EPA Comments on the
881 Hillside IM/IRA Implementation Plan
Submitted February 22, 1991

FRENCH DRAIN GEOTECHNICAL INVESTIGATION

General Comments:

The criteria used to determine how samples were selected for geotechnical analysis should have been stated in the text.

Geotechnical data must be evaluated in terms of the significance to construction and the project objectives. The results of the tests must not be generalized.

Contaminated dirt excavated during the french drain construction may need to be managed as hazardous waste. DOE is responsible for this determination. Plans must be made to address this possibility. The volume and location of the material to be excavated must be defined.

The specific changes in the french drain alignment and depth that may need to be made to meet IM/IRA objectives must be defined through implementation of field engineering and construction plans. These plans must be devised to insure that the constructed IM/IRA meets the approved objectives and requirements within the final Decision Document.

The date of the final report or revision should be included on the report. This submittal will be referred to as the March, 1991 submittal.

The submittal did not include the appendices. The appendices were submitted earlier with a draft copy. It is assumed that the appendices have not been changed.

Placement of permanent piezometers and ground water wells downgradient of IHSS 119.2 is recommended to evaluate the ground water and the saturated or unsaturated conditions downgradient of the drain.

Trench boxes or other support is recommended during the french drain construction. Excavation techniques should be employed which will minimize the amount of excess excavated material.

Specific Comments

Executive Summary

ADMIN RECORD

The occurrence of toluene in the boreholes along the proposed french drain alignment could have a significant impact on the IM/IRA. Prior to or during construction of the french drain, verification of soil contamination is necessary. If the soil is found to be contaminated and a hazardous waste, the drain design, spoils management and construction techniques should be revisited. It is DOEs responsibility to meet all substantive requirements of RCRA, CERCLA and the CHWA.

Section 3.1.1 Grain size/Hydrometer Analysis

All procedures should reference and be consistent with the SOPs Table 3-1 does not summarize all the data in Appendix B. Sample intervals and boreholes are missing from Table 3-1

The statement that permeable, well-sorted sandstones were not observed is not consistent with the borehole logs and the cross sections in Plate 1. Not all sandstone units are depicted on Plate 1 (log B301490). Plate 1 illustrates the presence of a sandstone lens in borehole B300190. The proposed french drain alignment cuts through the sandstone lens. Permeability tests were reported for geologic units deeper than the sandstone lens but not for the lens itself. The plan should have presented methods to satisfy IM/IRA requirements which include verification of the hydraulic conductivity for units in which the drain is to be placed, and for which the hydraulic conductivity is unknown. Additionally, permeability test results were not reported for all boreholes along the proposed french drain alignment.

Well completion logs for boreholes B303390, B303490, B303690 were included in Appendix A. The text does not mention that the borehole was completed as a well.

Section 3.1.2 Moisture - Density Analysis

Appendix B-2 data does not show the sample date and the text does not provide an explanation of how the samples were stored to preserve moisture at the time of collection. The results should be related to construction criteria. Average values may not be applicable. Values for each of the individual units should be presented in a table

Section 3.1 3 Direct Shear Strength

A more detailed summary of results and how the values relate to stability for both surficial and bedrock samples should have been presented. Cohesion intercept and angle of internal friction can be determined from the relationship between the normal stress and the shear stress Results should have been summarized in tabular form Average values may not be applicable Values for each of the individual units should have been presented in a table

Section 3.1.4 Triaxial Compression Strength Test

An evaluation of how the results relate to construction is necessary.

Section 3.1.5 Unconfined Compressive Strength Test

The results must be evaluated in terms of their construction significance.

Section 3.1.6 Back Pressure Permeability

An explanation of why samples from key boreholes were not tested should have been provided. Each borehole showing a hydraulic conductivity greater than that required, should have a sample test to support field testing of hydraulic conductivity. Averaging hydraulic conductivity values is not acceptable. A table showing the borehole number, geologic unit, depth interval and test results should have been presented.

An explanation of the effectiveness and accuracy of the short bedrock core interval (< 1 ft.) for the back pressure permeability tests should have been provided.

Section 3.1.7 Atterberg Limits

The text should have provided a summary table of the results showing from which boreholes and depth interval the samples were collected and the test results. The results must be evaluated in relationship to construction criteria.

Section 3.1.8 Consolidation/Swell Test

The text should have provided a summary of the results and must evaluate the results in terms of construction criteria.

Section 3.1.9 In Situ Packer Testing

The bedrock units in which the french drain will be placed, must be evaluated to determine if the hydraulic conductivity objectives defined in the OU 1 IM/IRA Decision Document will be met. This includes the clayey silty sandstones found.

Section 3.1.9.2 Results of Packer Tests

Packer test results are not provided for all the boreholes and data is not provided in Appendix C The testing is not conclusive in showing that the french drain alignment is placed so as to comply with the specified hydraulic conductivity requirements

Several boreholes showed water loss during packer testing

The reasons (i.e. structural features, permeable layer, etc.) for the water loss should have been discussed and must be evaluated in terms of the significance on construction and effectiveness of the drain system.

Section 3.1.9.3 Comparison of In Situ Packer Test Results with Laboratory Back Pressure Permeabilities

Because back pressure permeability tests are primarily an evaluation of the vertical hydraulic conductivity, it is not independently adequate to use the results of those tests to justify alignment of the french drain along boreholes which show a greater than 10^{-6} cm/sec hydraulic conductivity from in situ packer tests. Additionally, Table 3-4 does not provide back pressure permeability analyses for the boreholes with values greater than the IM/IRA requirement (see section 3.1.9.2).

Section 3.1.10 Summary

The rock discontinuities (i.e. fractures) can also impact the effectiveness of the french drain and need to be evaluated.

The text mentions that a gravel zone is present within the **bedrock in borehole B300290. Review of the borehole logs do not indicate the presence of the gravel unit.**

A cross section should be constructed illustrating the depth of the french drain and the geologic unit and corresponding permeability in which the drain is located.

Section 3.2 Geochemistry of Surficial Materials

A section on the geochemistry of ground water and surface should have been presented to summarize the previous investigations.

The volatile and semivolatile organics results for boreholes B303990 through B304290 must be submitted for evaluation All radionuclide data must be submitted for evaluation. It is significant that volatile organic and semivolatile organic contamination was detected downgradient of IHSS 119 2. The proposed french drain design does not extend far enough east to be downgradient of IHSS 119.2

Appendix D data show that some depth intervals in boreholes were not chemically analyzed All intervals in which the french drain will be placed, should have been tested The chemical data must be evaluated with the geologic data (permeability) to assure that the drain is constructed most effectively In addition, characterization of the excavated soil is important to determine the proper management of the soil.

The equation provided to calculate the critical slope angle is not clearly punctuated and therefore not understandable. All constants should have been explained. Additionally, it may not be correct to assume unsaturated conditions (if D = 0, then the equation has a term that is non definable).

Section 4.2.4.2 Material Properties

In reviewing the potentiometric surface maps, it appears that the water table will be tapped during construction activities. This depends on the depth of the drain and the depth of the water table during the time of construction. The drain is designed to be placed within the water table in order to collect contaminated ground water. A map needs to be constructed that depicts the depth of the water table (showing seasonal fluctuations) and the proposed depth of the french drain. During construction, the saturated zone will be encountered. The OU 1 IM/IRA Implementation Plan should have identified measures which will be taken to treat ground water draining into the trench and from any saturated excavated soils during excavation.

Section 4.2.4.3 Results of Analysis by Canmet

It is not clear how the slope angle for the for the colluvium was determined for the 1.2 safety factor. Data should have been presented in a table and related to the location of the samples.

Section 4.2.4.4 Modified Bishop Method

A plan map must be provided indicating the location of the slope stability profiles and the alignment of the proposed french drain. It is not clear if these profiles are to represent a new alignment of the french drain.

Section 4.3

The impact of fractures on the drain construction should be evaluated prior to construction.

Section 5 Conclusions and Recommendations

The results of the slope stability analysis DO NOT indicate that slopes greater than 50 degrees can be used to build the french drain

In some cases, the drain may need to be underexcavated in order to meet the IM/IRA hydraulic conductivity criteria The implementation plan did not specifically define the alignment of the french drain based on the results of the geotechnical evaluations

Prior to any realignment of the french drain, additional geotechnical and chemical testing must be conducted along any proposed new alignment.

The quantity of material that must be removed and placed to construct the french drain should be indicated. If the material is determined to be a RCRA hazardous waste, then it must be managed as a hazardous waste. Prior to construction of the drain, DOE should forward a plan to EPA and CDH indicating what procedures will be followed if contaminated material is encountered.

IM/IRA IMPLEMENTATION PLAN

General Comments

The ARARs identified in Table 3-3 of the Decision Document are to be followed and addressed in the IM/IRA Implementation Plan. Some of these requirements are addressed in the specifications and drawings but are not identified as such.

The water quality standards adopted for Woman Creek are now more stringent than the discharge limits required in the Decision Document. The standards do fall within the required operational range of the treatment system. EPA recommends treatment of influent ground water to the water quality standards prior to discharge into the south interceptor ditch.

Additional information regarding the treatment process designs, design rationale for level of treatment and effluent quality, and assumed equipment sizing and testing procedures need to be provided for EPA review. The basis used to determine the treatment operational range should also be provided. All process-specific calculations and design rationale information should be submitted as soon as possible.

All process testing plans, time frames and results should be submitted to EPA as soon as possible.

ASME STORAGE TANKS

The tanks containing hazardous waste must meet the substantive requirements of RCRA. These requirements are summarized as ARARs in Table 3-3 of the Decision Document. The IM/IRA plan should have included provisions for these requirements and identified them as such.

U.V./H.P. TREATMENT

Contingency plans must be in place in the event a spill occurs

Section 7 5

Treated effluent concentrations were not listed for acetone and carbon disulfide with required treatment concentrations of

50ug/l and 5 ug/l, respectively.

In accordance with the approved IM/IRA Decision Document, the unit must be able to treat influent ground water to the specified treatment levels at an incoming rate of 30 gpm.

ION EXCHANGE TREATMENT

Contingency plans must be in place in the event a spill occurs.

Section 8.4

The text states that the ion exchange treatment unit shall be able to treat 30 gpm continuously. This must be for 8 hours per day to meet the requirements of the IM/IRA Decision Document.

Section 8.5

The exhausted strong base anion resin column may need to be disposed of as a hazardous waste in accordance with RCRA and Colorado Hazardous Waste Act requirements. DOE is responsible for making this determination.

Section 8.6

The text states that the process flow diagram for the treatment system is provided in Drawing 38548-012. The diagram was not submitted with the text.

SPECIFICATIONS AND DRAWINGS

General Comments

The contractor shall be responsible for compliance with all Environmental Restoration Standard Operating Procedures (SOPs), where applicable, which are approved under the Interagency Agreement.

Screening levels which trigger management of waste materials as contaminated should be made known to workers

Health and safety wind speed criteria and soil wetting, previously approved for the 881 Hillside IM/IRA construction and earth moving activities, must be applied.

The contaminant levels at which workers will be required to undergo decontamination should be specified

Some of the procedures appear to be outdated (i e. use and disposal of asbestos) The plans should be updated to reflect current plant policies and be specific to the OU area.

BUILDING 891 FOUNDATION DOCUMENT

The contractor is tasked to maintain an optimal moisture content as set forth in ASTM D-698 standards. This standard addresses soil compactability rather than soil erosion or dust resuspension. Soil erosion criteria must be implemented in order to prevent dust resuspension (p. 02200-4).

The wind speed criteria for shut down of earth moving activities is two consecutive 15-minute monitoring periods where wind speed exceeds 15 mph. The action level for drilling activities is 35 mph. The text should be changed to reflect these criteria (p.02200-4).

EFFLUENT STORAGE TANKS DOCUMENT

Personal protective equipment requirements should be clearly defined for construction crew, tradepersons and other personnel. The means for determining the level of personnel protection for specific tasks must be stated or referenced.

Disposal of any material from the Individual Hazardous Substance Site (IHSS) or other areas cannot be disposed by spreading them within 1 mile of the site if the material is contaminated. Any hazardous or mixed waste must be disposed of in accordance with the substantive requirements of RCRA.

BUILDING 891, UTILITIES, TANK FOUNDATION DOCUMENT

Personal protective equipment requirements must be clearly defined for construction crew, tradepersons and other personnel. The means for determining the level of personnel protection for specific tasks must be stated or referenced.

The soil wetting procedures must be implemented for dust suppression (pgs. 02200 and 02200-4).

Disposal of any material from the Individual Hazardous Substance Site (IHSS) or other areas cannot be disposed by spreading them within 1 mile of the site if the material is contaminated. Any hazardous or mixed waste must be disposed of in accordance with the substantive requirements of RCRA.

The specification allows the use of vinyl asbestos floor tile (VAFT) materials for floor covering. The material contains friable asbestos fibers Other non-asbestos-bearing materials may be better suited to serve the purpose

The rationale (such as the AWWA code) should be used to define the disinfection process described

PROCESS TREATMENT SYSTEM DOCUMENT

Personal protective equipment requirements must be clearly defined for construction crew, tradepersons and other personnel. The means for determining the level of personnel protection for specific tasks must be stated or referenced.

Disposal of any material from the Individual Hazardous Substance Site (IHSS) or other areas cannot be disposed by spreading them within 1 mile of the site if the material is contaminated. Any hazardous or mixed waste must be disposed of in accordance with the substantive requirements of RCRA.

Drawing no. 38548-013 (Issue A), Sheet 10 of 29 show the air from the weak unit degasifier being vented to the atmosphere. Predicted qualitative air stream data should be presented.

Drawing no. 38548-014 (Issue A), Sheet 11 of 29 shows influent to the waste treatment plant originating, among other sources, from the six wells with pumps P101 through P106. These wells are missing from other design plans. Other waste treatment plant documents indicate that the ground water influent will originate in two sumps and one collection well (see Collection and Discharge System document review). The discrepancies should be corrected.

Drawing no. 38548-014 (Issue A), Sheet 11 of 29 must show the final effluent discharge location point and the receiving stream.

COLLECTION AND DISCHARGE SYSTEM DOCUMENT

Soil wetting procedures must be used for dust suppression.

Drawing no. 38548-15 (Issue A) Sheet 05 of 24 shows a frost-proof hydrant on the effluent lines of the discharge side of the collection wells and sumps. The use for the hydrant should be presented.

Drawing no. 38548-135 (Issue A), Sheet 14 of 24 shows a precast concrete vault having a floor drain on the bottom. The floor drain would allow collected water to drain back into the soils under the vault. This drain should either be replaced with a closed-bottom sump or supplemented with a line to drain collected water to an area for treatment.