FINAL COMMENT/RESOLUTION SUMMARY OF EPA COMMENTS ON FINAL TREATABILITY STUDIES PLAN

ROCKY FLATS PLANT

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

ENVIRONMENTAL RESTORATION PROGRAM

March 1992

ADMIN RECORD

FINAL COMMENT/RESOLUTION SUMMARY OF EPA COMMENTS ON FINAL TREATABILITY STUDIES PLAN

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U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
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ENVIRONMENTAL RESTORATION PROGRAM

March 1992

REVIEWED FOR CLASSIFICATION/UCNI
By [illegible]
Date 9/24/92

ROCKY FLATS ENVIRONMENTAL RESTORATION PROGRAM
REVIEW/COMMENT RESOLUTION FORM

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Reviewer Name(s): PRC FOR THE ENVIRONMENTAL PROTECTION AGENCY (Oct. 10, 1991) Date: February 21, 1992

REVIEWER'S COMMENTS			RESPONSE
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1	1	General. Several technologies have been selected for treatability studies at specific operable units (OUs) and one other has been selected for use in the U.S. Environmental Protection Agency (EPA) Superfund Innovative Technology Evaluation (SITE) Program. These treatment technologies should be identified in the text, tables, and appendices of the final TSP. In addition, the relationship between the current treatability studies and the site-wide treatability studies program should be described. Similarly, the treatment technologies that are currently being utilized at specific operable units (OUs) at RFP should be described in relation to the site-wide treatability studies program to clearly understand the work being done at RFP.	The relationship between all current treatability activities and the Final TSP will be addressed in the Treatability Studies Annual Report. At the time of publication of the Final TSP, many of the currently active test programs at RFP had not yet been defined, and hence were not discussed in that document. However, the Annual Report will review the interrelation between the SITE demonstration test, the on-going OU specific test studies, and the Sitewide program.
2	1	General. References to biological treatment technologies in the text and the screening tables are not clear and do not reflect detailed research into the specific technologies available. Previous comments on the TSP recommended that specific biological treatment technologies be discussed. However, no further discussion has been added to the final TSP to define the terms "anaerobic" biological treatment, "bioaccumulation," and "land treatment." These terms should be explained and evaluated in the same level of detail as other treatment technologies. Accurate and current information should be provided for all technologies presented in the TSP to maximize the utility of the document.	The reference to biotreatment technologies will be enhanced and clarified in the screening tables in the Treatability Studies Annual Report. The bio-treatment sub-technologies and process options will be defined more specifically in this document and considered at some greater level of detail than appeared in the Final TSP.
3	2	Page 3-7, Paragraph 8. This paragraph discusses the SITE Program. The "Techtran RHM 1000 Process" is now referred to as the "Filter Flow Technologies, Colloid Polishing Filter Method." This paragraph indicates that the treatment applies to radionuclides and heavy metals. In addition, the text states the colloid polishing method collects and treats water from the solar pond (OU4) seepage collection system.	Any reference to the SITE demonstration in the Annual Report will refer to it as the Filter Flow Technologies, Colloid Polishing Filter Method. The discussion of the interrelation of the SITE program and the Final TSP will correctly describe the SITE test as being limited to radionuclides, and treatment, not collection, of the OU4 seepage water.

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		A SITE demonstration using the colloid polishing method is underway at RFP. It is being applied only to radionuclides and not to heavy metals. In addition, the process is proposed only for treatment, not for collection of water from the OU4 seepage collection system. The text should be corrected as appropriate. Rationale: Accurate and current information should be provided for technologies presented in the TSP to maximize the utility of the document.	
4	2	Page 4-11, Paragraph 2. This paragraph indicates that treatments for polychlorinated biphenyls (PCBs) will be considered at a later date. Technologies applicable to the treatment of PCB contamination have not been identified in the text, tables, or technology data sheets. PCBs have been found at RFP and alternatives for treating these compounds should be considered in this document. Rationale: The presence of PCBs at RFP requires consideration of potentially applicable treatment alternatives.	At the time of publication of the Final TSP, the presence of PCBs at RFP had not been confirmed, and sufficient contamination data for evaluation of potential treatment technologies was not yet available. Since that time, a preliminary screening for PCBs has been performed, and it indicates that PCBs may be present. Appropriate technologies for treatment of PCBs will be evaluated in the Annual Report.
5	2	Pages 5-2 and 5-3, Figures 5-1 and 5-2. These figures illustrate the treatability study process and the technology selection process, respectively. Comments on the June 3, 1991 TSP suggested an explanation of the interaction between the management decision factor and the screening process be included in the text. Only the titles on these figures were changed and adequate detail was not added to the text discussion regarding the management decisions. The management decision factor should be described in further detail. Rationale: Information illustrated in figures should be complete and supported by explanations in the text.	The figure which indicates some relationship between the management decision factor and the screening process was derived from EPA's Guidance for Treatability Studies under CERCLA, and was added to the text at the request of the Colorado Department of Health. This "factor" was intended to provide the opportunity to consider management issues such as available annual budgets, potential impact on facility operations, state and community acceptance, and other issues, in the development of sequencing and performance schedules for test programs. A more complete discussion will be provided in the Annual Report.

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6	2	Page 7-2, Figure 7-1. This figure presents the tentative treatability studies plan schedule for work to be completed during the site-wide treatability studies program. The time line bars and the dates on the figure do not match. Dates and time line bars should be consistent. Rationale: Consistency among text and figures contributes to the clarity of the document.	Please see the discussion on future plans in the cover letter to the 1992 Treatability Studies Annual Report and in the report itself.
7	3	Tables 5-7A and 5-7B. Table 5-7A, which lists technologies for treatment of water, does not include a category for semivolatile organic compounds (SVOCs). Table 5-7B, which lists technologies for treatment of soil, does not include categories for SVOCs, volatile organic compounds (VOCs), or inorganic compounds. The other screening tables consider technologies for these contaminants The same categories should be included in Tables 5-7A and 5-7B for consistency throughout the screening process. Rationale· Consistency among the screening tables will contribute to the clarity and utility of the document.	Table 5-7A addresses only technologies for those contaminants known to be present in RFP groundwater and surface water. At the time of publication of the TSP, no semivolatile compounds (SVOCs) had been detected at levels above ARARs in RFP groundwater or surface water. Therefore, technologies for the category of SVOCs are not included in Table 5-7A. Table 5-7B addresses technologies only for those contaminants known to be present in RFP soil. There are no significant VOCs or SVOCs in RFP soils (the contamination is primarily radionuclides and metals), therefore, for the same reason expressed above, technologies for these classes of contaminants were not included in Table 5-7B.
8	3	Tables 5-7A, 5-7B, 5-8, and 5-9. These tables present information on the technologies retained after preliminary screening. They are not organized in the same manner as the preliminary screening tables (Tables 5-3, 5-4, 5-5, and 5-6). In the text and screening tables, information is organized by medium, contaminant group, and type of technology. The organization of the final screening tables should be consistent with the rest of the document. This will establish continuity among the tables, and aid in the clear understanding of the technologies being considered for treatability testing and the screening process.	The initial screening tables (5-3 through 5-6) contained so much information it was necessary, for ease of access, to organize it by contaminant group and technology group with technologies listed alphabetically in each. Following the screening, the number of technologies was significantly reduced, the tables were shorter, and the only change made was that the technology group subheadings were not used in order to fit full alphabetical lists for each contaminant type on one sheet. We also plan to use this approach in the Annual Report.

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		Rationale Consistency among text and tables contributes to the clarity and utility of the document	
9	3	Appendix B According to the text, a technology data sheet was to be provided for each technology retained after preliminary screening. In most cases, the technology data sheets apply to specific treatment process options. Two exceptions are chemical oxidation and solidification/stabilization which are broad technology categories which include more specific process options. Ozonation, peroxide oxidation, and ultraviolet oxidation are mentioned in the chemical oxidation technology data sheet, and cement- and polymer-based technologies are mentioned in the solidification/stabilization technology data sheet. However, individual technology data sheets are not included for these methods. Separate technology data sheets should be provided for each process option considered in the final screening stage, regardless of whether it is related to other technologies being screened. In addition, the solidification/stabilization technology data sheet is not listed on page 1 of Appendix B. Rationale: Information presented on the technology data sheets should be sufficiently detailed to provide an understanding of the processes involved for each screened technology.	Some technologies have so many similar sub-technologies or process options that the development of a distinct technology data sheet for each one would enlarge the document without adding to its clarity or utility. In fact, for the variations of solidification/stabilization, the processes are so similar, it would have been necessary to create any number of data sheets identical except for one, or a few, words. Hence, it was deemed more practical to describe all the very similar process options in one sheet, which identifies the possible different additive and system types. Likewise, ozonation, peroxide oxidation, and ultraviolet oxidation all utilize a similar mechanism to destroy aqueous organic contaminants by reaction with an oxygen radical. Because of this similarity in chemical mechanism, they are all described in one technology data sheet. Like the solidification/stabilization situation, to do otherwise would have required the generation of multiple, nearly identical data sheets, which would serve only to increase the document size without adding to its usefulness.
10	3	Appendices B and C. The technology data sheets presented in Appendices B.1 and B.2 and the statements of work presented in Appendix C are not organized in the same manner as the preliminary screening tables (Tables 5-3, 5-4, 5-5, and 5-6). In the text and screening tables, information is organized by medium, contaminant group, and type of technology. However, the final screening information is not separated by contaminant group nor by type of technology The organization of technology data sheets and	The technology data sheets in the appendices were deliberately sequenced in a different order than the order of technologies in the Chapter 5 tables. Many of the technologies in the tables were eliminated after one or more levels of screening. Since the technology data sheets represent only those technologies which were retained, this list is much shorter than, and bears little resemblance to, the extended lists in Chapter 5. Hence, it was decided to present the

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		statements of work should be consistent with the rest of the document to aid in the clear understanding of the screened technologies. Rationale: Consistency among text, tables, and appendices contributes to the clarity and utility of the document.	reduced final list in alphabetical order for simplicity and maximum usefulness.

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1	1	The contents of this document have improved in comparison with the previous draft document. However, EPA has significant concerns with the selected treatability studies which need to be addressed in the specific treatability study workplans to be developed. In addition, we have identified some shortcomings in the literature review and the selection process, as well as some inconsistencies between the text and the tables and some confusion over how the studies identified in this plan relate to on-going IM/IRAs and other treatability studies.	At the time of publication of the Final TSP, the only other active studies included the pilot scale carbon treatment study on OU2 surface water, and the OU2 bench scale testing series. The Final TSP did in fact recommend only studies that would generate new information. The Treatability Studies Annual Report will continue to examine the status of other programs on the RFP site, will not reproduce other current efforts, and will consider the impacts of information gathered from other on-going programs. The intent of this document is to identify treatability studies that would help us to gather new information which could be utilized to support the RI/FS decision making process. The workplans for these technologies will include available results of bench scale tests which have been already been conducted and justification for any additional new studies.
		EPA is concerned that the treatability studies identified in this plan for future completion, have in fact either previously been conducted or are currently being performed under other programs or as part of the on-going IM/IRAs. The intent of this document is to identify treatability studies that would help us to gather new information which could be utilized to support the RI/FS decision making process. This Site-wide Treatability Studies Plan must acknowledge the fact that treatability studies have already been conducted for some of the technologies chosen. Furthermore, the workplans for these technologies must include results of bench scale tests which have been already been conducted and justification for any additional new studies.	
2	1	Review of the references provided indicates that there are a number of pertinent items missing. EPA recommends that a more thorough literature review on treatment technologies be conducted in the future in order to incorporate new technologies in the annual update reports. Also, EPA recommends that technologies for treatment of PCBs be identified at this point for future consideration.	The Annual Reports will continue to examine a full spectrum of the most current literature on treatment technologies. Technologies for PCBs will be identified and evaluated by the same methods as were applied to other technologies in the Sitewide TSP.

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3	1	The documentation on the selection process needs to be more comprehensive. For example, detailed information on the criteria for rejecting or selecting technologies needs to be included. The advantages of a selected technology in comparison to other technologies which perform a similar function need to be explained in more detail in the text or in the respective tables. It should be noted that "too innovative" is not, by itself, a valid reason for rejecting a technology, but should instead be reason to watch developments in that area more closely, and to reexamine the viability of that option in the next annual update.	Better documentation on the selection process will be developed. The documentation will include more detailed information on cost and rejection/selection criteria. We agree that "too innovative" is not a valid reason to reject a technology and those technologies identified as "too innovative" have not been permanently dropped from the program. Information on these technologies will be monitored in future annual reports and some of these technologies may be incorporated for studies as appropriate when more information is available.
4	1,2	Inconsistencies throughout the document between statements made in the text and information presented in tables and appendices need to be addressed. The text should include a description for all the technologies listed on the tables using the same name as presented in the tables to avoid confusion.	The Annual Report will be consistent between the names of technologies as they appear in the tables, text, and supporting material.
5	2	Technologies already selected for on-going IM/IRAs at Rocky Flats (OU1 & OU2) need to be distinguished from other selected technologies. It is not clear how DOE is going to pursue these technologies as OU and/or Site-wide activities. Data from bench scale or pilot/field scale efforts conducted as IM/IRAs, needs to be considered in the selection process as described in this document. Lessons learned from these efforts must be integrated in the overall literature data base, and given full consideration when evaluating possible future efforts under the site-wide program. How this will be coordinated and how these efforts relate to one another must be explained, so the public can understand how this new program relates to actions they have already reviewed and commented on.	The Treatability Studies Program is a comprehensive program that encompasses site-wide and OU-specific feasibility/treatability studies and IM/IRA pilot/field scale tests. The Treatability Studies Annual Reports will evaluate the status, relationships, and lessons learned from all treatability testing projects. The Annual Reports will identify whether a given technology is, or will be, a part of an IM/IRA Feasibility Study or Sitewide Studies, and how it fits into the overall remediation program.
6	2	DOE is to submit annual reports on treatability studies to EPA and CDH. The annual reports should include information on all the activities performed during the year, as well as an update on the	DOE will submit Annual Reports on treatability studies to EPA and CDH. They will include updates on activities, an annual review of treatment technology literature, and a re-evaluation of technologies based on

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		literature review for treatment technologies. In addition, DOE is to reevaluate all the technologies presently being considered in this document on an annual basis. This would help to incorporate technologies that are rejected at this point, but could present a higher potential to treat Rocky Flats waste in the future.	availability of new technologies or new information on already considered ones.
7	3	Page 5-2, Figure 5-1. Explanation on interaction of the management decision factors with the screening process needs to be included in the text.	Figure 5-1, which mentions the use of a "Management Decision Factor," was added to the document at the request of the Colorado Department of Health. This factor allows management to consider items such as available budget, impacts on facility operations, state and community acceptance, and other issues, which are not part of the TSP selection process, in determining sequence and schedules for implementation of the test programs.
8	4	Page 5-3, Figure 5-2. Where is the "management decision factor" and how is it used in this selection process? Refer to Figure 5-1. Figures 5-1 and 5-2 need to be consistent.	Please see response to Comment No. 7, above. Integration of management decision factor into the selection process and criteria for its use will be developed as part of the screening process documentation discussed in Comment No. 3.
9	5	Page T-15, Table 5-3A. Why aren't biological processes listed for semi-volatile organics here too?	
10	5	Page T-15, Table 5-3A. The term "anaerobic" is too general. What are the anaerobic processes been considered here? Please list all the technologies available. Also, more research or thorough review is recommended in this area.	The Treatability Studies Annual Report will identify biotreatment technologies and will evaluate them in more depth than was presented in the Final TSP.
11	5	Page T-15, Table 5-3A. Incineration process is not applicable for water treatment. This needs to be explained in the text, and this table needs to be corrected.	The incineration processes identified in Table 5-3A include processes specifically for liquid streams. We agree that incineration is neither the performance nor economic optimum for low organic level, high water content streams. For these reasons, these technologies were ultimately excluded from the selected list for water streams at RFP.

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12	6	Page T-16, Table 5-3A. It is probably not necessary to distinguish volatile organics from semi-volatile organics at this stage	Semi-volatile and volatile organic compounds have been distinguished from one another throughout the Final TSP for the following reasons. First, they are not both present in every media. (For example, there are no appreciable semivolatiles in groundwater). Second, the technologies for the two categories are not identical. (For example, certain biotreatment processes suitable for semivolatiles would possibly strip more volatiles than they degrade, and would not be considered for volatiles even though they are theoretically possible for volatiles). Hence, for clarity, these categories and their potential treatment technologies were kept distinct throughout the document.
13	6	Page T-16, Table 5-3A. Could the biological technologies listed for semi-volatile organics be applicable for volatile organics as well?	The biological treatment processes shown in Table 5-3A for semivolatile organics are not all effective for volatile compounds. With the exception of in-situ bioremediation, the processes shown depend on mechanical aeration, which while it would enhance degradation rates of many semivolatiles without stripping them, would tend to strip many types of volatile compounds, particularly the chlorinated volatile compounds present at RFP. Biological treatment will be discussed at greater length in the Treatability Studies Annual Report.
14	6	Page T-16, Table 5-3A. Incineration is not applicable for water treatment, see previous comments page T-15.	Please see response to Comment No. 11, above.
15	7	Page T-17, Table 5-3A. Hasn't ion exchange technology already been chosen for OU1 IM/IRA? The text needs to explain the relationship between technologies chosen under the site-wide treatability study plan and the on-going IM/IRAs.	Yes, ion exchange technology has already been chosen for OU1 IM/IRA. The Annual Reports will consider and discuss the relationship between treatability studies under the Sitewide TSP, feasibility studies, and the IM/IRAs.
16	7	Page T-17, Table 5-3A. The term "bioaccumulation" is too general. Please list all the bioaccumulation technologies available.	Please see response to Comment No. 10, above.
17	8	Page T-18, Table 5-3A. Aren't bench scale Techtran, Inc. process studies currently being performed at RFP?	At the time of publication of the Final TSP, the Techtran Process was being considered for a SITE demonstration bench scale study at RFP, but

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			a decision to do so had not been reached. This decision has since been made and bench scale tests have been performed at RFP. The relationship between that study and the Sitewide Program will be discussed in the Annual Report.
18	9	Page T-19, Table 5-38. Soil washing is not discussed in the text in reference to volatile organics.	Soil washing and other two-phase soil treatments, per se, are not routinely used for removal of VOCs because, at least for the non in-situ processes, the compounds are frequently removed by volatilization during the mechanical preparation steps such as excavation, conveying, and size reduction, with no washing steps necessary.
19	9	Page T-9, Table 5-38. Aren't "incineration" and "thermal processes" the same?	Incineration and other general thermal processes were considered separately because they have some key differences. For the purposes of the TSP document, incineration refers to technologies which use high temperature equipment for the purpose of oxidative destruction, usually in a flame, or at least at flame temperatures of 1800°F or above. Other thermal treatments include those which use an elevated temperature, less than typical flame temperatures, for enhanced stripping (example: low temperature thermal desorption) or for oxidation that does not utilize a flame environment (example: Wet Air Oxidation).

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20	9	Page T-19, Table 5-3B. What are the advantages of looking at so many incineration processes?	The wide range of incineration and thermal processes was presented for completeness. These technologies were ultimately screened out of the selected list.
21	9	Page T-19, Table 5-3B. Again, the biological processes listed are too general. Please, be specific.	Please see the response to Comment No. 10, above.
22	10	Page T-96, Table 5-5A. Do not need to distinguish between volatile organics and semi-volatile organics at this stage.	Please see the response to Comment No. 12, above.
23	10	Page T-96, Table 5-5A. Several technologies listed have already been chosen for OU1 and OU2 IM/IRAs. On-going projects should not be included in this plan.	Please see response to Comment No. 15, above.
24	10	Page T-96, Table 5-5A. Weren't bench scale studies performed for the Tru-Clear technology already at RFP?	Please see response to Comment No. 15, above.
25	11	Page T-97. Research in the area of physical separation and soil washing is needed.	We agree that more research is needed in the areas of physical separation and soil washing, particularly on the potential usefulness of these approaches for removal of radionuclides from soil. The literature on this topic will be reexamined for each Annual Report including the results of recent research.
26	11	Page T-103, Table 5-5B. Research on biological treatment of metals is needed.	We are aware of promising work on the bio-sorption and stabilization of heavy metals in soils. However, we are not aware of any results from work specific to sorption of radionuclides. We will continue to investigate this area in the Annual Reports.
27	11	Page T-103, Table 5-5B. Biological treatments have potential applicability for radionuclides. Research on this area is recommended.	Please see response to comment No. 11, above.
28	12	Page T-106, Table 5-6A. "Too innovative" is not a valid reason for	The technologies described as too innovative were not rejected because

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		rejection of a technology.	they are developmental or new. These technologies were rejected at this time, because 1) insufficient data exists to determine if they show promise of being effective, and 2) it was not known whether these approaches would be commercially available for testing or application during the time frame of the Sitewide program. Please also see our response to the second part of Comment No. 3.
29	13	Page T-104, Table 5-6A. Trihalomethane by-products can be treated. We don't believe that the formation of these by-products is a justification for rejecting the technology.	Since this technology didn't offer any advantages over several others (such as ozonation, peroxide oxidation etc.) which have equivalent oxidation effectiveness and no toxic chlorinated by-products, it was not retained.
30	14	Page T-109, Table 5-6B. Include Glycolate Dechlorination as a treatment for PCBs.	Glycolate Dechlorination will be evaluated as a PCB treatment in the Annual Report.
31	15	Page T-114, Table 5-6B. The fact that polymer impregnated concrete must be applied in conjunction with other stabilization processes is not necessarily a fatal flaw for this technology.	This technology has been rejected at this time but could be added later if the fixation technologies selected for testing prove to be inadequate or ineffective.
32	16	Page T-117, Table 5-7A. This table needs to distinguish on-going projects (OU1 and OU2) from projects to be conducted under this plan.	The relationship and impacts of the IM/IRAs will be considered and explained in the Annual Report. Please see the response to Comments No. 5 and 15, above.
33	17	Page T-125, Table 5-8. What is the relationship between selected treatability studies under this program with the on-going IM/IRAs? This concern needs to be addressed.	Please see the response to Comments No. 5 and 15, above.
34	18	Page T-126, Table 5-9. Same comment as for Table 5-8.	Please see the response to Comments No. 5 and 15, above.
35	19	Page T-128, Table 6-2. A section addressing generated waste needs to be included. Information on volume of waste, characteristic of waste, types and management of waste should also be included.	Detailed information on waste types and quantities that will be generated from testing studies will be provided in the treatability studies technology specific work plans.
36	20	Page T-122, Table 7-1. This table needs to delineate the dates for	DOE/EPA/CDH correspondence has established the dates for several

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		subsequent submittals after the approval of this document. This should include dates for submittal of treatability study workplans, treatability study reports, and annual update reports.	deliverables, including the Annual Report. The Annual Report will include dates for future submittals.

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1	1	There are inconsistencies throughout the revised TSP between statements made in the text and information presented in tables and appendices. It is unclear which information is intended to be utilized for site-wide treatability tests at RFP. References to technologies in the text, tables, and appendices should be consistent. In general, the document would be improved by including more detailed explanations of the information presented in tables.	The Annual Reports will maintain consistency between the names of technologies in the text, tables, and appendices.
2	1	The names used to refer to specific technologies in different parts of the document are not consistent. For example, "granular activated carbon adsorption" is discussed in the text (page 5-16, paragraph 5), while "activated carbon" is listed in table 5-4A. Names used to refer to various technologies should be consistent throughout the document.	Please see the response to Comment No. 1, above.
3	1	The applicability of potential treatment technologies to specific contaminant groups is referred to in sections 5.2.2.1 and 5.2.2.2, in the technology data sheets (appendix B), and on Tables 5-4A and 5-4B. It is not clear which contaminants will be treated by various technologies. Different references to the same technologies should be consistent.	The tables and text referenced specifically identify which technology groups and types apply to which contaminant types. The text discussion is more general than the tables and intentionally doesn't match the tables item by item.
4	2	The final TSP considers innovative and emerging technologies as potentially applicable treatment alternatives for RFP. Many technologies have been eliminated during preliminary screening from consideration for treatability testing, and rationale have been listed in Tables 5-6A and 5-6B. One common reason for rejecting these technologies from consideration is that insufficient information is available to evaluate effectiveness, implementability, or the potential of the technology to meet cleanup goals. Although little data may be currently available for innovative and emerging technologies presented in the TSP, they should be considered again in annual reports, as more information becomes available.	We agree that technologies which were eliminated from current consideration, due to insufficient information, should be re-evaluated in the Annual Reports as more data become available. Please see our response to the second part of EPA Comment No. 3

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5	2	Page 4-11, Paragraph 4. The text indicates that technologies appropriate for treatment of polychlorinated biphenyls (PCBs) may be considered at a later date. PCBs have been found at RFP and alternatives for treating these compounds should be included in the screening process. Rationale: The presence of PCBs at RFP requires consideration of potentially applicable treatment alternatives.	At the time of publication of the Final TSP, the presence of PCBs had not been confirmed Since the time the document was published, additional characterization data has been generated that indicates their presence. Technologies for treatment of PCBs will henceforth be evaluated in each Annual Report.
6	2	Page 5-1, Paragraph 4. The text states that technology data sheets have been provided in Appendix B for each technology retained for treatment of soils and sediments after preliminary screening, as listed in Table 5-5B. However, technology data sheet are only provided for some of the alternatives listed in Table 5-5B. Technology data sheets should be provided for each technology retained. Rationale: Technology data sheets provide information on treatment alternatives which contribute to the final screening of treatment technologies for testing. Technology data sheets for all retained technologies should be included for review.	The technology data sheets do address all the technologies retained. However, in some cases, several identical technologies are described on one general data sheet.
7	2	Page 5-3, Paragraph 5. The text indicates that statements of work (SOWs) are presented in Appendix C for each technology selected for bench-scale or lab-scale testing. However, SOWs are not presented for the same alternatives retained after preliminary screening as listed in Table 5-5B. Rationale: Consistency among text, tables and appendices of the revised TSP will contribute to the clarity and utility of the document. All of the SOWs should be included in Appendix C for completeness.	The purpose of SOWs is to provide direction for execution of treatability studies for those technologies that were retained after final screening, that is, which were actually selected for testing. There is no value in presenting guidance and instruction for test programs that will not be executed, i.e. those technologies that made it through the preliminary but not final screening. SOW's were provided for all technologies which were selected for testing, however some similar or identical technologies were described in one SOW.

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8	3	Page 5-5, Paragraph 5. Section 5.2.1 summarizes criteria used for rejecting or retaining potentially applicable treatment technologies. More detailed rationale for rejecting technologies should be included for clarity. In addition, reasons for rejecting specific technologies from further consideration are listed in Tables 5-6A and 5-6B. The explicit screening comments also should be included as a column in Tables 5-4A and 5-4B to clearly present the rationale for rejecting or retaining technologies. Rationale: Presenting the rationale for selecting or rejecting technologies for treatability tests is necessary to substantiate the screening process in TSP. In addition, the rationale in conjunction with the screening criteria clarifies the presentation of information.	Please see the response to EPA Specific comment number 3 page 1 above.
9	3	Page 5-8, Section 5.1.4. This section describes the differences between laboratory screening, and bench- or pilot-scale treatability studies. Specific reasons for selecting laboratory screening and bench- or pilot-scale treatability tests for individual technologies have not been discussed. Rationale for choosing different levels of treatability tests should be provided. Rationale: Treatability tests are conducted to provide data necessary to evaluate the effectiveness and implementability of each technology at a specific site. The level of treatability studies chosen as appropriate depends on the information available for each technology and the particular conditions of the site.	The criteria for selecting lab, bench or pilot level testing are provided in Table 5-7. The criteria were: 1) if the required data could be obtained from bench or lab scale, that level of testing was selected, 2) if the technology could not be tested at bench scale or required more information than could be acquired at that scale and pilot testing would be acceptable to agencies and community, it was selected for pilot testing.
10	3	Page 6-1, Section 6.0. This section describes the preparation of treatability study work plans. However, there is no basis for prioritizing technologies for performing treatability studies. The order in which tests will be conducted should be listed and discussed in the TSP.	At the time of publication of the Final TSP, the selected treatability studies had not been prioritized and a sequence had not been established. A prioritization system is being developed. Implementation schedules will be presented in Annual Reports. Please see the response to EPA Comment No. 36.

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		Rationale: After preliminary screening of technologies for treatability studies, there should be an understanding of the processes involved in the individual treatability tests. In addition, the sequence in which tests will be conducted should be defined.	
11	4	Tables 5-3A and 5-3B. These tables provide comprehensive lists of potentially applicable treatment technologies to be screened for treatability testing. The same list of technologies is provided in Tables 5-4A and 5-4B. Sections 5.2.2.1 and 5.2.2.2 of the final TSP present summaries of these technologies, and Appendix B contains technology data sheets for potentially applicable alternatives. Neither the text nor the technology data sheets discuss the same list of technologies as Tables 5-3A and 5-3B. The treatment technologies discussed in the text and described in the technology data sheets should be consistent with Tables 5-3A, 5-3B, 5-4A, and 5-4B. Rationale: Consistency among text, tables, and appendices of the revised TSP will contribute to the clarity and utility of the document.	The text is intentionally more general than the screening tables. The data sheets intentionally combine several similar or nearly identical processes. Please see response to PRC Comment 6, page 2 and EPA Comment 8, page 3 above.
12	4	Tables 5-4A and 5-4B. These tables list the preliminary screening criteria used to determine whether treatability tests should be performed for each treatment technology. However, relative costs of different technologies do not appear on these tables, nor are they discussed in the text. It is appropriate to defer the discussion of exact costs to site-specific treatability studies work plans; however, relative costs should be evaluated when determining whether to retain or eliminate technologies for treatability testing. A column listing relative costs should be included in Tables 5-4A and 5-4B.	The use of relative cost as a screening criteria in the TSP was excluded based on an agreement with EPA and Colorado Department of Health reached at a meeting of May 1, 1991.

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		The category labelled "Applicability" indicates the contaminants for which each technology is appropriate. In some cases, the contaminants have been incorrectly identified For example, in Table 5-4A, page T-58, the elements for which the Techtran process is applicable have been identified as radium and thorium. This technology does not treat these radionuclides, but it is applicable for uranium, plutonium, and americium. The applicability of technologies listed in tables, appendices, and text should be consistent.	We will review Table 5-4. The Techtran process will be discussed and corrected in the Annual Report.
		Within the category labelled "O&M Requirements" high, low, and moderate qualifiers are listed for some technologies The meanings of these terms are not defined in the text or in footnotes to the tables. Definitions of these terms should be included on the tables.	The meanings of the terms "high, low, and moderate" as they apply to O&M requirements were solely comparative terms used for qualitative ranking based on engineering judgment. These terms do not correspond to specific costs or ranges because they could not be developed at this time. The meaning of these terms will be clarified on future tables.
		According to Tables 5-4A and 5-4B, conventional technologies such as granular activated carbon (GAC) adsorption and membrane processes such as reverse osmosis and electrodialysis have been retained for treatability tests. However, SOWs are not presented for GAC, reverse osmosis, electrodialysis, and other conventional technologies. It is not clear why these alternatives have not been included for bench-scale testing. An explanation should be provided for not including these procedures in the SOW section.	This comment regarding conventional technologies is incorrect. Tables 5-4 do not represent technologies selected for testing. Technologies selected for testing appear in Table 5-8 and 5-9 entitled "Technologies Selected for Bench or Laboratory Testing" and Technologies Selected for Pilot Testing", respectively.
		Rationale: Cost information is a criteria for evaluating whether treatment technologies should be considered for treatability testing. Defining terminology will clarify the document and enhance understanding and consistency among text, tables, and appendices. Treatability studies are necessary to evaluate the effectiveness, implementability, and cost of conventional and demonstrated technologies for specific conditions at Rocky Flats.	
13	5	Table 5-4B. This table presents the preliminary screening criteria for treatability tests for soil and sediments. The information	Comment noted. The descriptive terms will be consistent in future documents.

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		provided for each technology should be consistent throughout the document and supporting material, as well as within individual tables and sections. For example, on page T-64, soil washing is identified as being "available," while on page T-72, soil washing is listed as "innovative". Rationale: Consistency among text, tables, and appendices of the revised TSP will contribute to the clarity and utility of the document.(To be provided by JPS)	
14	5	Table 5-5B. This table presents the technologies applicable to various contaminant groups for soil/sediment treatment. The technologies are organized by treatment type. However, physical and chemical treatment technologies are combined in the same column. Physical and chemical treatments should be separated into different categories. Rationale: Different processes are involved in physical and chemical treatment technologies. Combining these types of alternatives into one column suggests that the technologies are related.	For soil treatment it is sometimes difficult to make a clear distinction between physical and chemical approaches, and categorization would be arbitrary. For this reason these "categories" were combined. We will review this approach for future documents.
15	6	Appendix C. This appendix contains the treatability studies SOW's which present the objectives and general procedures for each treatability study. However, the operational parameters involved in each test and how they will be optimized in the studies are not clearly defined in the SOWs. In addition, the specific procedures involved in each study are not described. SOWs should include more detailed descriptions of operational parameters and procedures. The SOWs do not include explanations of monitoring of treatability tests or analysis of samples collected. Detailed discussions of monitoring and analytical procedures involved in specific treatability studies should be deferred to work plans for individual operable units (OUs). However, general introductions of	The purpose of the SOWs was to provide guidance to ensure consistency among technology specific workplans to be written at a later date. It was never within the scope of the SOWs to provide the level of detail described in this comment. These details will be provided in the technology Specific Work Plans. However, we will consider adding general monitoring and analytical requirements to future SOWs.

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		the requirements for monitoring and analytical considerations should be presented in the SOWs. Rationale: Descriptions of the procedures involved and the information required to conduct the treatability studies selected will clarify the intent of the TSP. Every aspect of the treatability test process should be introduced in the TSP. In addition, the TSP should include strategies for planning the experiment, conducting the procedure, and evaluating the technology. Monitoring the experiment and analyzing input and output solutions, soils, or gases also are essential parts of treatability testing.	