Colorado Department of Health
Hazardous Materials and Waste Management Division

Final Phase III RFI/RI Report November 1993
Operable Unit 1 881 Hillside Area

GENERAL COMMENTS

Treatment of French Drain in Baseline Risk Assessment The treatment of the french drain through out the baseline risk assessment is unclear The environmental evaluation clearly states in the purpose and scope discussion that the french drain is not considered in the ecological assessment The public health evaluation discussion in section 6 3 does not mention the french drain or how it was treated in the PHE This could lead one to assume that the french drain was treated consistently in both the EE and PHE and therefore not considered in the PHE A review of Appendix F Public Health Evaluation indicates that the french drain is considered in the elimination of potential exposure pathways for the PHE The Division requires that the treatment of the french drain in the BRA be clarified and specifically that a discussion of how the french drain was treated in the PHE be added to section 6 3 and Appendix F of the report

Meeting Minutes The inclusion of DOE contractor notes and minutes from meeting regarding OU 1 in Appendix I Response to Agency Comments is not appropriate Many of the notes and minutes presented were not distributed to the Division and none have been reviewed or concurred with by Division staff who attended the meetings The Division requires that all meeting notes minutes and attachments be removed from this report The Division further requests that in the future all notes and minutes from meetings that the Division attends be submitted to the Division for review and concurrence before being entered into the administrative record

Hot Spot Sampling Data, Analysis and Conclusions The discussion of hot spot sampling results in section 4 4 2 3 and 4 9 1 4 states that plutonium contamination was found at a depth of up to 10 feet. According to the sampling plan Attachment A5 hot spot sampling was conducted to a maximum of 24 inches with a hand shovel There is obviously an error in the reporting of the hot spot results This error appears to be carried through the remainder of the report At the December 3 1993 OU 1 Phase III RFI/RI meeting DOE concluded that this error was due to an error in transcribing field results The Division requires that DOE review the original radionuclide hot spot field data verify its accuracy and correct all data summaries analysis and conclusions associated with the hot spot data. A summary of corrections to the report and impacts on the results of the report should be included in the response to this comment.

Hot Spots Removed by Sampling The report states repeatedly that the radionuclide hot spots were removed by sampling This conclusion is not supported by the hot spot field data which indicate elevated radionuclide levels in the deepest samples collected at several locations The Division requires that all statements that the radionuclide hot spots were removed by sampling be substantiated or deleted from the report

Summary of Findings and Conclusions of the Report This report is by necessity very large and extremely complex It could be difficult for stakeholders to find answers to the most basic questions being addressed in this report 1) what areas are contaminated and 2) what are the risks associated with that contamination without digging deep into the technical discussions and attachments

The Division requests that DOE add the following information to the Executive Summary of this report

1) Simplified maps depicting in general the source areas and the extent of contamination at OU 1 for at least VOCs and metals in groundwater radionuclides in surface soils and PAHs in surface soils and
2) A table summarizing the PHE quantitative risk and hazard index estimates for each exposure scenario evaluated The executive summary currently reports only the range of risk estimates and which scenarios are above the NCP targets

Data Validation The Division is concerned about the potential impact on the PHE of the low percent validated and high rejection rate for radionuclides in surficial soils on the PHE in the BRA In section 4 1 2 1 Data Validation it is reported that 66% of all the data had been validated with an overall rejection rate of 4% However radionuclides in surface soils results have been validated for only 43% of the data with a 41 % rejection rate

Surficial radionuclide contamination is very significant to the baseline risk assessment with inhalation of Pu 239 240 and Am 241 calculated to present the highest risk in many exposure scenarios During the December 17 1993 RFI/RI Review meeting DOE stated that the high rejection rate would not have a significant impact on the results of the PHE The IAG requires that validated data be used in the BRA The Division is unsure why the data validation process has not been completed for OU 1

The Division requests an analysis of the potential impact of the low percent validation and high rejection rate for radionuclides in soils be added to the uncertainty analysis in the PHE and that when data validation is completed the validated data set be compared to the data set in this report in support of the feasibility study

Documentation of Contaminant of Concern Selection Process The COC selection process is complicated voluminous and integrates across several sections of the RFI/RI report making it difficult to understand and follow the complete process or to evaluate the impact of any specific step on the final PHE results To insure the integrity of the report and improve its dissemination the Division believes it is critical to maintain accurate systematic documentation of the COC selection process and its implementation

Inconsistencies in the current reporting and documentation of each step in the COC selection process have made it difficult if not impossible to trace the path of any specific chemical through the process from the field data summary tables to the final COC lists Many chemicals have been dropped at various steps in the selection process without explanation or supporting rational Many tables appear to be erroneous or inconsistent with other tables or the text A large majority of apparent inconsistencies and errors encountered while reviewing the COC selection process can be attributed to poorly labeled and incomplete summary tables At many steps in the process information needed to review the conclusions from a step are not readily available or must be pulled from several sources

One example of this is Table F3 3 Summary Statistics Volatile Organics Groundwater which summarizes the analytical results and indicates which chemicals were retained for the toxicity and RBC screens This table presents an incomplete picture of the COC selection process giving the appearance of a deviation from the agreed to methodology Missing from the table is the professional judgement screen which eliminated many of the contaminants listed in the table from being retained for toxicity screening regardless of detection frequency

The Division requests that DOE compile a series of tables summarizing the fate of contaminants through each step of the COC selection process Separate tables should be developed for each media and each of the three classes of contaminants organics [VOC SVOC PCB/Pest] inorganics and radionuclides All chemicals detected in a media at the site should be listed in that medias table Fields across the table should follow the COC process presenting brief notations of the result of each step in the COC selection process ending at the far right with the final COCs

Nature and Extent of Contamination To support a feasibility study contaminant extent and type potential and actual migration pathways and migration mechanisms must be well understood Based on the information included in Section 4 of the report, there are four areas within OU 1 that potentially need a remedial evaluation in a feasibility study These areas are

a) the area under and around IHSS 145 and continuing down to and slightly down gradient from, the building 885 vicinity
b) the area around wells 0487 and 5287 and boreholes 32091 and 32191
c) the area within IHSS 119 1 with high concentrations of localized ground water contamination and
d) the area in the southwestern corner of IHSS 119 2 with high levels of soil gas concentrations and peripheral ground water contamination in well 34791

To support the feasibility study it is essential to develop and communicate a full understanding of the geologic hydrologic and contaminant regimes for each of these areas Therefore the Division requires that the following maps (scale no smaller than 1 = 100) and cross sections (horiz scale no smaller than 1 = 50 vertical exaggeration no larger than 10x) be constructed for each of the above areas to augment those already in the Final Phase III Report (also recognizing that some PAH and radionuclide contamination is better represented by the OU wide maps already included in the Report)

1 Surface topography base map showing locations of all boreholes wells piezometers etc regardless of their time of installation Each borehole etc should have the borehole number and total drilled depth posted next to it In addition IHSS boundaries and other appropriate information should be shown on this map including such items as the french drain roads fences bedrock/alluvial completions cross section grids etc

2 Bedrock surface topography map with a contour interval not exceeding 5 feet representing all wells and boreholes that penetrated the alluvial/bedrock interface

3 A series of maps interpreting the inter relationships between subsurface s ratigraphy bedrock topography and ground water occurrence and movement The specific maps for this series may vary for each area but must be internally consistent for the area under evaluation However maps for ground water extent by season and stratigraphic unit saturated thickness piezometric surface(s) and subsurface stratigraphy/lithologic units would seem to be the minimum necessary

4 A series of maps delineating and defining surface soil contamination subsurface soil contamination and ground water contamination These maps should not only post the analytical data next to the appropriate well or borehole but should interpret the extent of contamination as well They should also include all available data including pre-Phase III data particularly the Phase II soil gas data

5 At least one structural cross section through each of the subject areas that starts up gradient of the area and extends to some directly down gradient location and at least one structural cross section that extends some distance on either side of the subject areas in a direction perpendicular to gradient These cross sections should be as complete as possible indicating at a minimum the well/borehole number elevation at the ground surface total drilled depth

subsurface lithology screened intervals high and low yearly water levels bedrock surface and stratigraphic interpretation between wells/boreholes Including contamination information for each well/borehole in some manner should also be accomplished

6 Any other figures DOE deems necessary to fully communicate the conditions in each area

The goal of this effort should be clear To support a feasibility study contaminant extent and type potential and actual migration pathways and migration mechanisms must be well understood The contamination at a site must have a reasonable explanation that is technically developed but developed to the full extent that the data allows This goes beyond merely posting contaminant hits next to the appropriate well points A cohesive and complete story interpreting how and why the contamination is distributed in the manner found in the field is paramount to developing an effective remedy

Use of Professional Judgement Professional judgement is used to eliminate several chemicals from consideration as contaminants based on various arguments. Professional judgement can also be used to retain contaminants for consideration For example the chemical 1 2-dichloroethene was detected in groundwater at less than 5 percent frequency and failed the 1000 times RBC screen therefore it was eliminated from the PCOCs However 1 2-dichloroethene is a degradation product of a known OU 1 contaminant and narrowly failed both screens detected in 4% of the samples and at a maximum concentration of 12 000 ug/l was 218 times RBC The mean concentration of 1 2-dichloroethene at OU 1 is 106 6 ug/l This is one example of when professional judgement should be used to retain a contaminant as a COC The Division requests that DOE retain 1 2-dichloroethene as a COC in groundwater and include in the PHE uncertainty analysis a discussion of the impact of 1 2-dichloroethene on the quantitative risk assessment. The Division further requests that DOE review all PCOCs for any similar situations

RME Exposure Concentrations The RME exposure concentrations of COCs are presented in section F5 2 without supporting details The text simply states that COCs are 95% upper confidence limits and simple substitution was used for nondetects It is not clear what data were included in the COC calculations for each exposure scenario or what distribution was assumed in calculating UCLs It is imperative that enough detail be presented in the report to allow independent verification of all calculations. The Division requires a discussion of how RME concentrations were calculated including the data set (locations), all assumptions and sample calculations be added to the report for each exposure scenario.

External Irradiation Not Evaluated Quantitatively The risk from external irradiation was not quantitatively evaluated in this report Plutonium and Americium are both gamma emitters in addition to being alpha emitters by not considering the contribution of external irradiation the risk from exposure to these two radionuclides is underestimated The uncertainty of not considering external irradiation was never discussed Instead external irradiation is dismissed as not being significant at environmental levels The Division does not consider this argument to be appropriate in the PHE All of the information necessary to do these calculations is readily available Not doing these calculations will result in an underestimation of risk that is not necessary The Division requires that a quantitative evaluation of the external irradiation pathway be included in the PHE

Estimation of Inhalation RFCs from Oral RfDs Exposure to chemicals by inhalation of dust particles was not considered in this risk assessment because of the lack of published inhalation RfCs The analysis is incorrect. As stated in CDH comment 155 the oral toxicity value should be used to estimate inhalation RfCs for chemicals where no evidence exists in the literature that they cause irritant effects on the respiratory system. The Division requires that route-to-route extrapolation be used, where appropriate to estimate inhalation RFCs for the PHE.

Treatment of Chemicals without Toxicity Values The text on page F6-10 mentions that a major source of uncertainty to the risk estimations in this document is the lack of toxicity data for some chemicals and the response to CDH comment 127 states If neither a slope factor nor an RfD for a compound was given by EPA it has been discussed qualitatively in the uncertainty analysis However in the Uncertainty section only TCE is mentioned as not having an RfD No mention is made of any chemicals that were dropped from the COC list merely because there was no toxicity data RAGS clearly states (page 8 18) that any chemicals for which no toxicity data exists must be considered qualitatively in the risk assessment

The Division requires that the qualitative uncertainty section include a discussion of the underestimation of risk caused by the lack of toxicity values for each chemical At a minimum a complete list should be included of all chemicals and pathways that were present but were not considered in this risk assessment due to lack of toxicity values. In addition contaminants dropped from the PHE because toxicity values were not available should be carried through the intake calculations so that if toxicity values become available in the future they can be qualitatively evaluated.

Exposure Pathways not Evaluated The exposure pathways for construction worker exposure to surface soils and office and ecological worker dermal contact with surface water were reported in the text to have been evaluated in the PHE but were not actually evaluated The PHE only looked at subsoils for construction worker exposure and did not look at exposures to contaminated surface soil The Division requires that the above pathways be included in the PHE. Any exposure pathways not quantitatively estimated must be discussed in the qualitative uncertainty analysis

Final Borehole and Well Logs Final borehole and well logs were to be provided to the Division with this report in both hardcopy and electronic formats The Division assumes the LOGGER is still being used for these logs The Division requests that final format LOGGER lithological logs for all OU1 wells and boreholes be submitted in electronic format with this report

Preliminary Benchmark Tables The benchmark tables presented in Tables 4-34 through 4-40 of this report are not consistent with current efforts by DOE to develop approvable Sitewide Benchmark Tables. The Division requires that the Sitewide Benchmark tables be finalized and that the approved tables be incorporated into Tables 4-34 through 4-40 of this report.

SPECIFIC COMMENTS

Section 4 Nature and Extent of Contamination

Pg 4 10 This equation is ambiguous is 2 in numerator or denominator? Use additional set of () as needed to clarify this equation

What is the definition of surface vs sub surface soil and where does it appear in the report?

Pg 4 35 This entire documents discussion of PAHs centers on the premise that there are no potential PAH sources at OU1 However in this section it states that material from clean up of a fire was placed at IHSS 130 This could be a PAH source at OU 1 and should be included in these discussions

Pg 4-41 Section 4 3 9 1 Units should be ug/kg not ug/l

Pg 4-44 4 4 1 1 PCBs were found in two distinct areas of the OU that were both in close proximity to the RAD hotspots The possibility of a connection between PCBs and RAD Hotspots should be discussed in the report The Division does believe that there is sufficient data to make any conclusions regarding the extend of PCBs in these hot areas The large sampling grid almost 100 ft from each PCB hit to next closest sample location can not be used to infer there is no other PCB contamination at OU 1

Pg 4-62 Very high Selenium concentration at well 1074 is not a validated result What does this mean? Did data validation reject the sample?

Section 5 Contaminant Fate and Transport

Page 5 23, Geochemical modeling of OU1 groundwater Please explain what is meant by dissolved colloidal particulate The reasons for using wells 35691 and 31891 in this study were not well explained Well 35691 is within a VOC plume Might this not affect the cation/anion geochemistry? How many quarters of chemistry is this study based on? Is this well functional since the installation of the french drain? Well 31891 is located below the french drain near the SID infiltration of meteoric water seems like the stronger explanation for the lower TDS

Page 5 27 Degradation products are present in groundwater, please elaborate on abiotic dehydrohalogenation as an alternative method of degradation

Table 5 1 References for Half Life values should be added to this Table

Section 6 Baseline Risk Assessment

Pg 6 23 This discussion is potentially misleading It could be misinterpreted as an attempt to down play the significance of risks to current on site personnel The calculated risk to current on site workers should be stated in the text not referenced to being within the EPA NCP risk range

Section 7 Summary and Conclusions

Section 7 1 2, page 7 3 The discussion of waste materials in this section states that materials including metal shards were encountered during drilling of boreholes in IHSSs 119 1 and 119 2 The occurrence of metal shards in boreholes at IHSSs 119 1 and 119 2 is not evident in other sections of the report The summary of findings should not present new information If waste materials such as metal shards were encountered in boreholes at IHSSs 119 1 and 119 2 they must be discussed in the Nature and Extent of Contamination

Appendix D Determination of Contaminants

Detection Limits There is no discussion of the appropriateness of the DLs used in this investigation

Table D1 and Appendix C Summary Tables Add a new table or a field to the existing tables for the type of distribution assumed in estimating background Upper Tolerance Limits (ie normal or lognormal) so that these tables can be independently verified

Units of Figures in Section D The maps with blocks of sub surface contamination data do not indicate units for the depth of the bore holes From the text is appears they are in feet These figures should be labeled with all units

Appendix F Public Health Evaluation

Attachment F 1 The presentation of this quickie modeling effort is irrelevant to the baseline risk assessment The Colorado Department of Health s position is that if the water can be brought to the surface it can be used

Presence of NAPL in soils at 119 1 The nature and extent of contamination section of the report concludes that NAPL is present in the soils at 119 1 as a source for groundwater contamination but was not sampled directly This is a likely under estimate of the risk associated with sub surface soils and must be discussed in the qualitative uncertainty analysis

Uranium 235 Why was U 235 dropped from the risk assessment?

Treatment of Hot Spot Data in the PHE The Division is not certain as to how the hot spot data was treated in the PHE. The text states that hot spot data was used in the PHE quantitative evaluation but not included in the contaminant data summary tables or statistics If a table is developed without the hot spot data it must be clearly noted

Table F3 1 and F3 2 Summary Statistics Groundwater Inorganics and RADs

- Need a summary for sitewide values without geological classifications for the COC process. The geology specific data is only used for the background comparisons
  The PCOC and RBC flag columns do not appear to be consistent Both columns should never be flagged for the same chemical
  The percent detection column needs a second significant figure to evaluate greater than or equal to five and greater than zero
  Add a column with the number of samples included in the evaluation
  Why is only groundwater included in the summary tables Summary tables for other media should be added to section F3

Maps Section F2 The maps in section F 2 do not match the text. It is very difficult if not impossible to find wells or other hits on the appropriate map.

Table F3 28 The title of this table OU1 Contaminants of Concern Based on Toxicity Screening Results And Corresponding 95% Upper Confidence Limit (UCL) is confusing How does 95% UCL correspond with/to the toxicity screen?

Toxicity Screen Tables The Tables showing the concentration toxicity screen and the RBC screen are not accurate. Values listed are greater than or less than listed means (How were these calculations done?) Values were not calculated at all Chemicals were not marked as included in the risk assessment or not Was ground water from all depths combined for VOCs, semivolatiles and pesticides, and PCBs?

Quality Control of Section F Tables The following are some of the errors found in the Section F Tables during the review of this report

- Tetrachloroethene is 19% of toxicity screen for sub-surface soils but is not on summary Table.
- Benzo(k)fluoranthene is listed for sub-surface soil but is less than 1% of screen.
  Uranium 235 is 1% of surface soil screen but is not listed in the summary table.
- No Toxicity Screen Summary Table for Sub-surface Soil Carcinogenic Contaminants

No Summary Table for Sub-surface Radionuclides

Two Summary Tables for surface Rads with different results (see 5 above)

Why are chemicals that were not marked as Identified as a Potential Contaminant used in calculating the Toxicity screens? (Ex Ur 235 in Tab F3 12 & Tab F3 23)

Table F3 11 Why is Antimony marked as PCOC

Where toxicity screens conducted for surface water and sediments? Why are some of these contaminants marked ND in this table? What is the definition of ND? Are NDs still retained as COCs?

Table F5 3 Units for RADs is not correct

Table F6 1 Why is a value given with a footnote stating that it is not used The reference to [Smith 93] is not listed in the references in section F9

This is by no means a complete list of all errors associated with these tables The entire risk assessment analysis must be carefully reviewed for quality assurance and errors minimized