

| Comment No. | Comment | Response |
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| Colorado Department of Public Health and Environment (CDPHE) Comments | | |
| General Comments | | |
| None | | |
| Specific Comments | | |
| 1 | <p>Section 7.1, 2nd Paragraph – Although the concern is addressed regarding offsite transportation of contamination and the need for remedial actions if exceedances are seen at a POC, it should also be recognized that according to RFCA, surface water standards are supposed to be met everywhere on site, not just at the POCs. As such, remedial actions are supposed to be considered if surface water standards are exceeded anywhere on site. The current text appears to indicate that only exceedances at the POCs would result in remedial actions, which is not as agreed. Any exceedances at the POEs should result in remedial actions, and exceedances at any other monitoring location could also result in remedial actions. Exceedances at POCs would potentially result in penalties as well as remedial actions. As such, this text should be appropriately modified.</p> | <p>Text will be added in Section 8.2 to clarify that fate and transport data are evaluated at Fiscal Year 2005 (FY05) Integrated Monitoring Plan (IMP) Revision 1 surface water locations throughout the site (including Points of Evaluation [POEs] and Points of Measurement [POMs]), GS51, and the Points of Compliance (POCs). Potential impacts from groundwater to surface water are evaluated at Sentinel and Area of Concern (AOC) wells. The second paragraph in Section 7.1 will be deleted. Section 8.2 will address the issue. It will state, “Figure 8.1 denotes the representative surface water and groundwater locations, which are based upon monitoring locations in the Fiscal Year 2005 (FY05) Integrated Monitoring Plan Summary Document Revision 1 (IMP) (K-H 2005e). The representative surface water locations represent site-wide surface water quality in both Segments 4a, 4b, and 5, and upstream of the terminal ponds include locations in the North Walnut Creek watershed (SW018, SW093, and GS11), South Walnut Creek watershed (GS08), Walnut Creek watershed (GS03), South Interceptor Ditch (SID) watershed (GS51 and SW027), and Woman Creek watershed (GS05, GS31, and GS01). POM2 and POM3 are also IMP performance locations in South Walnut Creek but do not have any data prior to August 1, 2005 and consequently are not used in this RI/FS evaluation.</p> <p>Representative groundwater locations assess potential impacts to surface water quality as measured at Sentinel and AOC wells. The AOC and Sentinel well classifications are defined in the</p> |

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| | | <p>FY05 IMP and described in Section 8.2 as follows:</p> <ul style="list-style-type: none"> • AOC wells – Wells that are within a drainage and downgradient of a contaminant plume or group of contaminant plumes. These wells will be monitored to determine whether the plume(s) may be discharging to surface water. • Sentinel wells – Wells that are typically located near downgradient contaminant plume edges, in drainages, and downgradient of existing groundwater treatment systems. These wells will be monitored to identify changes in groundwater quality.” <p>Because contamination can potentially be transported off the site by surface water, residual quantities of an AOI (in any environmental medium) must be addressed by the final remedial action if migration of the AOI results in an impact to surface water quality. However, it is not appropriate to discuss potential penalties from surface water exceedances at POCs in the Remedial Investigation/Feasibility Study (RI/FS) Report.</p> |
| 2 | <p>Section 7.2.2, page 7-4, footnote – Please change this footnote to recognize that surface water quality at the site has not been in compliance with the respective standards. As mentioned previously, just because water quality standards have been met at the POCs does not mean that they have been met everywhere at the site. Meeting the standards at the POCs and at the site are two different things that need to be recognized. In fact, exceedances of surface water standards have been observed at the site and remediation has been performed prior to reaching the POCs. As such, please appropriately change this footnote discussion, as well as the</p> | <p>The footnote referenced in the comment will be deleted. Please see response to CDPHE Specific Comment 1.</p> |

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| | whole discussion in Section 7. | |
| 3 | <p>Section 7.2.3.1 – The listed areas are not the only areas where soil removal actions occurred. Others include UBC associated with B779, B776/777, B559, B663, and 701, soil excavation from under the tanks on the SE corner of B774, from the area next to Tank 207 and other excavations associated with the process waste lines, the solid waste disposal area west of B371 (PAC 300-700), Bowman’s Pond (PAC 700-1108), Fuel Oil Tanks next to B443 (PAC 400-129), etc. As such, it should be recognized that other significant removal actions have occurred besides those listed.</p> | <p>The purpose of this section is to identify accelerated actions that were significant in removing sources that impacted, or had the potential to impact, surface water quality. Per Environmental Protection Agency (EPA) General Comment 1, this discussion will be removed.</p> <p>Section 8.2.1.3 will discuss accelerated actions that currently exist, and will state, “As discussed in Section 1.0, numerous accelerated actions have been taken which affect the fate and transport of the AOIs. Most of these actions were taken to eliminate historical sources of contamination. Some of these actions remain in effect and were implemented to disrupt subsurface pathways to surface water for specific AOIs.”</p> |
| 4 | <p>Section 7.2.3.2 – This discussion relative to each system should be expanded to identify the areas/plumes being captured/treated. As such, Figure 2.2 is not sufficient to properly show the location and extent of these systems. Another figure showing the locations/extent of each treatment system, and the associated plumes being captured/treated needs to be provided and placed in this section. This discussion should be expanded to include all of the plumes being treated. The East Trenches System is also treating part of the 903 Pad plume, the Mound System is also treating the Trench 1 and Oil Burn Pit #2 plumes, etc.</p> | <p>An additional figure (Figure 8.6) will be created to display the groundwater treatment systems, modeled future groundwater flow directions, and the composite plumes identified for the significant groundwater AOIs (volatile organic compounds [VOCs], nitrate, and uranium). A composite plume of metals will not be added because of their dissimilar transport characteristics.</p> <p>Additional information on the groundwater collection and treatment systems may be found in the Annual Report for the Rocky Flats Environmental Technology Site Groundwater Plume Treatment Systems, January 2003 through December 2004, dated August 1, 2005.</p> |
| 5 | <p>Section 7.2.3.3 – Please identify what SWWB stands for (Site-wide Water Balance?).</p> | <p>SWWB stands for “Site-Wide Water Balance.” However, the reference to the SWWB document was deleted from the text in the revision.</p> |

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| 6 | <p>Section 7.3.1 – This list should be modified as discussed in comments for Section 3. That is, are all of these actually “contaminants” at the surface? And are they all still really surface soil AOIs? Also, please provide a discussion as to the difference between this list of AOIs and actual contaminants as identified during accelerated actions. Why are these AOIs apparently different than the WRW COCs, or at least the COCs that were identified during accelerated actions that exceeded WRW action levels and when remediations were required or not? Discuss why these are considered AOIs now but were not identified as COCs of concern that required remediation during the accelerated actions, and if these currently identified AOIs, which did not require remedial actions during accelerated actions or actions did occur, are now (still) considered AOIs. There appears to be some confusion generated, when those of us that have been dealing with the WRW/COC accelerated action level process, now having to relate to the CRA/AOI process without any apparent transition discussion.</p> | <p>Please see Section 1.0 and 3.0 for an explanation of the site conditions represented in the RI/FS. Please see Section 1.0 for a discussion on the approach taken for accelerated actions compared to the approach taken for the RFETS RI/FS to define any remaining environmental concerns after completion of the accelerated actions.</p> <p>Section 8.1 will state, “This fate and transport analysis focuses on contaminants that were identified as: ECOCs that present significant risk of adverse ecological effects; COCs that contribute risk greater than 1×10^{-6} to a WRW or a hazard index greater than 1; and AOIs for each medium identified through the nature and extent evaluation process. In this section, all of these contaminants (in surface soil, sediment, subsurface soil, groundwater, surface water, and air) will be referred to as AOIs.”</p> |
| 7 | <p>Section 7.3.2.1 –</p> <p>A) Why is the list of other media locations for Americium so limited? Please provide an explanation, or expand this list accordingly. Also, the reference to Figure 2.2 does not appear to identify the “East Trenches”, so please provide a proper reference/figure.</p> <p>B) To properly recognize the potential future issues on site, the discussions in this section</p> | <p>A) The list of media and locations where americium (Am) is an AOI is derived from the nature and extent section for each medium, based on sample results. The extent of Am is not limited; as described in the text, it is observed throughout the North Walnut Creek, South Walnut Creek, and Woman Creek drainages. The reference to the East Trenches has been removed (it is discussed in the subsurface soil section regarding americium).</p> <p>B) Please see response to CDPHE Specific Comment 1.</p> |

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| | <p>should be expanded to include detections in surface water above the standards at other locations than the POCs. This would include discussing the past exceedances that have occurred (and remediations that occurred to prevent exceedances at the POCs) at various surface water monitoring points, such as at GS10, SW93, the ponds, etc.</p> <p>C) Please provide information to support the statement that naturally occurring high levels of uranium occur in the soil on site and therefore high levels of uranium do not necessarily indicate anthropogenic uranium sources. Also, please recognize other potential sources for uranium, such as the remaining process waste lines and vaults.</p> | <p>C) Text in Sections 8.3.3.1, 8.4.2.1, and 8.4.5.1 will be updated to include a discussion of studies using High Resolution Inductively Coupled Plasma/Mass Spectrometry (ICP/MS) and Thermal Ionization Mass Spectrometry (TIMS) to quantify uranium isotope ratios to identify natural versus anthropogenic uranium in surface water and groundwater.</p> <p>Additional discussion about other uranium sources will not be included in this section, since it focuses on contaminant fate and transport. A complete discussion of contaminant source areas is provide in the Historical Release Report, which is Appendix B to the RI/FS .</p> |
| 8 | <p>Section 7.3.2.2 – Please include discussions as indicated in previous comments, especially comments on Section 7.3.1, regarding these metal concerns. Specifically the accelerated actions that occurred, remedial actions that occurred, or no actions that were identified/needed as a result of the accelerated actions that occurred, and the differences between the WRW/COC action levels and the currently identified CRA/AOI levels.</p> | <p>Please see Section 3.0, Nature and Extent of Soil Contamination, for a discussion on background metals contributions and the variability on metal background concentrations.</p> <p>Please see response to CDPHE Specific Comment #6.</p> |
| 9 | <p>Section 7.3.2.3 – Please add discussion to the source and locations of these SVOC PAHs as basically all areas where asphalt was present (not limited to the 300 & 700 areas of the IA) or was placed, such as in the landfills.</p> | <p>Text will be added to Section 8.3.3.3 stating, “Benzo(a)pyrene presence in the environment is widespread and a product of incomplete combustion of fuels and the presence of asphalt (or where asphalt was placed, such as the Present Landfill).”</p> |

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| 10 | <p>Section 7.3.3 – Please add to the discussion, as noted above, that AOIs in surface soil have been identified as above surface water standards at several locations including the terminal ponds, which should be noted as a concern for future monitoring and possible concerns with future exceedances at the POCs. This would specifically be a concern with the rads, and apparently with chromium as mentioned. Please also modify the next to last paragraph (the summary paragraph), to actually identify the AOIs being carried forward as AOIs of future concern and those that are not.</p> | <p>Section 8.2 and Flowchart 8.1 will discuss evaluation of the fourteen surface soil AOIs for potential impacts to surface water by identifying, “Are surface soil and sediment AOIs co-located in the same drainage as the AOI observed in surface water at representative surface water locations, above the surface water standard, background, or Practical Quantitation Limit (PQL)?” Representative surface water locations include those described in the Fiscal Year 2005 (FY05) Integrated Monitoring Plan Summary Document Revision 1 (IMP) (K-H 2005e). Representative surface water monitoring locations are described in Section 8.2 as follows: “The representative surface water locations represent site-wide surface water quality in Segments 4a, 4b, and 5, and upstream of the terminal ponds and include locations in the North Walnut Creek watershed (SW018, SW093, and GS11), South Walnut Creek watershed (GS08), Walnut Creek watershed (GS03), South Interceptor Ditch (SID) watershed (GS51 and SW027), and Woman Creek watershed (GS05, GS31, and GS01). POM2 and POM3 are also IMP performance locations in South Walnut Creek but do not have any data prior to August 1, 2005 and consequently are not used in the RI/FS evaluation. Then in Section 8.3.1 all 14 surface soil AOIs will be evaluated at these locations and their results are summarized in Table 8.3 and 8.4.</p> |
| 11 | <p>Section 7.4.2 – Please recognize that the pathway/impact to surface water is also important, even if it does not directly or immediately impact the POCs. An impact to surface water anywhere on site needs to be recognized as a concern, not just at the POCs. Also, please add to this discussion the potential for subsurface soil to become surface soil through various activities such as erosion or animal/insect activities, which would then add to</p> | <p>Please see response to CDPHE Specific Comment #1.</p> <p>The potential for subsurface soil to become surface soil (by mechanisms such as burrowing animals) was added to Section 8.2.1.2 and to Figure 8.2 (the general conceptual model of contaminant fate and transport at RFETS).</p> |

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| | the potential surface soil contamination and associated concerns. | |
| 12 | Section 7.4.2.1 – Either here or in the groundwater discussion there should be a recognition of the subsurface release of Am from B771, that impacted surface water and could have impacted the POC had the water not been retained and treated to remove the Am contamination. Although this release appears to have come from the drain system under B771, which was subsequently plugged, and is unlikely to occur again, this kind of event can not be completely ruled out in the future and so should at least be discussed. Also, the footnotes on page 7-23, 24, & 25 should be changed to properly reflect that the drain outfalls may have been disrupted, plugged and covered (as appropriate) with clean fill during building demolition, ER, and surface reconfiguration activities. However, the outfalls and drain system through which the carbon tetrachloride and/or other VOCs migrated still exist, they are no longer actively able to directly release to the surface. | Section 8.4.2.1 on subsurface Am transport will be revised to state, “However, americium-241 historically may have been transported vertically into subsurface soil due to entrainment in a liquid, such as oil and/or solvent that would have fostered limited downward transport, or via a subsurface conduit that facilitated subsurface movement of an insoluble constituent (such as occurred at the former Building 771 where americium-241 was transported to the surface through subsurface drains that were intact; these subsurface drains were subsequently disrupted).” We agree that the outfalls and drains through which carbon tetrachloride and/or VOCs migrated are no longer a pathway to the surface. |
| 13 | Section 7.4.2.3 – Please change the lead discussion to recognize that lead remains above the WRW PRG levels in the North Firing Range as well. (as high as 990 mg/kg) The data presented for this RI/FS needs to be inclusive of the data for the North Firing Range, which may affect the surface as well as subsurface data and discussions. | The WRW PRG for lead is 1000 mg/kg. Therefore, the sample location in the North Firing Range with 990 mg/kg has lead at a concentration below the level being used in the RI/FS Report to define contamination. . No change will be made. |
| 14 | Section 7.5 – This discussion should also recognize that groundwater is required to meet state groundwater requirements at the site boundary in | Boundary wells are not POC wells. Boundary wells are evaluated against surface water standards as specified in the FY05 IMP, Revision 1. |

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| | the POC wells. | In the Nature and Extent of Groundwater Contamination section (Section 4.0), all on-site groundwater wells (including current AOC, Sentinel, evaluation, boundary, RCRA, and Decision Document wells) will be evaluated against surface water standards. This approach is consistent with the state groundwater requirements. In the fate and transport section, groundwater AOIs will be evaluated at AOC and Sentinel well locations as discussed in Section 8.2. |
| 15 | Section 7.5.2 – This section should be modified to discuss and show all wells, including the POC wells at the boundary and the landfill monitoring wells (also need to include the recently installed wells, which have no history). This would include changes to Figure 7.4. | The Nature and Extent of Groundwater Contamination section dot maps and plume maps will be provided in Section 4.0. They will incorporate groundwater data (from June 28, 1991 through July 31, 2005) for all wells that are evaluated against appropriate surface water standards. This includes boundary wells, landfill wells, and newly installed wells that were sampled and analyzed through July 31, 2005. All the data locations by AOI will be provided on those figures (Figures 4.5 – 4.23). Figure 8.1 shows the representative groundwater and surface water monitoring locations used in this RI/FS evaluation. It is not appropriate to update Figure 8.1 to include wells that were not used in the RI/FS evaluation. |
| 16 | Section 7.5.3 – This section identifies Figures 7.6 through 7.22. It appears that this should be changed to include Figure 7.5. | Agreed. However, the figure numbering will change because these figures will be moved to the Nature and Extent of Groundwater Contamination section (Figure 7.5 is now Figure 4.7). |
| 17 | Section 7.5.3, page 7-34, 3 rd paragraph – The discussion identifies the MSPTS and two SPPTS. Please modify this as appropriate, possibly changing one to ETPTS. | Agreed. The second reference to SPPTS will be changed to ETPTS. |
| 18 | Section 7.5.3 – Please change the 2 bulleted | The text will be modified to indicate that groundwater AOIs are |

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| | <p>paragraphs to properly modify/remove the POC discussion, and to recognize the potential to migrate to surface water if the treatment systems were not operational.</p> | <p>considered to have limited migration from groundwater to surface water if they are not detected above the surface water standard at the AOC and/or Sentinel Wells (not based on a reference to POCs).</p> <p>However, it is not appropriate to add text regarding the potential to migrate to surface water if the treatment systems were not operational since the treatment systems represent the current (post-accelerated action) conditions described in the RI.</p> |
| 19 | <p>Figures 7.5 – 7.22 – Please check these figures and modify, or provide an explanation as to why some of the plumes are shown not to include wells with high values not separated by dry wells, and why other plumes are identified as containing higher levels than supported by the well designations provided.</p> | <p>In some cases, there may be two wells with concentrations of the AOI above the surface water standard. However, to be designated as a contiguous, mappable groundwater plume, there must be three or more adjacent wells with concentrations above the surface water standard (this methodology and its basis are described further in the Nature and Extent of Groundwater Contamination section [see Section 4.5.5]) and the Groundwater IM/IRA. The figures were reviewed; no change made.</p> |
| 20 | <p>Section 7.5.3.1 and Figure 7.20 – Please provide a discussion/explanation why the two locations that exceed 100x MCL do not form a plume, and why the SEP plume is not shown extending to the two detections along North Walnut Creek.</p> | <p>Please see response to CDPHE Specific Comment #19. The plume is not shown extending into North Walnut Creek because there are intervening wells with concentrations below the standard. No change will be made.</p> |
| 21 | <p>Section 7.5.3.2 – In addition to the discussion of the modeling results, it is recommended that the potential effects of the HRC that has been emplaced at these VOC locations as well as the expected rise in groundwater levels should be discussed.</p> | <p>General text will be added in Section 8.4.5.2 to reflect the expected effect on contaminant fate and transport resulting from the one-time addition of HRC in three locations: 1) former Carbon tetrachloride plume, 2) former Mound/Oil Burn Pit #2 area, and 3) former 903 Pad plume. However, additional monitoring data (which is being collected under the IMP) is necessary to fully understand the effects of inserting HRC.</p> |
| 22 | <p>Section 7.5.3.3 – The relevancy of the data and discussions of groundwater totals for metals is not</p> | <p>Groundwater AOIs (including total metals) were identified based on the AOI selection process described in Section 4.0. The AOI</p> |

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| | <p>clearly understood. Unless a direct pathway from groundwater to surface water can be identified (open fractures, caverns, pipes, drains, etc.), please provide some rationale for collection, presentation, and discussion of unfiltered groundwater samples for metals. (groundwater is not being used as a drinking water source) Otherwise the groundwater totals information seems unnecessary and appears to add confusion to these metals discussions, and should be removed. Also, unless there is direct evidence that shows added metals contamination is coming from the site significantly above naturally occurring contamination, it is difficult to recognize that contamination seen is not natural, and therefore the potential groundwater migration of naturally occurring analytes would not be a concern to be identified as potentially site generated. As such, the purpose and conclusions of these groundwater discussions seem confusing.</p> | <p>screening process includes a screen against the background concentration. Therefore, all AOIs have been detected somewhere above the 99/99 UTL background concentration. It is recognized that if an analyte is identified as an AOI, it is not necessarily a contaminant – the elevated concentrations could be the result of metals from a natural source being detected above the statistical background number.</p> <p>The reason for this comparison is based on a “like” comparison against the lowest surface water standard. Total (meaning unfiltered) constituents are compared to total surface water standards. Dissolved (filtered) constituents are compared against dissolved standards (if they exist). The groundwater collection process and analyte suite (filtered vs. unfiltered) is determined by the IMP but is also based on the AOI’s dominant transport process (particulate transport by erosion versus subsurface transport of dissolved constituents).</p> <p>The groundwater summary (formerly the conclusions which is now Section 8.8.1) will be clarified in the final RI regarding the potential impact of groundwater AOIs on surface water quality, based on observations at AOC and Sentinel wells.</p> |
| 23 | <p>Section 7.5.3.4 – These discussions regarding the levels of fluoride and nitrate/nitrite in wells do not appear to agree with the figures. It is stated that “most of the fluoride concentrations are below the surface water standard.” However that is not supported by the figure. Also, the rationale for identifying a plume is being above surface water standards. In addition, the N discussions state similar concerns, such as, only one of eight wells has exceedances. The nitrite/nitrate discussions also</p> | <p>For fluoride, the text in question is referring to the OUI area wells. The text will be streamlined and clarified to indicate that fluoride has not been observed at any AOC wells and only at Sentinel well 4087 downgradient of the Present Landfill.</p> <p>Text (footnote 16) will be added to discuss the differences between nitrite and nitrate (in terms of environmental persistence, and presence in the RFETS environment, and the reason why the data are presented as nitrite/nitrate).</p> |

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| | <p>add to the confusion by specifically discussing nitrite and nitrate within the nitrite/nitrate discussion, without any specific recognition of the difference. The N discussion of surface water concentrations needs to include discussion of surface water exceedances other than at the POC or terminal ponds. Therefore these discussions need to be modified to remove or correct the confusing statements being made.</p> | <p>In Section 8.4.5.4, the text will be clarified to state “Nitrate/nitrite has not been observed at any of the AOC wells, but it has been observed at Sentinel wells B206989 (downgradient of the Present Landfill) and P21 0089 (at the historical SEP) and 37505 (formerly 37501, located adjacent to the former Building 371).”</p> |
| <p>24</p> | <p>Section 7.5.4, page 7-50, next to last paragraph – Although it may be agreed that surface water quality is not likely to be compromised at the POCs, this isn’t the only concern that should be addressed. Please expand this discussion to recognize the potential for groundwater to compromise surface water quality elsewhere on site, especially considering the expected increase in groundwater flow, with associated contaminants, to surface water.</p> | <p>The text will be modified to address the potential for groundwater to impact surface water quality (as measured at the Sentinel and AOC wells). Future potential impacts from VOCs in groundwater to surface water were modeled (see the Summary of Hydrologic Flow and Fate and Transport Modeling Conducted at the Rocky Flats Environmental Technology Site, dated September 2005). Modeling results will be summarized in Section 8.2.1.4 and a summary of groundwater AOIs with a complete pathway to surface water is listed in Section 8.6.1.2.</p> |
| <p>25</p> | <p>Tables 7.6 – 7.8 – Please provide the standards/levels of concern and identify those measurements that exceeded them.</p> | <p>Tables 7.6 – 7.8 (for Pu, Am, and U) will be deleted. Table 8.4 will include a listing of the AOI surface water standards for all representative surface water monitoring locations where an AOI has been detected above its standard.</p> |
| <p>26</p> | <p>Figures – For all surface water figures please show the levels of concern/standards on each figure for the analyte being shown.</p> | <p>The surface water figures will be revised to show surface water standards on each figure. These figures are now in the surface water and sediment nature and extent section (Figures 5.5-5.28).</p> |
| <p>27</p> | <p>Section 7.6.3.2, cis-1, 2-DCE – This discussion regarding SW056 is somewhat confusing considering this location has been removed and the release to surface water disrupted. Although this</p> | <p>The discussion regarding SW056 will be modified to reflect the actions taken under the RSOP notification for the SW056 site (see “Closeout Report for Surface Water Station SW056 Outfall”, date November 2005). Footnote 18 states, “The disruption of the</p> |

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| | release from groundwater may emerge again in the future near this or at a different location, the current configuration of this reach of South Walnut Creek does not appear to support the conclusion presented. Please modify this discussion. | surface water location SW056 was completed as an accelerated action. This action included the removal of the french drain and associated gravel pack, placement of hydrogen release compound where contaminated groundwater pooled, and installation of a monitoring well. “ |
| 28 | Section 7.6.3.2, Methylene Chloride - In the 1 st paragraph it refers to Figure 7.9, which does not appear to provide the data being discussed. Please provide an appropriate reference and/or figure. | The figure reference will be deleted. Please refer to the nature and extent section (Figure 5-8) for spatial presentation of methylene chloride data in surface water. |
| 29 | Section 7.6.3.2, Vinyl Chloride - In the 1 st paragraph it refers to Figure 7.15, which does not appear to provide the data being discussed. Please provide an appropriate reference and/or figure. | The figure reference will be deleted. Please refer to the nature and extent section (Figure 5-11) for spatial presentation of vinyl chloride data in surface water. |
| 30 | Section 7.6.3.3 - Please identify if the individual metal discussions are in response to dissolved or totals analysis. Also, please explain why metals that are known to have naturally high levels of totals and/or dissolved (background values), are being identified as AOIs coming from site activities. If these metals do not significantly exceed the natural background levels, why aren't they removed from consideration as AOIs? If they do, then this should be specifically identified in this discussion. | Please see response to CDPHE Specific Comment #22. |
| 31 | Section 7.6.4, page 7-64, VOCs – Please modify the discussion of cis-1,2-DCE, to remove the discussion of methylene chloride or show how this is relevant. | Methylene chloride was inadvertently included in the discussion. It will be deleted from the surface water AOI summary text in section 8.6.2. |
| 32 | Section 7.6.4, page 7-66 – Please modify the discussion regarding the 10 AOIs having surface water as a primary pathway, since there appear to | Section 7.6.4 will be deleted as part of the overall consolidation of the fate and transport section. However, the fate and transport of the surface water AOIs will be summarized in Section 8.6.2 as |

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| | <p>actually be 11 rather than 10. Cis-1,2-DCE appears to have been left off the list. Also, there appear to be only 8 AOIs with limited migration rather than 9. In addition, what happened to benzene? Why was benzene apparently left out of this discussion? As such, please make the appropriate modifications to this discussion in Section 7.6.4.</p> | <p>part of the summary and conclusions section. Cis-1,2-DCE is addressed in that summary section as a surface water AOI with a limited pathway to surface water, based on the data review and evaluation process. Benzene is not discussed, since it is not a surface water AOI, based on the AOI selection process presented in the Nature and Extent of Surface Water and Sediment Contamination section (Section 5.0)</p> |

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| 33 | <p>The discussions of sediment transport should be expanded to properly address the potential for pond sediment to be eroded in the future unless the ponds are actively managed and maintained to prevent erosion of the sediments behind the dams. Although it is our understanding that the dams are not supposed to be part of the remedy/solution, without them there would potentially be a different understanding of the final pathway and ability of contaminants to reach the POC locations. If the dams were removed the sediment behind them would be exposed to erosion and could potentially move to the POCs. As such, their continued existence and potential to prevent contaminant migration to the POCs should be recognized. It should also be recognized that the dams prevent possible surface water contamination from reaching the POCs (as demonstrated during the Am incident). Therefore, the discussions in this document need to properly address the past contributions of the ponds in preventing POC exceedances as well as their potential contribution in controlling future exceedances. At the same time this discussion should be provided to recognize that the ponds are not supposed to be included as part of the final solution/remediation for RFETS.</p> | <p>In the past, the system of retention ponds has been used as a surface water management tool; however, these ponds will not be relied on as part of the final remedy for the site.</p> <p>While it is acknowledged that removal of the dams could cause erosion and transport of sediments from the former pond bottoms, any predictions regarding potential contaminant transport are based on a broad range of unknowns. If, for example, the sediments in the pond bottoms were removed at the same time the dams were breached, then the potential water quality effects would be different than if the sediments were left in place. In any event, evaluating the effect of removing the dams (an action which is not currently planned) is an evaluation of a hypothetical future site configuration that is beyond the scope of this document.</p> <p>Therefore, no change will be made to the text.</p> |
| 34 | <p>Section 7.9.1, page 7-77 – Please appropriately modify or remove one of the last two bullets, as they appear to be the same.</p> | <p>This section will be deleted.</p> <p>Results of the fate and transport evaluation for all environmental media will be summarized in Section 8.6.</p> |
| 35 | <p>Section 7.9.1 – Since Section 7.9 should provide</p> | <p>A) The summary section has been reorganized. AOIs from</p> |

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| | <p>the conclusion of the discussions contained in Section 7, please modify and expand this discussion to, at a minimum:</p> <ul style="list-style-type: none"> A) identify the AOIs of interest that have been identified in Section 7 as primary AOIs of concern, B) properly address the concern with contamination/AOIs being concerns at other locations on site other than at the POCs, C) identify the role of the ponds in preventing contamination from possibly reaching the POCs, but are not part of the solution to prevent contamination from reaching the POCs, D) change the discussion in the 2nd paragraph on page 7-78, as this is confusing when previous text throughout Section 7 has stated that the primary AOIs will be further evaluated, E) to recognize the AOIs previously identified as primary concerns and why they are not being “carried forward for further evaluation to the FS”, and F) as discussed previously the footnote 25 adds to confusion over the rationale for identifying actual AOIs, when natural background levels appear to be ignored when generating rationale for metals AOIs. | <p>each media are identified as having either a “complete” pathway to surface water or a “limited” pathway to surface water. AOIs in each media identified as having a complete pathway to surface water are identified in the summary section (Section 8.6) identifies . In addition, Tables 8.3, 8.5, 8.6, and 8.11 summarize potential impacts to surface water from surface soil, sediment, subsurface soil, and groundwater, respectively and list AOIs as having a complete pathway to surface water, not in terms of being an “AOI of concern.”</p> <ul style="list-style-type: none"> B) Contamination at locations other than at POCs will be discussed in the summary. Please refer to the response to CDPHE Specific Comment #1 . C) Please see response to CDPHE Specific Comment #33. D) The modified summary text will not indicate whether or not the AOIs will be further evaluated. Instead, the summary text will clarify the AOIs that are detected at representative IMP groundwater and surface locations and have a complete environmental pathway to surface water. E) As noted above, the text will be clarified to show whether AOIs are observed at representative groundwater and surface water locations and have a complete environmental pathway to surface water. F) Footnote 25 will be removed from the text. |
| 36 | <p>Section 7 is very hard to read and comprehend, and should be rewritten. This appears to be a problem based on there being too much redundant text and discussions. As such, it is recommended that the</p> | <p>It is agreed that Section 8 (formerly Section 7) presents a large volume of information and is difficult to comprehend. The original intent was to organize the section in a manner that would provide a methodical analysis of all AOIs identified for each</p> |

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| | <p>text be appropriately simplified/reduced by removing all or most redundant text, including providing the rationale for the decisions being made only once, and the conclusion sections reduced to simply provide the conclusions reached based on the discussions/rationale previously provided.</p> | <p>medium. The text will be simplified to eliminate redundancy and clarify the systematic process used for evaluating where AOIs are observed at representative groundwater and surface water locations, and whether an AOI has a complete environmental pathway to surface water. Airborne contaminant fate and transport is assessed in a different manner than the other media, because it is based on the potential contaminant exposure received by a human receptor via the airborne pathway, as measured against applicable EPA Dose Limits (see Section 8.6 for more details). As noted in the comment, the summary and conclusions section (section 8.6) will be written to provide a concise summary of discussions/rationale presented in the preceding text.</p> |
| <p>37</p> | <p>Table 7.2 – A) The discussions associated with Am and Pu should be very similar as to the historic and future potential for migration. As such, please provide appropriate changes and modify the discussion as provided in the Pu section to recognize that the removal of buildings and pavement actually opens up more surface soil for potential erosion, which could increase the runoff of contamination into the streams adding to the contaminant load in sediment and surface water, which is what has been observed at various sampling locations such as at GS10. Also however, as previously discussed, the addition of clean fill and vegetative cover should reduce the potential runoff of contamination from disturbed areas. In addition, if the ponds are not supposed to be part of the remediation/solution, then why is</p> | <p>A) Text for Am and Pu will note that the removal of buildings and pavement will make more surface soil available for erosion, but the amount of runoff and peak discharge rates will also decrease significantly with the impervious surfaces removed. Since runoff drives soil erosion (and its associated contaminant transport), the migration of contaminants bound to surface soil is expected to be reduced. With respect to the ponds, during remediation and reconfiguration of the site, the system of retention ponds was used as a surface water management tool to protect surface water quality. However, these ponds will not be relied on as part of the final remedy for the site. B) The carbon tetrachloride discussion will be modified to address the disrupted drains near 771/774 in a historic tense, and clarify that the drains no longer exist. C) Please see response to CDPHE Specific Comment #22. In the nature and extent sections, the screening process to identify whether an analyte is an AOI involves a comparison with statistically-derived background concentrations (based on the 99/99 Upper Tolerance Limit [UTL]) for each analyte (meaning</p> |

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| | <p>the statement included that sedimentation in the ponds is effective in removing AOIs from surface water?</p> <p>B) Carbon Tet discussion should be modified to remove or modify the last paragraph discussing the disrupted drains associated with B771 & 774.</p> <p>C) Metals discussion such as aluminum should be modified to provide specific information for Rocky Flats as to why the metal is a concern. Simply because it occurs above standards should not be relevant if it occurs naturally at these levels. However, if metals such as aluminum are to be retained for discussion then please include the information regarding their background levels as well.</p> <p>D) Please provide appropriate discussions for Fluoride and Nitrate/Nitrite (N) in regard to “persistence in the environment” and “Rocky Flats – Specific Characteristics”</p> | <p>99% of natural samples will have a concentration below the value, with a 99% degree of confidence). If an analyte does not exceed the 99/99 UTL, then it is not considered further as an AOI.</p> <p>D) Text will be added to Table 8.2 (formerly Table 7.2) for fluoride and nitrite/nitrate characteristics at RFETS.</p> |
| 38 | <p>Table 7.3 – It should be recognized that “subsurface soil” is that soil below 6 inches. As such, erosion can easily affect subsurface soil. Please indicate this on this table or provide appropriate rationale for erosion not being an appropriate geological process that cannot affect subsurface soil to create gullies and other erosional features seen at Rocky Flats. Also, why isn’t water erosion identified as a process that affects sediments? In addition, sediment can be dispersed by the wind when dry.</p> | <p>Table 7.3 is being eliminated to reduce redundancy. However, in response to the comment, in areas with general, dispersed erosion (not in rills or gullies), past studies estimate the amount of erosion to be fractions of a millimeter per year. While it is recognized that the formation of gullies can potentially cause localized erosion and transport of soil at depths originally considered to be in the “subsurface,” measures implemented at RFETS make erosional transport of subsurface soil unlikely, as discussed below.</p> <p>The areas most prone to gully formation, in the drainage channels, were heavily armored with rip-rap or grouted rip-rap in</p> |

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| | | <p>order to protect the channels and minimize erosion. In addition, on hillslopes where erosion is most prone to occur, erosion-control best management practices (BMPs) were implemented to minimize the likelihood of rill and gully formation. When coupled with ongoing monitoring and erosion control measures at the site, it was determined that erosional transport of “subsurface” soil would not be a significant transport mechanism; therefore, it is not identified as a dominant transport mechanism in Section 8.2.1.2, nor is it depicted in the conceptual model of transport mechanisms in Figure 8.2. However, the potential for burrowing animals to mobilize subsurface soil is acknowledged and identified in Section 8.2.12 and shown on Figure 8.2.</p> <p>It is agreed that erosion (by both surface water and wind) can cause transport of sediment. The table will be modified to indicate those are both viable transport mechanisms.</p> |
| 39 | Table 7.4 – Please modify this information to include the new wells installed. | Figure 8.1 will show the newly installed wells (Table 7.4 has been deleted and the information included on Figure 8.1). |
| 40 | <p>Table 7.9 – Please appropriately modify the discussion associated with:</p> <ul style="list-style-type: none"> A) rad surface soil contamination to recognize that levels of rad contamination above action levels appear to remain, based on the ORISE investigation. B) environmental restoration to recognize that the activities did not remove all contamination, only that above the accelerated action levels, and that those areas where contaminant levels did not exceed these levels were not removed. C) decommissioning to recognize that contamination remains associated with some buildings and structures. | <p>Surface soil rad contamination is defined in Section 3.0; the values used to define contamination are not RFCA action levels but are based on background or 1×10^{-6} for a wildlife refuge worker (a restricted user).</p> <ul style="list-style-type: none"> A) ORISE data are not part of the soil data set used in the RI/FS analysis. Therefore, the text regarding residual soil contamination will remain the same. B) This will be foot noted and will be added to the Table 8.13 (formerly Table 7.9). Building emission sources can be included in the table as a historic source, but will be identified as “No” in the “Ongoing emission source” column. The portions of buildings that remain with residual fixed contamination are well below grade level are not identified as a potential air |

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| | | emission source. |
| 41 | Table 7.10 – Please correct this table per previous comments. Also, this table should be modified to identify the remaining contamination in all areas, including that associated with buildings and structures as discussed in previous comments. | In order to eliminate redundancy in the fate and transport section, Table 7.10 will be deleted. Information regarding remaining contamination at the site is provided in the contaminant nature and extent sections (Sections 3-6). Section 8 will focus on the fate and transport of the AOIs. |
| 42 | Table 7.11 – Please modify these discussions to recognize the need for surface water to meet standards everywhere on site, not just at the POCs, but also at the POEs, and other monitoring locations. Also, without the ponds it should be recognized that at least some of these AOIs could have and still might exceed the standards at the POCs. As such, these discussions need to be modified to properly address the past and potential future concerns. | Table 7.11 will be deleted to eliminate redundancy with the summary and conclusions section. To address the subjects raised in your comments, please see the responses to CDPHE specific comments 1 and 33. |
| 43 | Figure 7.24 – Although this may be an appropriate depiction of the information being presented, please provide the rationale for including this figure showing these processes that are associated with the ponds, when the ponds are not supposed to be a part of the remediation/solution at RFETS. | The figure (now Figure 8.4) will be modified to remove the dam/pond. Generalized surface water transport processes will still be appropriately represented on this figure. |
| 44 | Attachment 2, Section 3.3, page 8, last paragraph – Please complete the identification of the figure intended, assumed to be Figure A2.16. | The text will be corrected. The new figure number is A2.11. |
| | Editorial Comments | |
| | None | |
| | CDPHE – Supplemental Comments | |

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| | Specific Comments | |
| 1 | Section 7 – An implicit assumption through out this section is that the site will remain undeveloped and undisturbed, other than by natural erosion processes. There should be some mention of this assumption. | The contaminant fate and transport discussions are based on factual presentation of the mechanisms that currently causecontamination to move in the environment, not on implicit assumptions about how the site will be maintained in the future. In the discussion of Remedial Action Objective 2 (Section 10.4.2.2) and in the discussion of Institutional Controls (Section 11.3.1.2) the issue of not disturbing soil at the site is addressed. |
| 2 | 7-78, next to last paragraph – Again, there is an implicit assumption of use restrictions prohibiting activities that would increase erosion. | Please see response to CDPHE Specific Comment #3. |
| 3 | <p>Table 7.11 – Throughout this table, there are implicit (and sometimes explicit, though oblique) assumptions that uses inconsistent with maintaining erosion controls will be prohibited. (For example, for americium-241 and plutonium-239/240, summary column, under the heading “Effect of accelerated actions” is the statement: “Improvement is based on the assumption that vegetation is established, soil is stabilized, <i>and widespread soil disturbance does not occur in areas with residual [contamination].</i>”) Such use restrictions are necessary to ensure surface water standards are not exceeded. They should be carried forward to the FS for analysis. Other examples include:</p> <ul style="list-style-type: none"> • U₂₃₅ and U₂₃₈ in subsurface soil above WRW PRGs – implied assumption of use restrictions. | This table will be deleted to eliminate redundancy. It is agreed that this section should focus on contaminant fate and transport. Regarding restrictions on disturbance of the site in the future, please see the discussion related to Remedial Action Objective 2 (Section 10.4.2.2) and the discussion of Institutional Controls (Section 11.3.1.2). The subjects of preventing any action that would impair the functioning of the groundwater treatment systems and prohibition of constructing wells for groundwater use (other than for remedy-related purposes) are both addressed in the discussion of Institutional Controls in Section 11.3.1.2. |

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| | <ul style="list-style-type: none"> • U (sum of isotopes) and nitrate rely on SEP treatment system. Though M & O of the system may be considered as part of the “no action” alternative, IC’s to prohibit damage to the system cannot. They need to be analyzed in the FS/CMS. • All VOCs in groundwater above standards. Again, there is an implicit assumption the ground water will not be used. This use restriction needs to be analyzed in the FS. <p>Chromium (surface soil) erosion – assumption of no widespread soil disturbance implies need for IC.</p> | |
| Environmental Protection Agency (EPA) Comments | | |
| | General Comments | |
| 1 | <p>EPA recommends that Section 7 focus strictly on a discussion of contaminant fate and transport. Currently, this section contains several references to past remedial activities. For example, see section 7.2.3.2 which discusses accelerated actions and enhancements. Historical information such as this should be described in more detail in the introductory section. Additionally, Section 7 discusses compliance status of contamination in various media. For example, see section 7.4.2.2 – Chloroform - where it is discussed that chloroform does not exceed surface water standards. Any discussion of compliance should be addressed in the summary and conclusions section of the document.</p> | <p>Text regarding past remedial activities will be reduced to better focus on contaminant fate and transport. Please see response to CDPHE Specific Comment #3.</p> <p>Discussion about compliance will be removed from this section. The F&T section will focus on whether AOIs are observed at representative groundwater and surface water locations and have a complete environmental pathway to surface water. Only accelerated actions that affect fate and transport (such as the groundwater treatment systems) will be discussed. With respect to text that addresses compliance, please see the response to CDPHE Specific Comment #1.</p> |
| 2 | <p>Currently, the RI-FS only addresses contaminants selected as AOIs based on comparison to human</p> | <p>The RFCA Parties have agreed on the process that identifies AOIs for each medium. Analytical results above an ecological</p> |

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| | <p>health risks. Based on previous EPA comments regarding discussion of ecological risk, other contaminants may be identified; if so, they will need to be addressed in the Fate/Transport section and any required remedial measures addressed in the FS.</p> | <p>screening level or identified as an ECOPC do not mean that a significant risk of adverse ecological effects exists. The results of the CRA will identify when and where such a condition exists. These conclusions will be summarized in the RI/FS section before the Contaminant Fate and Transport section. The ECOCs identified in the CRA will then be evaluated in the contaminant fate and transport section.</p> |
| | <p>Specific Comments</p> | |
| <p>1</p> | <p>Page 7-3, Section 7.2.2: This section describes the primary fate and transport processes (physical, chemical, and biological) at RFETS and references Figure 7.1 which graphically illustrates those processes. Figure 7.1 should contain a physical transport component for subsurface to surface (i.e., burrowing, slumping). The figure and related text should be revised accordingly.</p> | <p>Figure 8.3 (the contaminant fate and transport conceptual model diagram, formerly referred to as Figure 7.1) and the related text will be modified to reflect the subsurface to surface transport mechanism.</p> |
| <p>2</p> | <p>Page 7-7, Section 7.2.3.2. This section describes the groundwater treatment systems and associated enhancements. On the bullets describing the East Trenches, Mound Site, and Solar Evaporation Ponds treatment systems, please provide a description similar to 881 Hillside Area and Present Landfill. This change should be made when this section is moved to the introductory section (see general comment 1).</p> | <p>The descriptions for the East Trenches, Mound Site, and Solar Evaporation Ponds treatment systems will be modified to be more similar to descriptions provided for the 881 Hillside Area and the Present Landfill. It will also be noted in Section 8.2.1.3, the OUI groundwater treatment system was discontinued in April 2002, in accordance with the Major Modification to the OUI CAD/ROD, because of the consistently decreasing groundwater contaminant levels (near the maximum contaminant levels [MCLs]) and no downgradient impacts to surface water quality.</p> |
| <p>3</p> | <p>Page 7-16, Section 7.3.2.3, Second Paragraph: The document states that benzo(a)pyrene is a ubiquitous product of incomplete combustion. Please provide additional detail to describe</p> | <p>While benzo(a)pyrene is wide spread and a product of incomplete combustion, as stated in the document, it is also a product of asphaltic compounds. The text in Section 8.3.3.3 will be changed to reflect the connection between the presence of asphalt and the</p> |

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| | examples of site activities that produced benzo(a)pyrene. | detection of benzo(a)pyrene. Table 8.2 (formerly Table 7.2) will also be modified accordingly. |
| 4 | Tables 7.4 through 7.8. These tables provide concentrations of AOIs at sampling locations. These tables need related and referenced maps to be more meaningful. Maps that identify these sampling locations should be provided. | <p>Table 7.4 will be deleted. It will be replaced by Table 8.7 (Summary of Groundwater Data at AOC Wells) and Table 8.8 (Summary of Groundwater Data at Sentinel Wells). AOC and Sentinel Well Locations are shown on Figure 8.1.</p> <p>Table 7.5 (now Table 8.12) – Groundwater Monitoring Locations with Stainless Steel Well Construction and/or Sampling Equipment. A figure will be added to show the location of these wells (Figure 8.7).</p> <p>Tables 7.6 – 7.8 (for Pu, Am, and U) will be deleted. Instead, the surface water data evaluation will be expanded to include surface water data for all the AOIs (including Pu, Am, and U), presented in time series in Attachment 4, for the surface water monitoring locations consistent with the FY05 IMP, Revision 1. These locations were selected based on their representativeness of surface water across the site, not from a compliance perspective.</p> |
| 5 | Table 7.11. This table lists AOIs and indicates that no AOIs will be carried forward for further analysis. But several AOIs are considered in sections 8-10 (Pu-239/240 is an example – see section 8.7), so this is not clear or is incorrect. Please clarify. | Table 7.11 will be deleted. Instead, Tables 8.3, 8.5, 8.6, and 8.11 summarize potential impacts to surface water from surface soil, sediment, subsurface soil, and groundwater, respectively. |
| 6 | Section 7: Attachment 2, Figures 2.12 – 2.16. Figures show “annual average concentrations” of AOIs and should indicate the media (i.e., air, surface/groundwater). | Agreed. The figure titles will be changed to make it clear the media being represented is air. |
| | Editorial Comments | |

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| | None | |
| U.S. Fish and Wildlife Service's (USFWS) Comments | | |
| General Comments | | |
| 4 | Throughout the Contaminant Fate and Transport the concentrations are compared to WRW PRGs, but should be compared to the lower of the WRW PRG or the Ecological Risk Levels (when available). | Section 1.4 addresses the use of different standards for comparison. |
| Specific Comments | | |
| 17 | Section 7.2.3.2, page 7-7, first and third bullet – We were expressly told that the addition of the cottonwood trees and willows was not a phytoremediation project but rather an enhancement or polishing step. The word phytoremediation should be removed from this discussion and no credit taken as phytoremediation, since this is not what occurred. | The references to phytoremediation will be clarified with text referring to the use of phytoremediation technologies as a one-time enhancement, not as an accelerated action. |
| 18 | Section 7.3.2.5, page 7-17 – This is all based on a very small sample size without much aerial extent and should be discussed. | Text will be added to indicate the number of samples is limited, as is the extent of the area sampled. |
| 19 | Section 7.6.3.1, page 7-52 – It will be a fine line to describe the ponds without making it sound like treatment. | Please see response to CDPHE specific comment 33. |
| Editorial Comments | | |
| | None | |