentation of this information is provided to the regulatory agency representatives when requested.

Comment 59. **Section 8.14, Page 189.** EPA's Specific Comment 120 on the Draft Final FYRR cited the *Guidance* for the information to be provided in Section 8.0. Subparagraph 3 of this comment stated that, per the *Guidance,* a discussion should be included of unresolved concerns or items raised by support agencies and the community. Section 8.14 states that there are no concerns; though it is obvious that the information to support this statement is not yet available. Presumably, this is a placeholder statement and will be updated once the comment resolution process with the regulatory agencies is completed and public comments are received on the draft final report. Appendix A of Volume I and the Appendices in Volume III should also be updated to discuss the comment resolution, and Section 8.14 updated to identify unresolved concerns.

Response: Agreed.

Comment 60. **Section 9.1, Page 189.** This section discusses follow-up actions for the off-post monitoring well security issue. The summation of this issue should be expanded to include off-post and on-post well maintenance issues as discussed in the comment to Section 8.2. The conclusion in the last sentence in Section 8.2 should be retained with the addition of "on-post monitoring wells."

Response: It is not RMA policy to lock on-post wells, so the requested addition to section 8.2 has not been made. The Army will ensure that the well maintenance and security issues are corrected in accordance with RMA policies and procedures in the next FYR period. Inspections of off-post and on-post monitoring wells will be conducted and reported in accordance with the revised LTMP.

Comment 61. **Section 9.9, Changes in Monitoring Networks, Page 191.** This section discusses follow-up actions for the changes in monitoring networks. The follow-up discussion should consist of the first two paragraphs only, and the proposed criteria should be removed from the discussion because the criteria will be determined during the revision of the LTMP. In addition, a limited program of upgradient monitoring (for chloride and sulfate as well as other COCs) is needed to support system shut-off considerations. The locations and frequency of this type of monitoring should be evaluated in the revised LTMP.

Response: This section has been revised to focus on the key elements of the LTMP evaluation, which will include any considerations related to shut-off monitoring needs.

Comment 62. **Section 9.13, Page 192.** This section discusses ARAR changes and indicates that the ARAR changes become applicable as of the date of the issuance of this report. However, ARARs are a component of the On-Post and Off-Post RODs and the FYRR cannot make

a change to the RODs. The section should be revised to indicate that a Fact Sheet will be prepared to document the change in ARARs.

Response: See response to Comment 19.

Comment 63. **Table 2.0-1.** This table shows the chronology of ROD-related events. The dates shown for the ESDs are the dates of the ESD, not the date that the ESD was signed. The effective date of the ESD is the date of signature, not the date of the document. The table should be revised to provide the effective date of the ESD.

Response: The requested revisions have been made.

Comment 64. **Table 7.4.1.1-1.** This table presents the proposed updated quantitation limits for the water treatment systems. However, the table has not been revised to reflect the current status of the PQLs and Decision Document DD-RMAPQL-11 for determining site-specific PQLs for all treatment systems. The table should be revised to reflect the current status of the approach for setting PQLs at RMA. In addition, the following are specific comments on this table:

a. The table shows a column for 2005 quantitation limit. However, this limit is a proposed limit. The last notification received by EPA regarding quantitation limits was the Army letter of October 12, 2004 (Army 2004). The table should be revised to show the latest quantitation limits for which the Regulatory Agencies have received notification.

b. The table shows that some quantitation limits are based on the Colorado PQLs. However, CDPHE currently does not have guidance regarding PQLs. Therefore, Colorado PQLs should not be shown on the table.

c. The table shows quantitation limits for carbon tetrachloride at the NBCS, OGITS, BANCS, and CERCLA Wastewater Treatment Unit (WWTU); and 1,2-DCA at BANCS and CERCLA WWTU that are greater than the CSRGs. However, it has been understood that MRLs less than the CSRGs have been achieved for these compounds. The table should be revised or footnoted to indicate that MRLs less than CSRGs have been achieved for these compounds during the comment resolution process on the FYRR.

d. The table shows quantitation limits greater than the CSRGs at the NWBCS, NBCS, OGITS, BANCS, and CERCLA WWTU for one or more of the following compounds: aldrin, dieldrin, and n-nitrosodimethylamine (NDMA). However, there is no indication that a process for determining site-specific PQLs has been approved. A footnote should be added that identifies the October 26, 2006 Decision Document, DD-RMAPQL-11.

e. For the CERCLA WWTU, the table shows compounds (1,2-dichloropropane and vinyl chloride), in addition to those discussed in subparts c and d of this comment, with PQLs greater than the CSRGs. The applicability of the State of Colorado PQLs to these compounds will need to be resolved during the next FYR period.

Response:

a. In accordance with the approach established in the 2000 FYRR, this document is used to re-evaluate and update the site-specific PQLs, so no revisions to the table are necessary.

b. Please refer to response to Comment 50e regarding Colorado PQLs.

c. The reductions in the MRLs for carbon tetrachloride and 1,2-DCA occurred after the cut-off date for the 2005 FYRR so a footnote has been added to the table to clarify this.

d. A footnote reference to the PQL Decision document has been added to the table.

e. Comment noted.

Comment 65. **Figure 4.0-4.** This figure shows the operating remedy projects as of March 31, 2005. However, the scale of the figure is not sufficient to show all elements of the operating remedy identified in the legend, principally because of the inclusion of the off-post monitoring network. The figure should be revised to adequately show the operating elements of the on-post remedy and an additional figure should be provided for the off-post components of the operating remedy projects.

In addition, it appears that the line symbols for NWBCS and NBCS for recharge trenches 61 and 62 respectively are color coded opposite to the triangular well system. The color coding for the trenches and wells for the NWBCS and the NBCS should be checked and revised as appropriate.

Response: Comment noted.

Remediation Venture Office's (RVO) Responses to
Tri-County Health Department's (TCHD)
September 27, 2005 Technical Comments on the
Draft Final Five-Year Review Report

GENERAL COMMENTS

Comment 1. Root Cause of Deficiencies Associated with Off-Post Monitoring Wells

During FYR inspections, the inspection team found four off-post monitoring wells that were not locked. The draft report includes a recommended follow-up action to either repair and lock these wells, or abandon them in accordance with established procedures. The report doesn't include an explanation for this deficiency, e.g. vandalism or failure of groundwater sampling personnel to properly lock the well following sampling. If the deficiency occurred because of the latter, TCHD recommends that the FYR include a recommendation to provide additional training for sampling personnel regarding RMA sampling protocols. Please provide appropriate clarification regarding the cause of this deficiency throughout the document.

Response: The four wells found not to be locked were originally on-post wells, which therefore did not have locks. However, as a result of moving the fence line, these wells became off-post wells that needed locks. Locks have been added to these 4 wells since the inspection was performed and this explanation has been added to the text in the revised FYRR.

Comment 2. Proposed Enhancement to the Off-Post Well Notification Program

The Off-Post ROD includes the use of institutional controls. The objective of these controls is:

"Prevention of the use of the groundwater underlying areas of the Off-Post OU exceeding groundwater containment system remediation goals."

The Remediation Scope and Schedule for the Off-Post OU provides further specifics on the implementation of institutional controls. The primary mechanism for implementing the institutional controls is a well notification program developed in conjunction with the Colorado Department of Natural Resources State Engineer's Office (SEO) and RMA.

Under this program, the Army provides the SEO with maps identifying areas in the Off-Post Study Area where groundwater could potentially exceed CSRGs. The SEO is then asked, as it processes well permit applications, well permits, and/or drilling permits within the areas delineated on the map, to place a notification statement on the well permit applications.

The first FYR concluded that the well notification process had not been completely effective, e.g. notifications were not included on all well permits issued in the notification area. To improve the process, the following recommendations were made:

- The RVO would set up meetings with SEO staff to review the status of the notification program and determine if correspondence associated with applications included the proper notification.

- The SEO would provide the Army and TCHD copies of all well applications for the potentially affected area.

- At the Army's request, TCHD would make contact with well applicants to provide a detailed explanation of the nature and extent of groundwater contamination in the area.

Following inclusion of these recommendations in the first FYR, representatives of the RVO and TCHD met with personnel from the SEO on July 31, 2001. The purpose of the meeting was to update the SEO on the results of the first FYR related to the institutional control program, provide a new map for the notification area, and to review the list of agencies and individuals who should receive copies of permits, e.g. the Army, EPA, and TCHD. The meeting was followed up with an August 28, 2001 letter to the SEO summarizing the discussions and formally transmitting the 1999 CSRG Exceedance Map, a map of the notification area, and the list of personnel from the Army, EPA, and TCHD to be copied on well permits issued in the notification area.

From a recent review of permits issued in the most recent notification area, TCHD found that:

- Over 90 permits had been issued since the first FYR. Most of the permits were for monitoring wells.

- The notification agreed to by the Army and the SEO in July 2001 was only found on three denied applications and on four well permits.

- The SEO does not appear to be following a standard procedure for transmitting copies of all well permits to the Army, EPA, and TCHD.

Discussions with representatives of the SEO lead TCHD to believe that the difficulties with the notification process are the result of staff turnover in the SEO. The SEO indicated a willingness to modify internal procedures to assure that the well permit notification program is appropriately implemented.

Based on this evaluation, TCHD has concluded that the SEO is not including the agreed upon notification on all well permits issued in the notification area and copies of permits are not routinely being transmitted to all parties. To address this situation, TCHD recommends:

- The SEO not be responsible for transmitting copies of well permits within the notification area.
- Under its existing Memorandum of Agreement with the Army, TCHD assume the task of obtaining and reviewing well application and permit data in the notification area.
- Under this new recommended procedure, TCHD would do the following:
- Four times per year (once per quarter), TCHD will make a formal request to the SEO office for copies of well permits issued in the well permit notification area.
- TCHD will review each permit to determine if the appropriate notification has been placed on the well permit and evaluate if the well user is or may in the future be extracting and using groundwater that exceeds CSRGs. If notifications are not being placed on well permits issued in the notification area, TCHD in conjunction with the Army will work with the SEO to address the deficiencies in the notification process.
- Notify the RVO, EPA, and CDPHE if a well permit is issued near an existing plume. Place the well on the next sampling schedule and provide notification if the groundwater exceeds CSRGs.
- When warranted, make individual contact with the permit recipient to provide a detailed explanation of the nature and extent of groundwater contamination in the off-post area.

TCHD recommends that Section 5.2.2 of the draft report be modified to more clearly address the ongoing difficulties with the well notification program since the first FYR. In addition, we recommend that Section 7.1.3 include a discussion of this component of the remedy and that Section 9 address the changes recommended above.

Response: The RVO agrees with the proposed change in procedure, which has been included in the Final FYRR.

SPECIFIC COMMENTS

Comment 1. Section 3.0 Background

The last sentence of this section indicates that Section 7.1.6 of the draft report assesses the institutional controls identified in the Off-Post ROD. It appears that Section 7.1.6 only address on-post institutional controls. Please clarify.

Response: The Final FYR text specifically identifies Off-Post Institutional Controls in the Background provided in Section 3.0 and cross-references the reader to the assessment in Section 7.2.2.3.

Comment 2. Section 4.1 Remedy Selection – On-Post OU

TCHD found this section confusing in that some of the project descriptions simply describe the ROD identified remedy whereas other descriptions include a project status in addition to the remedy description. TCHD suggests that the section be revised for consistency.

Response: The text has been substantially revised to include consistent information in accordance with the Final EPA Guidance.

Comment 3. Section 6.4.1.4 Exceedance Monitoring

To our knowledge, the 2004 exceedance map has not yet been finalized or provided to the SEO. If the map is not finalized prior to issuance of the final FYR report, this section should be modified accordingly.

Response: As noted in the Section 5.2.2 of the Final FYRR, the exceedance map was finalized and sent to the SEO in November 2005.

Comment 4. Section 6.4.2 Biota Monitoring

Should this section address the deer study currently being conducted by the USFWS?

Response: The text and references in Section 6.4.3 of the Final FYRR provide a general assessment of the ongoing USFWS biota monitoring activities.

Comment 5. Section 7.1.3 Ongoing Projects Private Well Network

TCHD recommends that the following information regarding the Private Well Network be included in this section:

"Private Well Network (Table 3 -#96)

The Private Well Network program is administered by TCHD via a Memorandum of Agreement with the Army. Under this program, TCHD samples private wells and surface water sources in the off-post study area. Each year, sample locations are selected based on the criteria listed in Section 3.3.8.4 of the Long Term Monitoring Plan for Groundwater (Foster Wheeler 1999). The objectives of this sampling effort are to:

- Provide data to assist in refining the CSRG exceedance area

- Sample new wells installed in the off-post area as required by the Off-Post ROD (HLA 1995)

- Sample existing wells in response to citizens requests

In addition, TCHD samples surface water discharges from gravel operations, and maintains a database with demographic information regarding private wells in the CSRG exceedance area.

Annually TCHD prepares and provides a candidate sampling list (CSL) for RVO, EPA, and CDPHE review. After receiving and incorporating comments, the CSL is finalized. Sampling of approximately 50 wells takes place each summer. Private well samples are taken with the permission of the well owner. TCHD samples the wells on the CSL and the private wells recommended for sampling in the first FYR unless:

- The well has been taken out of service as a result of connection to a public water supply or development in the area where the well is located.

- TCHD is unable to make contact with the well owner to obtain permission to sample.

- The property owner denies access.

As new demographic information and the water quality data become available in the area of interest, it is entered into TCHD and RVO Environmental Databases. Approximately 250 wells and surface water sources have been sampled under this program since the last FYR. The results of the program are provided annually by TCHD to the RVO, EPA, and CDPHE.

In conclusion, the Private Well Network program is functioning as intended and is meeting the objectives outlined above."

Response: The information provided by TCHD has been included in the Final FYRR.

Comment 6. Section 7.1.3 Ongoing Projects Off-Post Institutional Controls

The first FYR included a discussion in this section to answer Question A relative to the Off-Post Institutional Control Program. TCHD recommends that the second FYR include a similar discussion. Please see General Comment 2 for TCHD's assessment of the operation of the SEO's implementation of the well notification process that is the key component of the institutional control program.

Response: The Off-Post Institutional Controls are assessed in Section 7.2.2.3 of the Final FYRR.

Remediation Venture Office's (RVO) Responses to Tri-County Health Department's (TCHD) December 6, 2006 Technical Comments on the Final Five-Year Review Report

GENERAL COMMENTS

Comment 1. Although Tri-County does not normally comment on other agency response to comments. However one potential area needing additional clarification may be in volume III, pages 87 to 90. TCHD supports the RVO's offer to discuss the on-post 1994 plume map with the EPA but believes that the other agencies should be involved and that the subject of what the groundwater status is expected to look like at the time of remedy completion should be in the main topic. In addition, the basis for deleting on post groundwater plumes from the NPL should also be discussed.

Response: The tracking of on-post groundwater contamination will be addressed through the LTMP and when groundwater deletion becomes a possibility it will be discussed at the appropriate levels and include the appropriate parties.

Comment 2. Since the referenced comment and response may represent differing views of the intention of the ROD, it would seem like longer-range discussions would be beneficial are needed.

Response: The SEO procedure reflected in the 11/06 Final FYRR is that recommended by TCHD in the September 2005 comments with later revision. The implementation of the program during the current five-year review period will be addressed in the third FYRR, due in 2010.

SPECIFIC COMMENTS

Comment 3. Vol. 1, page xxii, On-Post Operable Unit: Notwithstanding the good work in modifying this 5YRR, TCHD believes that dieldrin migration is not controlled at the NBCS fenceline. TCHD does not believe this lack of control affects protectiveness of but does not meet remedy requirement. Can this be clarified and addressed in other portions of the document?

Response: The reasons for the presence of elevated levels of dieldrin downgradient of the NBCS are explained in detail in Appendix C of the FYRR, which provides documentation that addresses concerns that were raised regarding the Draft FYRR. As discussed and agreed with the regulatory agencies in working sessions in 2006, the chemical and hydrogeologic data for this area indicate that bypass is not occurring.

Comment 4. Five-Year Review Summary Form, page 3 of 5, Extraction Well…: TCHD suggests reviewing and potentially deleting the last portion of this paragraph. It does not seem necessary to prejudge outcomes and the consideration of upgradient/downgradient wells in the shut-off decision seems to be different

than the shut-off criteria quoted from the On-Post ROD on page 7. Please review

Response: Comment noted.

Comment 5. Five-Year Review Summary Form, page 4 of 5, State Engineer's Office…: TCHD would suggest the following wording: "Administrative changes made by the SEO during FY 2006 have resulted in the effective implementation of the Well Notification Program. The RVO and TCHD have confirmed that the SEO implementation is effective and TCHD will continue to audit the program on a quarterly basis and provide reports to the Water Team.

Response: The implementation of the revised TCHD/SEO oversight program during the current five-year review period will be addressed in the next five-year review period.

Comment 6. Page 1, Introduction: Even though the Introduction does not mention deletions, it seems like it should be more definitely stated that the FYR includes deleted areas. This may be implied by the first sentence of the 5th paragraph but should be ore clearly stated prior to the deletion discussion in Section 2.

Response: As stated in the 1st paragraph the Five Year Review is performed for areas where unlimited use and unrestricted exposure is not allowed due to remaining contamination. As such, the FYR is only conducted on a very small portion of the deleted areas that remain within the jurisdiction of the USFWS. None of the areas sold or transferred to outside parties (e.g. Western Tier Parcel and 100-ft strips) are subject to FYR.

Comment 7. Page 3, Selected perimeter Area and Surface Deletion Area: This section raises questions relating to General Comment 1.

Response: See response to General Comment 1.

Comment 8. Page 4, Sec. 2.1.3, Internal Parcel: Can this section be re-evaluated? Figure 3.0-1 (referenced in the next paragraph) does not show the Internal Parcel but includes the previous deletions. Since this deletion is outside the FYR time period, an argument could be made for omitting this section. Since it does not correspond to Figure 3.0-1, yet represented such a major deletion, perhaps a clarifying statement could be added in the paragraph or on Figure 3.0-1 or both.

Response: Section 2.1.3 is included as general information so that the public will not be confused by media reports occurring after the close of the FYR period. This is consistent with the statement in the 4th paragraph of the introduction.

Comment 9. Page 6, 2nd paragraph on page: The statement that Table 2.0-2 lists forecasted start dates for projects that have not yet begun is not accurate and should be modified. This seems to be an area that has not been updated as one might expect upon reading the last sentence in the 4th paragraph on page 1. This is

confusing since some information is updated (Internal Deletion) and some is not (Table 2.0-2).

Response: The forecast start dates provided in Table 2.0-1 are used as the basis to assign projects to one of the categories: Not Yet Begun; Under Construction; Operating; or Completed. This status was assigned as of March 31, 2005 and has not been changed to avoid constant, significant changes to the FYRR during the evaluation.

Comment 10. Page 6, 4th paragraph: Will O&M costs continue to be omitted from future 5YRR or are steps being taken to make O&M costs part of the process as suggested by EPA guidance

Response: O&M Costs have been included in the revised FYRR.

Comment 11. Page 7, 1st paragraph: Doesn't the first quoted section indicate that the dieldrin plume emanating from the RMA at the NBCS does not meet the RAO for groundwater?

Response: There is no indication that RAOs are not met. Please refer to response to Specific Comment 3.

Comment 12. Page 18, Sec. 4.1.2.8, NBCS #62: The purpose of the system is stated in the first and second paragraphs. The 4th paragraphs states that the "Contaminant plumes migrating toward the NBCS were effectively contained." TCHD believes that the authors and signators to the On-Post ROD assumed that the specified containment system would, over some unspecified time, prevent contamination from spreading off-post. This would leave the OGITS to clean up the off-post contamination. To date, this contamination gap has not occurred and operational changes have not been undertaken to ensure that ..."off-post migration of contaminated groundwater..." does not occur. By not taking steps to half off-post contaminant migration, the operating life of the OGITS system is being extended. Appendix B is a justification to show that the containment system is intact, but it also seems to show why system modifications need to be considered and implemented. TCHD believes that there is no public health risk involved but remedy compliance with respect to the NBCS is not being met and that greater attention should be placed on this issue.

Response: Please refer to response to specific comment 3 regarding documentation that demonstrates that there is no evidence that NBCS is not in compliance with the ROD.

Comment 13. Page 26, Section 4.2.1.1, OGITS: TCHD applauds the clarification of the OGITS purpose but believes that there should be a different operating philosophy between a containment system and a amass removal system. Without adopting a different operational mode along with the more clearly stated definition, nothing has really changed and the RAO of "mitigating migration of contaminants in alluvial groundwater as soon as practicable" is not being effectively implemented. This should go hand-in hand with the previous

comment. Also, TCHD believes the mass removal estimates shown in Table 4.2.1.1-1 should be shown yearly as is presented in the OARS. This would be more clear and informative.

Response: During the summer and fall of 2006, the RVO worked with representatives from TCHD, EPA, and CDPHE to develop specific performance goals for the RMA and containment systems. These recommendations are described or referred to in Sections 7, 8, and 9 of the Final FYRR. With regard to the mass removal estimates, the OARs, as indicated, serve the purpose of presenting information annually, while the FYRR evaluates and compares performance during five-year review periods.

Comment 14. Page 29, last paragraph of Section 4.2.1.2" The number of wells and surface water sources sampled may have been overstated. TCHD takes approximately 35-40 samples each year but these wells and water samples are generally the same each year. The number 250 may convey a broader well sampling population than is actually being sampled. Also the last sentence on the page appears incorrect and should be deleted. The sampling was not discussed in the TCHD memo dated October 3, 2005.

Response: While it is true that fewer wells are sampled on an annual basis, the number provided is the number on record for the entire FYR period. The text has been revised to clarify that the sampling was conducted later.

Comment 15. Page 111, last part of 2nd full paragraph: Although all of this is true, it is outside of the FYR period.

Response: The 2005 and 2006 references were included because they address information from the FYR period.

Comment 16. Page 127, partial paragraph at top of page: The reference to basements reminds TCHD that the EPA conducted an updated assessment for the vapor pathway route of exposure sometime during the FYR period. While we are not sure if or where any reference belongs in this report, it does show that the original risk assumptions have been checked in this particular instance.

Response: Please see Section 7.4.7.

Comment 17. Page 138, 1st complete paragraph: It is not clear to TCHD how or why the shutdown of the NWBCS Southwest extraction system is dependent upon anything except the dieldrin concentration in the extraction well. While the logic may be sound to consider monitoring wells, the ROD authority stated on page 7 seems clear that the decision is on the extraction well. TCHD suggests that the mechanism for changing ROD requirements should be followed rather than circumvented as seems apparent under Extraction Well....On page 3 of 5 in the Five-Year Review Summary Form.

Response: Revisions to the shut-off monitoring requirements and procedures are being considered as part of the LTMP. The RVO wants to make sure that additional contamination is not migrating toward the system before shutting it down.

Comment 18. Page 143, last item on page: TCHD believes that the dieldrin situation at the NBCS deserves greater attention and investigation notwithstanding the conclusions reached in Appendix B.

Response: Comment noted. The RVO will continue with the system-specific and site-wide groundwater monitoring programs, but based on documentation provided in this FYRR and the agreements reached in working sessions with the agencies, there is no need for any specific dieldrin investigation.

Comment 19. Page 145, Sec. 6.4.1.6 Private Well Network Monitoring #96: Please expand the second paragraph to say discharges "...to the South Platte..." and that the samples are analyzed for DIMP only. Also in the next to the last section in this paragraph, please change the 250 wells to the language used on page 29. See specific comment 14.

Response: The requested revisions regarding discharge and analysis have been made.

Comment 20. Page 160, Section 7.2.1.6: TCHD believes this section on the NBCS is overly optimistic in its viewpoint and that the NBCS and the dieldrin plume which continues to emanate from the RMA (for whatever reason) warrants increased attention and focus. TCHD believes the questions in the front of this section need to be more specifically justified for this issue.

Response: Please refer to responses to comments 3 and 18.

Comment 21. Page 162, Sec. 7.2.2.3: In this section, TCHD would recommend that the review of permits states in the first sentence be dated October 2005 and that the word "known" be inserted between "no" and "exposure" in the second paragraph since one domestic well has not bee sampled due to lack of owner permission. Listing the issue in Section 8 seems fine but there should also be the mention somewhere that the SEO has changed policies and that everything is functioning well as recently verified by TCHD and the RVO.

Response: As stated in responses to Comments 2 and 5, the revised SEO oversight program will be evaluated in the next FYRR.

Comment 22. Page 192, Section 9.11 State Engineer's Office ...: TCHD recommends a modification to this section since the system is currently working. Proposed language: "Based on TCHD's findings that the SEO did not comply with the agreed upon notification process, TCHD held a meeting with the SEO at which time administrative changes were put in place. Since that time, the system ahs been working with the proper notification being placed on the well permits and copies transmitted to TCHD and other involved entities. To maintain the currently working system, the following will occur:

- TCHD will audit the well permits 4 times per year issued in the notification area to see that the notification has been included and they have been appropriately sent out.
- TCHD will plot each received well permit on an Exceedance Map to see more precisely where the well is expected to be drilled within the notification area.
- TCHD will notify the RVO, EPA, and CDPHE if a well permit is issued near an existing plume. If so, TCHD will notify the driller and well owners as to the proximity of the plume.
- Prior to the annual private well sampling event, TCHD will attempt to determine from the SEO, which permits have been drilled and what wells may be available and of interest for sampling. Appropriate wells will be added to the candidate-sampling list.

Response: Please refer to response to comment 21.

FIGURES

Comment 23. Figure 4.0-4 would seem to overstate the Private Well Network. How current is this data? It might be more appropriate and informative to show the wells within the SEO area of notification

Response: Comment noted. The map is intended to give a general overview of the extent of the RMA remedy. The well information has been reviewed and updated.

Comment 24. Figure 6.4.1.5-1 is significant and useful map but TCHD also believes that a similarly constructed dieldrin plume map would be informative. In addition a 2004 CSRG plume map would also be informative.

Response: Since the CSRG exceedance maps are published and made available to the public as separate deliverables, they are not included in this report. The DIMP plume is included because its footprint was used to develop the IC components of the off-post remedy.

MINOR GRAMMATICAL

Comment 25. Vol. 1, Page 1, Table of Contents: 4.3.1, 4.3.2, and 4.3.3 could have parallel or consistent headings. This could apply to 4.4.1 etc. also. Also, could 6.3.7 (DIMP Investigation) be renamed so that it is identified with the HWL?

Response: The Section headings are consistent with the RDIS and the project titles used during remedy to the extent practical.

Comment 26. Five-Year Review Summary Form, page 2 of 5, Northern Pathway System Modifications. The word "Intermediate" should be used ahead of Conceptual Design Document to be consistent with the bibliography. This also true in the 3rd complete paragraph on page 27.

Response: Text has been corrected to include "Intermediate".

Comment 27. Page 30, 1st full paragraph: "Lead" should probably be "led."

Response: The text has been corrected as suggested.

Comment 28. Page 112, paragraph above Sec. 5.2.4: Despite the vagueness of this paragraph, TCHD believes that the acronym RMA should be examined here and in other parts of the document. The responsible entity would be more explicitly stated if Army or RVO could be used instead.

Response: Comment noted.

Comment 29. Page 115, 1st full paragraph: Section 6.3 lists 14 documents, not 10.

Response: The text has been corrected to reflect the correct number of documents.

Comment 30. Page 116, next to the last paragraph: Please fill in the date.

Response: Comment noted. Date will be added when it has been set.

Comment 31. Page 116, last paragraph: Again there are 14 documents listed, not 12.

Response: The text has been corrected to reflect the correct number of documents.

Comment 32. Page 124, Sec. 6.3.7, DIMP Investigation: Can this section heading be changed to reflect that this is a HWL issue?

Response: Section title has been revised as requested.

Comment 33. Page 142, last paragraph: The reference to Table 6.4.1-3 seems incorrect. Should it be Table 6.4.1.5-1? The table also does not seem to show the items listed under the 2nd and 3rd bullets on page 143.

Response: Text has been revised to refer to Table 6.4.1.5-1 and to reflect the information presented in the table.

Comment 34. Page 145, Sec. 6.4.1.6 Private Well Network Monitoring #96: Should the 2nd bullet use the work "authorized" instead of "required?" TCHD has to get owner permission to sample.

Response: Required is the term used in the Off-Post ROD, so it will be used in the FYRR.

Comment 35. Page 149, Sec. 6.4.2.2, 2nd line: "The area is" seems like a carryover.

Response: The indicated text has been deleted.

Comment 36. Page 154, 2nd paragraph under Sec. 7.1.1: There should be a closed parenthesis.

Response: The text has been corrected.

Comment 37. Page 155, Sec. 7.1.4, last paragraph: "med" should probably be "met."

Response: The text has been corrected.

Comment 38. Volume II, Sec. Q, Off-Post Private Wells: The Site Inspection Checklist shows 10 wells that were inspected. The EPA Inspection Report for the Off-Post Private Wells indicates 12 wells were visited from a list of 13 wells provided by TCHD. Since these are separate reports, they probably cannot be changed and only the discrepancy can be noted.

Response: Noted.