



Department of Energy

ALBUQUERQUE OPERATIONS
ROCKY FLATS AREA OFFICE
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7 - 881 Hillside RI
= al Draft
3039-17-04

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Gentlemen:

The Remedial Investigation Report for the high priority sites (881 Hillside area) has been completed. This Remedial Investigation Report contains results of additional drilling performed in 1987 and responses to the Colorado Department of Health and the Environmental Protection Agency comments received on a draft Remedial Investigation Report submitted to you in July of 1987. In addition to the report, a list of the response is presented for each comment made by the EPA and the CDH. This list is attached as a document separate to the Remedial Investigation Report.

This Remedial Investigation Report is being submitted for your comments as a "Draft Final" in accordance with EPA preferred terminology.

Questions regarding the Remedial Investigation Report may be directed to Ms. Candice Jierree at 303-966-2646

Sincerely,

W. Rask
William C. Rask, Chief
Operations Branch

Attachment

cc:

K. B. McKinley, Rockwell

ADMIN RECORD

"REVIEWED FOR CLASSIFICATION"

By *R B Hoffman*

Date *6/11/90*

"REVIEWED FOR CLASSIFICATION"

By *R B Hoffman* (C)

Date *7-6-90*

A-DU01-000107

REPLY TO EPA COMMENTS ON DRAFT 881 HILLSIDE RI REPORT

GENERAL COMMENTS

1. Comment: Section 2.0, Regional Setting and Site Features, is quite thorough. However, this information is not integrated in the data interpretations. For example, the significance of the geology/soils with potential contaminant migration is never evaluated. Is this area a potential recharge zone for deeper bedrock aquifers, and has this possibility been addressed?

Response: The affects of geology and soil type on contaminant migration will be discussed in the Site Hydrogeology chapter (Section 5.0). A regional ground-water hydrology section will be added to the regional setting chapter which will identify recharge and discharge areas for the bedrock aquifers.

Comment: The basis for selection of sampling locations, analytical parameters, sampling methods, and analytical methods are not presented. These are necessary for an adequate evaluation of the results, and conclusions in the report rely heavily on these. For example, soil gas sampling locations are extensive across the site; however, the method is not described. Radionuclide data may indicate contamination for some isotopes; however, analytical methods and detection limits are not provided. The basis for

selection of the radionuclides is not clear. What about decay and possible daughter products? Has this been considered adequately?

Response: The basis for selection of sampling locations, analytical parameters, sampling methods, and analytical methods are presented in the Installation Generic Monitoring Plan (IGMP) for Rocky Flats Plant and the site specific monitoring plan (RI Work Plan) for the 881 Hillside. Soil gas sampling methods are described in Appendix B (Soil Gas Survey) of the July 1, 1987 draft RI report and Appendix C of the final report. Radionuclide analyses methods and detection limits will be provided in the final report. Radioactive decay and the production of daughter productsd will also be addressed in the final report.

2. Comment: All EPA and CDH guidance or action levels for transuranic compounds in air, soil, and water should be summarized in a table with uniform units in order to facilitate comparisons with collected data. In addition, discussion should address the fact that much of this guidance has not been finalized. This report gives the impression that finalized standards and criteria exist, which is not true.

Response: Elevated plutonium, americium, and tritium in any medium is not apparent from the data, therefore such guidance and action levels are not applicable. Elevated

uranium concentrations exist in alluvial groundwater and chemical-specific applicable or relevant and appropriate requirements (ARARs) as well as calculated public health risks for uranium exposure are provided in the feasibility study of the 881 Hillside Area, (March, 1988).

3. Comment: Drinking water criteria for VOCs should also be summarized and compared to ground water and surface water VOC data.

Response: See response to General Comment #2.

4. Comment: The entire evaluation of the air exposure pathway is based on filters which primarily collect particulate that are 0.01 - 1.0 microns in size (page 6-1). This data is not representative of all particles actually respired and potentially lodged within the respiratory system. Maximum deposition in alveoli (60%) occurs with particles 3 microns in size, maximum deposition in the lungs as a whole (100%) occurs with particles 10 microns in size. Deposition in the lungs also occurs with particles up to 15 microns in size. See EPA (1982) and Cowherd et al. (1985) for a review of this issue. In addition, the possibility of larger particle sizes being ingested should be addressed.

Response: This comment refers to characterization of the air pathway with respect to radionuclides and not the "entire evaluation of the air exposure pathway." The filters used for

particulate collection are rated at 99.42 percent efficient in collecting particles 0.01 to 1.0 microns median aerodynamic diameter. They have greater efficiency in collecting particles greater than 1.0 micron median aerodynamic diameter. The filters used in the Routine Ambient Air Monitoring Program collect particulates that are representative of particles potentially respired and lodged in the lung. The ingestion of airborne radionuclides contributes a minor dose equivalent compared to deposition of airborne particles in the lungs and will therefore not be addressed.

5. Comment: Although potential receptors were quantified, no risk was ever quantified because it was assumed that the receptors would not be exposed. The RI needs to quantify the potential risks should exposures occur. Typically, the maximum plausible exposure is quantified as well as the average exposure.

Response: The 881 Hillside Feasibility Study, March 1988, addresses the potential risks of airborne contaminants.

SPECIFIC COMMENTS

1. Page EX-4, last paragraph

Comment: A site map is needed for reader orientation. The elevated organics and radionuclides should be identified.

Response: Page EX-4, last paragraph, refers to ambient air monitoring for radionuclides and Criteria Pollutants. Figures 6-1 and 6-2 showing air monitor locations are provided in Section 6.0 (Air). Neither volatile organics or radionuclides were elevated in air in the vicinity of the 881 Hillside Area based on data presented in Section 6.0.

2. Page EX-4, second paragraph, last sentence

Comment: The reference cited does not propose radionuclide drinking water standards.

Response: The correct reference will be cited. The new revised RI report defers all discussion on ARARs for radionuclides (and metals and inorganics) to the Feasibility Study for the 881 Hillside Area (March 1988).

3. Page 1-2, Section 1.1

Comment: This report describes the results of remedial investigations at only one of the high priority sites.

Response: The High Priority Sites at Rocky Flats Plant are those Solid Waste Management Units (SWMUs) located within the 881 Hillside Area. Thus, this report described remedial investigation results for all of the high priority sites at Rocky Flats Plant. This concept will be clarified in the revised report.

4. Page 1-8, Section 1.4

Comment: The previous investigations outlined here include all those conducted at Rocky Flats. A breakdown of those activities conducted at the 881 Hillside only is needed.

Response: The previous hydrogeologic investigations listed on page 1-8 and 1-9 at Rocky Flats Plant have been conducted on a Plant-wide scale. However, portions of each of these studies were conducted at the 881 Hillside Area, thus, these investigations were mentioned. This will be clarified in the text, and the portions of these investigations specific to the 881 Hillside Area will be discussed.

5. Page 3-1

Comment: For the 9 soil samples for which results are not yet available, a map or description of the location and SWMUs from which these samples were taken would be helpful.

Response: Borehole locations are shown on Plate 4-1 (881 Hillside Borehole, Monitor Well, and Cross Section Locations), and the borehole sample numbering scheme is presented in Appendix C (Description of Drilling Activities). This map and appendix should have been referenced on page 3-1; however, these data are available for the final report.

6. Table 3-1, page 3-2

Comment: The parameter list should include the analytical methods. Also, at some point in this section the

analytical detection limits should be presented, and compared to appropriate health standards. Further, the basis for selection of these parameters should be stated in the text.

Response: Analytical methods and detection limits as well as the basis for selection of analytes is presented in the RI Work Plan and will be referenced in the RI report. Discussion of ARA's is deferred to the Feasibility Study (Rockwell International, 1988).

7. Page 3-3, last paragraph

Comment: The postulated lab or field contamination with methylene chloride should be evaluated with lab or field blanks.

Response: A discussion of laboratory contamination of samples is provided in the final RI report in Sections 4, 5, and 6 as appropriated.

8. Table 3-2, page 3-4

Comment: The meaning of the analytical ranges reported with "U" indicators is unclear. Explain how ranges can be given for values less than detection limits.

Response: The ranges represent variability in detection limits for various samples. Thus, a range of 5U-10U indicates that the analyte was undetected for more than one sample, and the detection limits ranged from 5 to 10 for all samples. This concept will be clarified in the final RI report, and the

number of samples used to calculate the range will be provided.

9. Page 3-5, first paragraph

Comment: The misidentification of a SWMU location does not necessarily preclude it as a source of environmental contamination.

Response: The mislocation of a SWMU does not preclude it as a source of contamination. The location of SWMU 102 has been reviewed prior to submission of the final RI report.

10. Page 3-5, third paragraph

Comment: Soil gas results for SWMU 103, as well as other units discussed later, have been used to revise the location of these units. However, the possibility of migration (via gas or aqueous phase) is not discussed. In other words, due to migration, soil gas results may not exactly coincide with the original disposal location, but may be used to evaluate the direction and magnitude of migration (i.e., soil gas results may reflect a contaminant plume).

Response: Soil gas results may indeed reflect a contaminant plume rather than a source. Additional drilling was performed at the 881 Hillside to further investigate the SWMUs and resulting soil contamination. Results of this program will be presented in the final RI report, and source contamination will be differentiated from contaminant plumes where possible.

11. Page 3-15, Sections 3.9 and 3.10

Comment: It is not clear whether soil samples were collected at SWMUs 145 and 177. If they were not, samples should be collected and analyzed to confirm that these sites are not sources of contamination. If samples were collected, data should be presented as it was for the preceding SWMUs.

Response: Soil samples were not collected from SWMU 177 as it is being closed under Interim Status and will not be addressed in the final 881 Hillside RI report. There is no evidence for the presence of SWMU 145 as discussed in Section 2.24, therefore, SWMU 145 was not discussed in Section 4.0.

12. Table 4-1, page 4-3

Comment: The table needs more explanation. When were the tests conducted? What was the duration of the drawdown recovery, slug and packer tests? What methods were used to analyze the data? What confidence intervals can be applied to the hydraulic conductivity values? Do the test interval footages correspond to screened intervals, sensing zones, saturated thicknesses within a well or confined zones intercepted by a well.

Response: Data, results, and analyses of drawdown-recovery tests, slug tests, and packer tests are presented in Appendix E (Hydrogeologic Data) of the final report. Table 5-1, 5-2, and 5-4 summarize these data.

13. Page 4-4, Section 4.2

Comment: The discussion of how bedrock dip was estimated needs to be revised. Well 5-87BR is not present in any of the cross-sections on Plate 4-3, and based on the cross-sections no correlations between the indicated wells can be made.

Response: Well 5-87BR is shown on Cross Section H-H' (Plate 5-4).

14. Page 4-5, last paragraph

Comment: Only one seep has been investigated at the 881 Hillside. Are there others? How does the location of buried paleochannels correlate with soil gas plumes?

Response: These questions will be addressed in the revised RI report. Only one seep (SW-881HS) has been identified at the 881 Hillside. No buried paleochannels are believed to exist as evidenced by the discontinuous nature of the sandstone units.

15. Page 4-7, Section 4.3.2

Comment: In the discussion of vertical hydraulic gradients and associated ground water flow between alluvium and bedrock materials, it should be restated that despite the strong downward gradients, the hydraulic conductivity in the Arapahoe claystones is small enough and the conductivity differences between alluvium and bedrock are large enough that most alluvial ground water flows laterally along the

alluvium/bedrock contact rather than flowing downward into the bedrock.

Response: This concept will be discussed in the final report in Section 5.0. A summary of the hydraulic gradients are presented in Table 5-3.

16. Page 4-9, Section 4.3.2

Comment: More discussion should be provided on the concept of contaminant flow being dependent upon alluvial saturated conditions. Also ground water flow through fractures and enhanced flow rates resulting from this should be discussed.

Response: Seasonal variations in alluvial saturated conditions will be addressed to the extent possible in the revised report. The potential for ground-water flow through fractures will also be discussed.

17. Page 4-12, Table 4-2

Comment: The table needs to be revised to indicate (1) which data have been through data validation procedures; (2) what the "<" and "-" symbols indicate; (3) what the radiochemistry "+/-" results imply and why some of these pairs have such a large range; (4) field parameter (pH, T, SpC) data; and (5) suspected source of error for cation-anion balances higher than 10%.

Response: These concerns will be addressed in the revised report.

Comment: The text should address the mechanisms that might be controlling ground and surface water chemistry. Do the analyses indicate whether or not controlling mechanisms are present for the contaminants (e.g., complexation, precipitation, or adsorption of radionuclides).

Response: The presence and effects of such controlling mechanisms will be addressed to the extent possible in the revised report.

18. Page 4-27, Section 4.5

Comment: Contaminant flow velocities or at least effective ground water flow velocities, should be discussed. Some discussion on contaminant characteristics, degradation mechanisms, and retardation factors should be included as well.

Response: Effective ground-water flow velocities are discussed in Section 5.3 (Ground-Water Flow). Some discussion of contaminant characteristics, degradation mechanisms, and retardation factors are presented in Section 5.4.2.

19. Page 5-1, last paragraph

Comment: Why were flow measurements not taken during May, 1987? This could represent an important seasonal high flow period.

Response: Unfortunately, flow measurements were not taken during May, 1987.

Comment: Flow data (charts and/or tables would be useful) indicate wide variations with the downstream direction. However, the implications of this are not addressed. For example, could water be infiltrating and moving through the stream channel alluvium at certain locations? Water balance would be calculated on the interceptor ditch and Woman Creek. Also, what was precision of flow measurements, i.e., were replicate measurements performed?

Response: A series of hydrographs have been designed and presented in Section 5 to illustrate seasonal fluctuations in the ground-water levels. Seasonal information was not available for surface water stations.

20. Page 5-2, Section 5.1.2

Comment: The radiochemistry results present in Appendix E-6 contain such large error ranges that interpretations of these data are virtually meaningless. The text should be revised to reflect this.

Response: Large error terms for radionuclide results are explained in Section 4 of the final report.

21. Table 5-2, page 5-4

Comment: What do "-" (negative signs) indicate on tables? What are "ND", "NS", etc? The radionuclide data should contain error estimates, or reference Appendix E-6, which contains these numbers. Data indicate high levels of PO4 for SW-C2 and SW-28 (20 mg/l). Implications are not discussed.

Response: All symbols and abbreviations used in tables will be explained in the revised report, and error estimates for radionuclide data will be presented or referenced. The occurrence of phosphate will be addressed.

22. Page 5-16, last paragraph

Comment: Tritium sediment samples are reported in pCi/ml. This should be pCi/gm, since this analysis is a solid, not water.

Response: The Tritium results are in pCi/ml, and these are the correct units; it is found in the water associated with the soil.

23. Page 6-1, last paragraph, fourth sentence

Comment: Particulate sizes collected are not reflective of total exposures to the respiratory system (see General Comment #4).

Response: Please see response to General Comment #4.

24. Page 6-2, second paragraph

Comment: Of the 23 on-site sampler, 5 are analyzed bi-weekly for plutonium. How frequently are the remaining 18 samplers analyzed for plutonium?

Response: The remaining 18 samplers are analyzed for total long lived (TLL) alpha activity. If the TLL of a sample exceeds the Plant screening guide of 0.01 picoCuries per cubic meter, then the sample is specifically analyzed for plutonium. This procedure and its rationale will be explained in the final report.

25. Page 6-2, third sentence

Comment: Include reference for DCG for W and Y plutonium classes.

Response: The text has been altered to address this comment.

26. Page 6-5, Section 6.1.1

Comment: The text needs additional evidence or quantification in order to justify the statement that "field activities are not contributing significantly to plutonium movement."

Response: Additional evidence has been provided.

27. Page 6-7, last paragraph, second sentence

Comment: Respirable particle should be ≤ 10 microns (see General Comment #4).

Response: Please see response to General Comment #4.

28. Page 8-6, third paragraph, second sentence

Comment: This statement cannot be verified with existing data.

Response: This comment presumable refers to the sentence "This network has found ambient air samples to be well within applicable regulations and guidelines for the protection of human health and the environment for all radioactive contaminants monitored that could possibly have originated from the 881 Hillside Area." Data will be provided with which to justify that plutonium concentrations in air are within applicable regulations and guidelines for the protection of human health and environment.

29. Page 8-7, third paragraph, second sentence

Comment: Is well 61-86 the same as 61-86A on Plate 4-1?

Response: Well 61-86 not located on the 881 Hillside and is a separate well from the abandoned borehole, 61-86A, shown on the maps in Section 5.

30. Page 8-7, third paragraph, fifth sentence

Comment: Define "clean"

Response: The term "clean" has been edited from the text

31. Page 8-7, third paragraph, sixth sentence

Comment: What does VOC data from well 64-86 show? Wells 15-74 or 65-86 are not shown on Plate 4-1. What does VOC data from wells 15-74 and 65-86 show?

Response: All wells mentioned in the final RI report will be shown on appropriate figures or maps. VOC data from alluvial wells completed in Woman Creek alluvium will also be provided in the revised report.

32. Page 8-8, Section 8.2.4

Comment: The text should include a discussion of how the 18 hour flow time was derived for surface water traveling between stations SW-45 and SW-44. The argument of turbulence of surface water flow as a mechanism for volatilization is inconsistent with the flow rates presented, and should be revised or removed.

Response: Calculations of the flow time will be provided in Section 6.0.

33. Page 8-9, last paragraph, second sentence

Comment: This conclusion has only been verified for organics.

Response: This conclusion will be reevaluated and revised accordingly in the final report.