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PH. III RI/FS W.P.

CORRES CONTROL
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DIST	LTR	ENCL
ALLHOFF F H.		
BREEN, J H		
BRETZKE, J C		
BURLINGAME, A H		
DAVIS, J G.		
FERRERA, D W		
FERRIS, L R.		
FRANCIS, G E.		
GOODWIN R.		
HEALY, T J.		
IDECKER, E. H		
KERSH, J M	X	X
KIRBY W.A.		
MAJESTIC J R		
McKINLEY K B	X	X
MELLEN J B		
PARNELL, R F		
POTTER, G.L.	X	X
RHODES J.L.		
RISNER, V.L.		
SAVEGOD, T H		
SHANNON, W.M.		
VAN LEUVEN, D B		
WARNER, B P.	X	X
YOUNG, E R.		
BETCHER, D H		
CARNIVAL, G.J		
HARMAN L.K.		
HEBERT, J L		
HOFFMAN, R B		
KLAMMAN R L		
KRIEG, D M		
LOUDENBERG, G.E.		
NAMON, E R		
NEWBY R L		
TURNER, H L		
VELASQUEZ, R N		
CORRES CONTROL	X	X
CONTRACT ADMIN		

Received for Addressee
Corres Control RFP

5-23-90
Date By
Ref Ltr #

STATE OF COLORADO

COLORADO DEPARTMENT OF HEALTH

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MAY 22, 1990

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ROCKY FLATS PLANT
CORRESPONDENCE CONTROL
MAY 23 12 08 PM '90

Re: Comments on the February, 1990 Phase III RI/FS Workplan for OU1.

Dear Messrs. Nelson and Warner,

The Colorado Department of Health, Division of Hazardous Materials and Waste Management ("the Division") has reviewed the Draft Phase III RI/FS Workplan for Operable Unit No. 1 (OU1) as identified in the December 14, 1989 proposed Interagency Agreement (IAG).

The Division's comments are enclosed. Many of the general comments are similar to those presented by the Division and EPA in February on the Draft Phase II Workplan for Operable Unit II (OU2). Revision of the Phase III OU1 Workplan must take into account the agencies' comments on OU2 where applicabl

Overall, the plan appears comprehensive, however, concerns regarding plans fo characterizing the sources and nature and extent of contamination exist. Identification of hydraulically interconnected units, such as the sandstone units, which may be impacted by hazardous waste releases must be located. Th ongoing seismic study will greatly benefit this cause. The Division emphasizes the need for a comprehensive evaluation of all data sources such a drill logs, seismic study, hydraulic testing, and air, ground-water, and surface water analytical results to fully characterize the nature and extent of contamination at OU1.

ADMIN RECORD

If you or members of your staff have questions regarding these comments, please contact Patricia Corbetta at (303) 331-4843 or Gary Baughman at (303) 331-4830.

Sincerely,

Gary W. Baughman

Gary W. Baughman, Unit Leader
Hazardous Waste Facilities
Hazardous Materials & Waste Management Division

cc: Lou Johnson, EPA
Nat Miullo, EPA
Joan Sowiniski, CDH-HMWM
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Teresa Hampton, AGO
Howard Brown, RFEMC
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GWB:PC/kjb/mm
5786K:41/42

CDH Comments
DRAFT PHASE III RI/FS WORKPLAN
881 HILLSIDE AREA (OU 1)
FEBRUARY, 1990

1.4.8 Radioactive Site - 800 Area #1 (SWMU Ref. No. 130).

A copy of the Owen and Stewart Report 1973 is requested for review. It is likely that this report will be reviewed and summarized in the historical release report to be submitted under the IAG. Additional information may be gained by reviewing this report at an earlier time.

1.4.10 Building 885 Drum Storage Site (SWMU Ref. No. 177).

Ground-water contamination from SWMU 177, if present, is to be addressed under OU3 as outlined in the 1989 IAG draft. However, if it is technically more practical to address clean up of contaminated ground-water at SWMU 177 under OU1, then the closure of SWMU 177 must be addressed prior to ground-water clean up at OU1.

2.2.1.1. Surficial Geology

The text states that artificial fill covers the colluvium at SWMU 130. The map in figure 2-2 does not indicate this and needs correction.
The text does not describe in detail the composition, grain size, and sorting and hydrologic properties of the surficial deposits. These properties are important in understanding the transport capabilities of contaminants in ground water.

Colluvium

The text states that the area south of SWMU 130 is undisturbed colluvium. This is not consistent with figure 2-2. The area immediately south of SWMU 130 is shown to be disturbed.

The text sites the correlation of basal gravel in wells 59-86, 69-86, and 8-87BR. Figures 2-1 shows well 8-87 but not 8-87BR. It is assumed that 8-87 and 8-87BR are the same wells. Test and figures must be reviewed for consistency.

It is important to illustrate in cross-section the correlation of the gravel zones within the colluvium. Cross-sections can thus be used to provide a better understanding of ground-water flow conditions in the area.

2.2 12 Bedrock Geology

If reference(s) were used in this section, they must be cited.

Claystones

The thickness of claystones and fracture density in the Arapahoe Formation must be stated in specific terms. Generalizations (i.e. mild fracturing) does not lend to understanding the hydrogeologic conditions at the site.
Well 5-87BR and abandoned well 7-87BRA are identified as 5-87 and 7-87A on figures 2-1. Consistency between the text and figures is necessary.
The results of Packer tests at wells 5-87BR and 8-87BR must be presented separately. Averaging the values does not seem appropriate as bedrock in well 5-87BR was "mildly" fractured and only one "45 degree" fracture was found in the bedrock at well 8-87BR. Additionally, these locations are greater than 600 feet distant to each other.

Explain how fractures are distinguished from drying of clay bedrock upon removal and storing of core.

Cross-sections illustrating the vertical extent and degree of fracturing and the extent of weathering in the claystone are necessary.

Sandstones

Although the extent of sandstone units are not well defined, it is known that more than one sandstone unit is present. A summary of findings accompanied with cross-sections is appropriate.

Ground-water Flow Directions

Potentiometric surface maps should be updated to reflect the 1989 water-level data. Any changes or trends in data between 1988 and 1989 should be noted and evaluated. Data collected from 1989 wells may contribute greatly to interpretation of ground-water flow conditions.

The interconnection between the south interception ditch and ground-water flow can be better determined using water level data from wells to the south of the ditch and also west of 47-87 (i.e. 2-87, 59-86R, 55-87 and 64-86).

If ground-water is below the base of the interceptor trench, the potential for contaminated ground-water to migrate downgradient toward Woman Creek is likely. Ground-water could potentially emerge at seeps and flow into the creek.

Ground-water flow rates

The mean ground-water velocity through colluvium is calculated to be 155 feet per year rather than 150 feet per year as stated in the text.

Contaminants have not been found at well 47-87 because the well was dry during sampling events. The values determined for ground-water velocity vary two orders of magnitude (1,400 feet per year to 13 feet per year) indicating that the Packer test results were not conclusive and that the flow velocity is highly dependent on the geologic medium through which it passes.

More evaluation is necessary to determine flow velocity in regard to future remedial actions and past releases. It is possible that preferential subsurface pathways with the high hydraulic conductivities exist which would allow for release to Woman Creek especially prior to construction of the interceptor ditch.

The loss of water to evapotranspiration is critical to evaluating ground-water conditions and total distance traveled in a year.

The supporting data for the evapotranspiration evaluation should be illustrated graphically to show seasonal variations and trends.

The ground-water velocity, based on the geometric mean hydraulic conductivity of 1.5×10^{-3} cm/s is 326 feet per year and not 220 feet per year based on the equation:

$$v = k \frac{dh}{dl} / n$$

where $k = 1.5$ cm/s

$\frac{dh}{dl} = .021$

$n = 0.1$

and $1 \frac{cm}{s} = 1.035 \times 10^3$ feet per year

When ground-water is not flowing during one season, due to evapotranspiration, there is less water available in the system. The available water is capable of flowing at the same velocity as during the other seasons. Thus, the reasoning behind dividing the flow velocity by four and multiplying by three to arrive at a maximum possible velocity does not seem reasonable.

2.2.3 Surface Water Hydrology

2.2.3.1 Woman Creek

The time of year during which the surface water measurements were taken along Woman Creek must be referenced as seasonal fluctuations have a large impact on the ground-water flow and interconnection to Woman Creek. The statement that there is frequent interaction between Woman Creek, the South Interceptor Ditch and the shallow ground-water system indicates that a flow path for contaminant release exits into the surface water drainages.

2.3 Nature and Extent of Contamination

2.3.1 Background Characterization

CDH comments on the Background Geochemical Characterization Report apply to this section of the RI report.

Probability distributions for measured values where the error term is larger than the measured value should be avoided by taking a minimum of 25 readings from each sample.

Background samples should have been analyzed for VOCs to verify that they are unaffected by known and unknown contaminated areas.

Data evaluation must include graphical analysis showing the sample locations where parameter concentrations are measured as greater than background.

Borehole locations, depths, and sample locations should be shown graphically in cross section (Table 2-6).

2.3.2.3 Radionuclides

Plutonium in surface scrape at 881-41 also occurred at an elevated level. This location is at least 1,500 feet southwest of the 903 pad and may not be related to contamination from the pad.

Uranium cesium, and tritium values (Appendix A) should be shown graphically in cross section.

The question regarding cesium occurring as a natural constituent or from a criticality accident depends on if the isotope is present or the metal. If cesium 137 is present due to fallout, then values of fallout must be provided with references for comparison.

On Figure 2-10, the data does not support the lines of equal TDS concentration. For example, the TDS concentration at well 1-74 is indicated as 1646 mg/l but falls within the bullseye for the 1770 mg/l contour as indicated at wells 43-87 and 4-87. The data indicated that a separate contaminant source lies south of SWMUs 130 and 119, or that contaminants are being concentrated in an area downgradient from the SWMUs.

The number of data points is inadequate to determine the extent of contaminant migration between wells 8-87 and 47-87. It is indicated, however, that contamination (nitrate) has migrated beyond the south interceptor ditch.

The TCE and PCE concentration maps (Figures 2-8 and 2-9, respectively) do not adequately project conditions through time. For example, well 48-87 was dry during second quarter 1989 but not during first quarter 1988. Trend analyses are necessary to understand the extent of ground-water contamination. This is especially important in this location as VOCs are detectable in the ppm range upgradient from Woman Creek.

On Figure 2-12, it is not clear why two isopleths cross each other. the highest selenium values occur in or adjacent to SWMU 119.1, an area of high VOC contamination. Is selenium a parameter in the waste? Strontium, nickel, and zinc values also are high near SWMU 119.1. It is possible that the high VOCs leach the metals from their matrix. If this is the case, this can be an indicator and provide supporting evidence for the extent of contamination.

Figure 2-16 indicates that the source of uranium is not necessarily localized but dispersed at this time. Thus the higher concentrations near wells 43-87 and 6-87. It is not clear why the 53 pci/l contour lies outside the 35 pci/l contour.

The text lacks a discussion on plutonium occurrence in this area.

3.3.3. Summary of Extent of Contamination

The text indicates that contaminants have not migrated an appreciable extent. However, the data and figures indicate that contamination may have migrated to and possibly the south interceptor ditch.

2.3.4 Surface Water

It is not understandable or acceptable why surface water data have not been received for dissolved and total radiochemistry analyses given that the investigation began in 1987.

2.3.5 Sediements

The sediment station locations must be indicated on a map with analytical results.

Although acetone is not a likely sediement contaminant at the SED-30 sample location, its presence at a concentration of 200 mg/kg indicates significant problems with sampling and or analytical techniques. The area requires resampling for verification of results.

2.4 Applicable or Relevant and Appropriate Requirements

Table 2-11 lists 1,1,-dichlorethane as a RCRA Appendix VIII constituent. The background value for this constituent is therefore relevant and appropriate. (See EPA comments of February 14, 1990 on the Draft Phase II RFI/RI workplan for OU2).

Table 2-11, page 2-71 and page 2-75 the units for ARARS must be mg/l and pCi/l, respectively.

The standards for metals and organics must be changed to include most recent Colorado standards reclassification (Notice of Final Adoption of February 15, 1990). Table 1 of the new standards lists the TCE standard as 0.8 based on fish ingestion which is more restrictive than the standard based on carcinogen water supply.

2.5. Sampling and Analysis Requirements for Remedial Alternatives Evaluation

EPA comments on Section 2.5 of the Draft Phase II RI/FS Workplan (alluvial) for OU2 must also be considered in this report.

3.1 Phase I and II RI Conclusions

Conclusion (7), the radionuclide contamination at SWMU 130 was no adequately evaluated in the Phase I RI report to conclude that plutonium was not detected.

3.2 Site Specific Phase III RI Objectives and Data Needs

CDH comments of February 15, 1990 on Section 3.2 of the Draft Phase II RI/FS Workplan for OU2 apply to Section 3.2 of this report also. These comments are cited below.

Characterize Site Physical Features

The hydraulic interconnection between the surficial deposits and bedrock must be determined through hydraulic testing. Sandstone lenses in the Arapahoe Formation must be delineated in order to evaluate the fate and transport of contaminants. Delineation can be achieved through drilling and seismic studies.

The hydraulic properties of the underlying bedrock must also be determined through aquifer testing.

During drilling, logging and other site characterization activities, a geologic oversite program must be implemented that emphasizes consistency in geologic mapping and core logging.

Characterize Contaminant Sources

Installation of wells may not necessarily be restricted to the alluvium. The impact of releases on the uppermost aquifer must be determined.

Characterization of the Nature and Extent of Contamination

The vertical and horizontal extent of contamination due to radionuclides, VOCs, and inorganics in the uppermost aquifer and surface water must be determined. Ground-water monitoring wells must be installed into all hydraulically interconnected geologic units. As nitrates were detected south of the 881 Hillside, nitrate analyses must be included.

Tracking of plumes through time is necessary to determine the rate and extent of contaminant migration. Data evaluation and analyses is a necessary step to characterization of the nature and extent of contamination.

Provide a Baseline Risk Assessment

The migration pathways and receptors must be identified as part of the baseline risk assessment. Identify the migration pathways, receptors, toxicity and quantity of contaminants.

Addition of New Categories

- Identify appropriate IM/IRAs for OU1 if necessary.
- Identify and implement data management procedures.
- Identify the necessary upgrades to the air monitoring program for detection of possible releases during RI/FS activities.

Table 3.2, Comparison of Chemical-Specific ARARs and TBCs to Analytical Detection Limits of the Draft Phase II Workplan for OU2 must also be included in Section 3.2 of this report. The table must be revised to address EPA's comments on the previous document. That is, detection limits must be modified for all analyses where detection limits are greater than the ARAR standard.

4.1 Remedial Investigation Tasks

4.1.1 Task 1 - Project Planning

The current seismic reflection program will help in the evaluating hydro-geologic conditions at OU1. Results of the study should be used in scoping further investigation at OU1.

4.1.2 Task 2 - Community Relations

The final workplan must mention the interim community relations plan.

4.1.3 Task 3 - Field Investigation

Many of the comments provided by CDH and EPA on the Draft Phase II RI for OU2 regarding Section 4.1.3 apply to this report.

4.1.5 Task 5 - Data Evaluation

Data evaluation must also be used to determine the rate of ground-water flow and contaminant migration.

Data collected from the seismic study, drilling, water level measurements, and any other characterization activities must be evaluated and used to construct detailed cross sections and plan maps depecting site-specific geology, hydrology, and nature and extent of contamination. Cross-sections are necessary to illustrate the vertical extent of contamination and to identify data gaps. Results of the Backgroumd Geochemical Characterization Report must be incorporated into the characterization study of OU1.

4.1.6 Task 6 - Baseline Risk Assessment

CDH comments on the Draft Workplan for OU2 are to be considered in this report also.

4.1.6.1 Public Health Evaluation

Contaminant Identification

Contaminants occurring at OU1 must be considered in the risk assessment regardless of the frequency of contaminant occurrence.

Toxicity Assessment

In order to asses the risks from a site, the projected concentrations of all constituents analyzed must be compared to ARARs to judge the degree and extent of risk.

A summary of toxicological studies performed must include an evaluation of all constituents found in concentrations greater than ARARs.

CDH must also be consulted regarding the appropriateness of the data and methodologies to be used in deriving reference values.

4.1.7 Task 7 - Treatability Studies/Pilot Testing
See additional attached comments.

It is a possibility that soil contamination is present at boreholes 1-87, 57-87 and 58-87. Therefore, a section on soil decontamination is necessary.

4.1.8 Task 8 - Remedial Investigation Report

The report must also discuss the rate of contaminant migration and include all data from quarterly ground-water and all surface water sampling events.

Section 5.1 Sampling Location and Frequency

All wells must be sampled on a quarterly basis at a minimum. A higher sampling frequency during wetter seasons may be necessary to determine if contamination is moving in slugs.

Wells must be completed to a depth below their vertical extent of contamination.

5.1.1.3 Liquid Dumping Site (SWMU Ref No. 104)

For complete investigation of this area, one borehole must be completed as a monitoring well. If contamination of ground-water is found, installation of additional wells will be necessary to determine the extent of the plume.

5.1.1.5 Outfall Site (SWMU Ref No. 106)

If contamination at the outfall is found, other monitoring wells and boreholes up and downgradient of the pipe may be necessary. Upgradient locations would be necessary to locate possible leaks in the pipe.

5.1.1.6 Hillside Oil Leak Site (SWMU Ref No. 107)

It is not clear where ground-water samples will be collected within SWMU 107. No new monitoring well locations are shown on Figure 5-1.

5.1.1.7 Multiple Solvent Spill Sites (SWMU Ref. Nos. 119.1 and 119.2)

SWMU 119.1

Additional ground-water monitoring wells are needed to confirm hydrogeologic conditions and to trace the extent of ground-water contamination. Suggested locations are: at the southwestern end of SWMU 119.2 and south of the road but north of the dry wells 50-87, 62-86, an 63-86.

5.1.2 Sample Analysis

Explain how the results of the experiment designed to determine the source of phtalate contamination will be presented to CDH and EPA.

5.2 Nature and Extent of Contamination

5.2.1.1 Monitor Well Locations

SWMUs 119.1 and 119.2

It is important to evaluate the data from the seismic study to determine the location of sandstones and hence the location of the monitoring wells.

5.2.1.2 Chemical Analysis of Ground-Water Samples

Prior to reducing the parameter list for analyses, DOE must receive approval from CDH and EPA.

5.2.1.3 Hydraulic Testing

Pumping and Tracer Tests in Woman Creek Valley Alluvium

The locations of the pumping and tracer test locations must also be illustrated on a smaller scale to show their geographical relationships with SWMUs.

Pumping Test

The references for the hydraulic conductivity, storage coefficient and saturated thickness must be given. Calculations showing how the sustained discharge was determined and the drawdown values from the pumping site must be provided. All calculations must be provided.

The need for specific hydrogeologic data to determine fate and transport conditions of contaminants is recognized. Explain why the more detailed pumping tests are only proposed for Woman Creek alluvium.

5.3 Evaluation of Proposed Interim Remedial Action

5.3.1 Borehole Location

Additional monitoring wells and or piezometers are necessary south of the French Drain and west of the cluster P201 through P204.

5.3.2. Chemical Analysis of Soil Samples

A sample must be taken if contamination is suspected by staining, discoloration or odor.