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TRANSMITTAL OF COMMENT RESPONSES RELATED TO THE OPERABLE UNIT 1 DEWATERING EXCAVATION EVALUATION PROJECT WORK PLAN

01/12/95

DOE-0392-95
DOE-FN EPAS
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RESPONSES

Department of Energy
Fernald Environmental Management Project
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JAN 12 1995

DOE-0392-95

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF COMMENT RESPONSES RELATED TO THE OPERABLE UNIT 1 DEWATERING EXCAVATION EVALUATION PROJECT WORK PLAN

This letter formally transmits the Department of Energy, Fernald Area Office (DOE-FN) responses to the United States Environmental Protection Agency (U.S. EPA) comments on the Operable Unit 1 (OU1) Dewatering Excavation Evaluation Project (DEEP) Work Plan. The responses contained herein address the additional detail requested on the original U.S. EPA comments Numbered 1, 3, 7, 11, and 12. The DOE-FN agrees that there is, in general, a limited discussion associated with the end use of the data collected through the DEEP project. Additionally, the DOE-FN recognizes that the ability of the U.S. EPA to fully evaluate a treatability study work plan is highly dependent on the level of detail provided.

Because the DEEP project involves collection of primarily engineering data for the purpose of supporting the ultimate design of the remedial action of the OU1 waste pits, there is only a limited amount of detail that can be practically provided within the work plan with respect to the actual use the data will have prior to collection and evaluation. Given this, the DOE-FN is prepared to include in the final report of the DEEP project, a detailed discussion of data collected during the investigation, along with the best engineering interpretation of the results in light of the remedial design for OU1.

Although providing the details of how the data will ultimately be used in the final report obviously detracts somewhat from U.S. EPA's ability to comprehensively evaluate the plan, the DOE-FN is of the belief that some consideration should be given to the fact that engineering data evaluation can vary widely, depending on the design and ultimate final use of that data.

An example of such variation may be illustrated by considering the following three parameters being evaluated in the DEEP Project: 1) the moisture content, 2) Atterberg Limits, and 3) the Triaxial Compression. The first two tests provide information on the quantity of water contained in a solid sample under various conditions, while the Triaxial Compression provides specific information on the ability of the solid material to maintain strength and shape under various weight loads.

For the DOE-FN to indicate at this time, all of the many ways in which this data could be used in remedial action design would involve providing the design itself. In addition, it is highly likely that, due to the results and the relationships among and between the various other parameters of interest, some data results may be determined to be unnecessary for development of remedial action design.

The DOE-FN recognizes the importance of data collection and interpretation in the remedial design process. However, the DOE-FN believes that providing cumulative information collected during the project, with an engineering interpretation as an appendix to the final report, will allow for a comprehensive discussion of the more important findings of the project in light of the final remedial action as opposed to merely providing the myriad of end uses these engineering data may provide.

The DOE-FN hopes that the additional information provided along with a commitment to include an evaluation in the final report will satisfy U.S. EPA concerns about data collection process of the DEEP Project.

If there are any additional questions regarding this submittal, please contact Randy C. Janke at (513) 648-3123.

Sincerely,

Johnny Reising

for Jack R. Craig
Fernald Remediation Action
Project Manager

FN:R.C. Janke

Enclosures: As Stated

cc w/encs:

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RESPONSE TO U.S. EPA TECHNICAL REVIEW COMMENTS ON THE OPERABLE UNIT 1 DEWATERING EXCAVATION EVALUATION PROGRAM TREATABILITY STUDY WORK PLAN RECEIVED JULY 15, AND NOVEMBER 28, 1994

Commenting Organization: U.S EPA Commentor: Saric
Section #: All Page #: NA Line #: NA Code:
Original General Comment #: 1 (1)

Comment: The U.S. Department of Energy's (U.S. DOE) Dewatering Excavation Evaluation Project (Deep) Treatability Study Work Plan (TSWP) does not include information required by the U.S. Environmental Protection Agency (U.S. EPA) guidance, "Guide for Conducting Treatability Studies under CERCLA." Specifically, significant deficiencies exist in the areas of (1) documenting how the data to be collected supports the test objectives; and (2) clearly presenting what data will be collected, how it will be collected, and how it will be interpreted. U.S. DOE should revise the text to provide this information, as well as to provide summary tables that correlate data collected with test objectives and example data collection log sheets. (Received July 15, 1994)

Comment: Deficiencies still exist in documenting how the data to be collected supports the test objectives; and clearly presenting what data will be collected, how it will be collected, and how it will be interpreted. (Received November 28, 1994)

Response: Agree. The DEEP Treatability Study Work Plan Addendum should include data collection information on the original DEEP Treatability Study Work Plan and the Modular Process Areas addendum. Some DEEP data collection methodologies are not well documented, however, additional detail has not been available because much of this geotechnical work will be performed by subcontractors; these subcontracts have not yet been awarded.

Action: DOE will incorporate into a revised DEEP Treatability Study Work Plan Addendum information which addresses the geotechnical testing performed under both the DEEP program and the Modular Process Areas addendum. This information will be provided as new Attachment H, "Project Specific Plan for Operable Unit 1 Dewatering Excavation Evaluation Program Geotechnical Investigation, Revision 0", dated September 30, 1994, and new Attachment I, "Project Specific Plan for Operable Unit 1 Modular Process Areas, Revision 1", dated October 19, 1994.

Please consider for review purposes, that the field work performed under these two Project Specific Plans has been completed for several months.

Commenting Organization: U.S EPA Commentor: Saric

Section #: 2.2.1 Page #: 2-4 Line #: NA Code:

Original Specific Comment #: 3 (1)

Comment: The information provided in this section should be presented in a table correlating the data to be collected to the data uses. (Received July 15, 1994)

Comment: Deficiencies still exist in documenting how the data to be collected supports the test objectives; and clearly presenting what data will be collected, how it will be collected, and how it will be interpreted. (Received November 28, 1994)

Response: DOE agrees in part with the comment. Soil boring samples and geotechnical property information collected was gathered in accordance with a Project Specific Plan for the completion of this work. This Project Specific Plan, a lower tier document relative to the DEEP Treatability Study Work Plan, detailed much additional information which was not addressed in the DEEP Treatability Study Work Plan.

The original U.S. EPA comment did not address interpretation of the geotechnical information obtained during field work and soil sampling analysis results. DOE is of the belief that much of the interpretation, and by inference how the data collected will be interpreted, cannot be readily correlated to a fixed range of geotechnical field or laboratory derived results which represent an acceptable or unacceptable condition. Rather, interpretation represents the process of determining what the present conditions are, what additional engineering information may be necessary in light of the test results, plus what design requirements may need to be addressed. For example, a geotechnical analysis result may be unsuitable for a particular type of foundation, however, the knowledge of the geotechnical analysis result provides the design engineer with information to assist with the design by proposing, for example, a different type of foundation, or a site preparation plan which takes into consideration the deficiencies identified during the geotechnical investigation.

Action: The information presented in Section 2.2.1 and Tables 2-3 and 2-4 will be revised and rewritten to provide additional information that more precisely correlates the data to be collected with the intended data uses.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 3.1.3 Page #: 3-4 Line #: NA Code:
Original Specific Comment #: 7 (5)

Comment: The title of this section indicates that data collection, analysis, interpretation, and reporting will be discussed in the section. Sections 3.1.3.1 and 3.1.3.2 vaguely discuss data collection and analysis, respectively. Data interpretation and reporting are not discussed. The text should be revised to (1) provide more information on how the data will be collected, and (2) discuss how data will be interpreted and reported. (Received July 15, 1994)

Comment: Deficiencies still exist in documenting how the data to be collected supports the test objectives; and clearly presenting what data will be collected, how it will be collected, and how it will be interpreted. (Received November 28, 1994)

Response: Partially agree. Wet excavation field work will be performed in accordance with a Project Specific Plan that was not included in the DEEP Treatability Study Work Plan. This Project Specific Plan provides additional information about what data will be collected, how the data will be collected, and how the data will be interpreted.

Action: Information about data collection and interpretation methods from the DEEP Wet Excavation Project Specific Plan will be incorporated into the DEEP Treatability Study Work Plan Addendum.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.3 Page #: NA Line #: NA Code:
Original Specific Comment #: 11 (9)

Comment: The title of this section indicates that data collection, analysis, interpretation, and reporting will be discussed in the section. Sections 4.3.1 and 4.3.2 vaguely discuss data collection and analysis, respectively. Data interpretation and reporting are not discussed. The text should be revised to (1) provide more information on how the data will be collected, and (2) discuss how data will be interpreted and reported. (Received July 15, 1994)

Comment: Deficiencies still exist in documenting how the data to be collected supports the test objectives; and clearly presenting what data will be collected, how it will be collected, and how it will be interpreted. (Received November 28, 1994)

Response: Comment acknowledged. DOE is unclear as to what additional data needs U.S. EPA seeks. At the time of the DEEP Treatability Study Work Plan preparation, DOE was prepared to submit conceptual design information about this phase of the Waste Pit dewatering project. Since that time, negotiations with potential dewatering subcontractors have provided additional information about the data gathering, data collection, and interpretation aspects of this project.

However, as is pertinent to Comment No. 1 of this submittal, certain project work will be performed by subcontractors - this has been the intent of DOE. As such, it is difficult to present some additional information beyond what has already been submitted without having the expertise of subcontractors available.

Action: DOE is prepared to provide additional information, to include more details as to how data will be collected in the field, and how the data will be interpreted.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 4.5.1 Page #: 4-16 Line #: NA Code:
Original Specific Comment #: 12 (10)

Comment: The text states that 105,000 gallons per day (gpd) of water will be generated during initial dewatering activities. The text also states that two 20,000-gallon tanks; a 5,000-gallon tank truck; and the 30,000 gpd Plant 8 treatment system will be used for storage and treatment during testing. Based on the combined storage and treatment capacity of 75,000 gpd, an excess of 30,000 gpd of water will exist. U.S. DOE should indicate how it will handle the excess 30,000 gpd of water generated during the initial 3 to 4 days of dewatering. (Received July 15, 1994)

Comment: U.S. DOE responded to comment 12 by adding text that states dewatering will be phased so as not to exceed the storage and treatment capacity of 75,000 gallons per day (gpd). However, Section 4.5.1 still states that 105,000 gpd will be generated and the text does not describe how dewatering will be phased. (Received November 28, 1994)

Response: Agree. The potential impacts of dewatering to the FEMP treatment capacity should have been clarified. DOE assures EPA that the FEMP treatment system will not be compromised by dewatered liquids from the waste pits. The 105,000 gallons per day figure represents a calculated rate of pit pumpage which, based on the anticipated porosity and permeability of the waste pits may not be achievable, even with the use of dewatering enhancements. At this time, the pits' ability to be dewatered is undefined. The waste pits contain large amounts of heterogeneous materials. Attempts to quantify the amount or degree of dewatering achievable are likely to be impacted by the degree of heterogeneity encountered during dewatering and excavation.

DOE does not anticipate recovering more pit liquid than the FEMP water treatment system can effectively treat. DOE is cognizant that overloading the water treatment system may not only hinder the system's ability to efficiently treat the water, but could result in violations of the FEMP NPDES permit.

In the event that dewatering results in greater than 75,000 gpd storage and treatment capacity recovered, this contingency can be addressed. Excess water could be temporarily stored in holding tanks at the waste pits and batch treated during periods when the FEMP water treatment system had the ability to treat a higher volume from the Operable Unit 1 dewatering project. Optimum time for availability of extra treatment capacity would be after normal hours of operations and during weekends.

Once dewatering commences, 24-hour per day, 7 days per week is the plan of operation at this time. If, due to excess water recovery, or limited water treatment and storage capacity, difficulties are encountered, dewatering could be reduced, or halted completely. This phased approach is difficult to quantify until such time as dewatering begins. However, DOE wishes to stress that once dewatering commences, that no conditions will be encountered which would result in injury, damage to equipment and property, or degradation of environmental media if the dewatering system were shut down for a limited period of time to offset possible water treatment system hydraulic overloading concerns.

Action: DOE will revise the DEEP Treatability Study Work Plan Addendum to change the dewatering phase pit water recovery volume and to provide additional narrative information about temporary storage and batch treatment of pit water wastes, as well as phasing dewatering, noting that these contingencies are available if changing field conditions warrant such action.

RESPONSE TO U.S. EPA TECHNICAL REVIEW COMMENT ON THE OPERABLE UNIT 1 DEWATERING EXCAVATION EVALUATION PROGRAM TREATABILITY STUDY WORK PLAN ADDENDUM

NOVEMBER 28, 1994

Commenting Organization: U.S EPA Commentor: Saric

Section #: All Page #: NA Line #: NA Code:

Comment #: 1 (1)

Comment: U.S. EPA's only comment on the DEEP Treatability Study Work Plan Addendum concerns sample collection and testing. The addendum references sample collection and testing methodologies consistent with those described in the Final DEEP Treatability Study Work Plan (August 1994). However the Final Work Plan does not adequately describe sample collection and testing methodologies. (Received November 28, 1994)

Response: Comment acknowledged. DOE agrees that the DEEP Treatability Study Work Plan Addendum does not contain specific information regarding sample collection and testing. At the time of the October 19, 1994 submittal, the Modular Process Areas Geotechnical Investigation Project Specific Plan had not yet been completed.

As alluded to in the October 19, 1994 correspondence, due to funding considerations, the DEEP program was determined by DOE to represent the most cost-effective mechanism to obtain the required Modular Process Areas building foundation information.

Action: The DEEP Treatability Study Work Plan Addendum for the Modular Process Areas will be incorporated into a revised version of the DEEP Treatability Study Work Plan. The DEEP Treatability Study Work Plan will also be amended to incorporate additional information about the Modular Process Areas addendum. Also, DOE references the Operable Unit 1 Remedial Design Work Plan (in preparation). This document, scheduled for completion in March 1995, will provide further information about the Modular Process Areas.

Please see also the action proposed under comment 1 of this submittal.

2.2 SOIL BORINGS

2.2.1 Soil Borings Test Description and Objectives

Fifteen borings will be drilled in Waste Pits 1, 2, and 3. Figure 2-1 depicts proposed boring locations, the general layout of the soil-covered waste pits, and nearby access roads. Samples will be collected for geotechnical laboratory testing and will consist of split-barrel samples and thin-walled tube samples taken at selected intervals in coordination with Standard Penetration Test (SPT) testing. Borings will be installed in multiple phases that may be days to weeks apart to satisfy a project objective of determining geotechnical material properties before, during, and after planned dewatering activities.

Standard Penetration Tests (SPT) will be performed prior to every excavation, and before and during the full-scale dewatering tests begin in Waste Pits 1 and 3. SPT will supply data about the nature of the waste strata and strengths. The SPT strength data will yield information on the viability of the waste to hold certain types of equipment and excavation slopes for excavation planning. The strata knowledge will yield strength information at known depths. The geotechnical tests that will be performed from the SPT samples will also provide information on the properties of the waste for excavation and process purposes, i.e. tri-axial shear will yield the shear strength for slope stability, moisture contents of the waste will yield information in the dewatering and drying designs, sieve tests will yield information for material classification and crusher/shredder designs. SPT that are performed during and after dewatering will yield information on the effectiveness of the dewatering, i.e. through an increase in strength of the material and a reduction in moisture.

Soil and waste material samples will be tested to provide the geotechnical testing information (Table 2-1) to evaluate the effectiveness of the dewatering alternatives to be tested during the DEEP. Geotechnical testing in this project includes:

TABLE 2-1

TABLE OF GEOTECHNICAL TESTS FOR SPT

GEOTECHNICAL TEST	**SAMPLE TYPE**	**METHOD (Appendix H)**
Consolidated-Compression Tests with Pore Pressure Measurements	Undisturbed	ASTM D 4767-88 / EM-1100-2-1906, APPENDIX X
Grain-Size Analysis	Disturbed	ASTM D 422-63 / ASTM D 1140-92
Atterberg Limits	Disturbed	ASTM D 4318-84
Moisture Content	Disturbed	ASTM D 2216-92
Specific Gravity	Disturbed	ASTM D 854-92
Unit Weight	Undisturbed	EM-1100-2-1906, APPENDIX II

At distinct lithologic changes, split-spoon samples shall be tested for grain-size analysis, Atterberg limits, specific gravity, and moisture content (Table 3-2). A sample volume of 500 ml will be sufficient sample to complete the requested tests. The thin-walled Shelby tube samples will be tested for unit weight, and Consolidated, Undrained Triaxial Compression Tests with Pore Pressure measurements (TX-CU w/pp). After the TX-CU w/pp is completed on the thin-walled shelby tube samples, the disturbed tests (Table 3-2) will also be completed on the resultant cuttings from the tube. The University of Cincinnati laboratory personnel will determine if the amount of cuttings is adequate to complete the disturbed tests.

Geotechnical testing for physical properties will be conducted under the appropriate ASTM standards and laboratory procedures using qualified geotechnical laboratory technicians and properly calibrated apparatus which meets ASTM D 3740-90, "Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction" (Appendix H).

Additionally, as described in Section 2.3 of this work plan, STP analysis results will be used to correlate the Cone Penetrometer Test results obtained to verify/refute the results of each type of subsurface investigation. Following completion of field work, the geotechnical testing results obtained will be used to decide which dewatering and excavation methods are safest, most economical, fastest, and consistent with the Preferred Remedial Alternative, as identified in the Operable Unit 1 Proposed Plan.

3.1.3 Wet Excavation Data Collection, Analysis, Interpretation, and Reporting

3.1.3.1 Wet Excavation Data Collection

The following data will be collected during the wet excavation. This data will be collected by field observation during excavation, and recorded on field logs:

- **Angle of Repose in Excavation and Stockpile** - A visual evaluation of the angle of repose of materials exposed in the trench excavation sidewalls and the waste stockpiles will be conducted and recorded. The Angle of Repose in the excavation and waste stockpiles will be determined by the use of one or more of the following observation methods:

  1)Evaluating the vertical and horizontal distances between the toe and crest of the slope.
  2)Estimating vertical sidewall and slope distances by use of the backhoe boom.
  3)Using a tape measure or survey rod at the ground surface to gage horizontal distance.

  This information will be necessary to adequately determine the behavior of the excavated trench sidewalls during excavation. Project field staff safety concerns and the determination of safe equipment proximity to the excavation both at the surface, and once full scale excavation below the ground surface begins, drive the need for this information.

- **Moisture Content in Situ** - Waste samples will be taken from the excavation and analyzed per American Society for Testing and Materials (ASTM) method 2216, for moisture content. Moisture content will be used to determine the predewatered waste moisture content for the purposes of comparison with the postdewatered moisture content, to evaluate the relative success of dewatering. Also, knowledge of moisture content of the wet waste will assist with the waste dryer system design by allowing for duplication of moisture content, as necessary, when the treatability study waste samples collected (Section 3.1.2.3) are ready for batch processing through the waste dryer system.

- **Plate-Bearing Capacity** - A Plate Bearing Capacity test will be performed (and recorded) on the undisturbed waste in the excavation. Three different Plate 3 Bearing Capacity end pressures will be used to simulate the bearing pressure under an excavator's tracks.

- **Dust Generation From Excavation and Stockpile** - The waste stockpile and atmospheric conditions will be monitored to evaluate the potential for dust generation during waste excavation. Visual observation and air sampling will be performed and recorded. Additionally, dust suppressants will be tested for their effectiveness and reliability over the duration of the test. In addition to the need to evaluate the potential for entrainment of dust entrainment into the atmosphere from both the waste excavation and waste stockpile, FEMP Safety Analysis requirements, as determined by DOE Orders, stipulate that both the excavation and stockpile be continuously monitored to document any particulate release which may occur due to a high wind event. This information is necessary in order to identify any existing or potential dust creation problems prior to full scale waste excavation.

- **Air Emissions From Excavation and Stockpile** - Prior to, during, and following excavating, portable air monitoring instrumentation will be established both upwind and downwind of the excavation and stockpile area. Air station monitoring will be performed for the presence of particulates, radon, and organic vapors. In addition to the need to evaluate the potential for dust entrainment into the atmosphere from both the waste excavation and waste stockpile, it will be necessary to determine if any particulates, radon, or organic vapors will be released as a result of the wet excavation. This information can thus be taken into consideration once full scale waste excavation commences.

- **Water Released From Stockpiled Waste and Ponding of Water in Excavation** - The storage pad beneath the waste stockpiles will be graded to divert any resulting leachate drainage back into the open excavation. Grading will also include the creation of small depressions to allow observation, collection, and controlled release of leachate back into the excavation. This information will be used to evaluate the porosity and degree of permeability of both the disturbed waste stockpiled, and the excavation.

- **Stratigraphy of Cap and Waste** - During excavation, efforts will be made to segregate cap materials from the underlying wastes. This will be accomplished by performing visual observation of the excavated material, and utilizing mechanical and manual separation techniques, if possible. If successful, differentiation of cap material from pit wastes may allow for separate temporary storage of the cap material. This ultimately will provide useful information about the homogenization and segregation of the waste/cap material. There exists some variation in the thickness of the waste pits' cap material. Also, during full scale waste excavation, the pit cap material will likely be segregated for the purposes of moisture content and waste handling/disposal. Informed decisions about the nature and volume of the cap material will be based, in part, on observations made during the wet excavation phase.

- **Ease of Handling Excavated Waste** - Anticipated and unanticipated difficulties associated with mechanical excavation of the waste will be observed and recorded. This information will be documented by observation and documented during the wet excavation phase. Uses of the information will include waste dryer system and components design, and full scale excavation specialized equipment/storage requirements. Some waste material handling problems which are anticipated include the following:

  - Stickiness
  - Viscosity
  - Debris interaction
  - Splashing
  - Dust generation
  - Stiffness

- Other information derived from mechanical excavation will be the determination of the efficiency of simple bucket excavation and of the need for liners for the excavation bucket and truck beds.

3.1.3.2 Wet Excavation Data Analysis

The following data analyses will be performed during the wet excavation:

- **Angle of Repose in Excavation and Stockpile** - Angle of repose information will be included in remedial excavation planning to provide safe and achievable excavation grades in the waste, itself. Angles of repose in wet and dewatered waste will be compared to determine if pit dewatering results in slopes that can maintain stability under the variety of waste conditions anticipated.

- **Moisture Content in Situ** - Moisture content of the waste material will be measured at several locations throughout the waste pits. This information will allow a reasonable estimation of the average moisture in the waste pits and of the variations of the moisture content. Changes in moisture content with fluctuations in the water table within the waste pits is critical to the development of waste- drying requirements during the project remedial design phase.

- **Plate-Bearing Capacity** - The analysis of Plate-Bearing Capacity will provide general engineering evaluation information of the capacity of the waste in situ to support excavation and equipment.

- **Dust Generation** - Several dust suppressants will be tested on waste in the pits and in the stockpiles. These suppressants include, but are not limited to:

    - Water
    - Foams
    - Surfactants
    - Latex coatings

All surfactants will be tested and evaluated for suitability based on the following criteria. This information will be used to optimize the excavation sequence. The criteria include:

- Ease of application
- Durability
- Application manpower requirements
- Adhesion to waste
- Performance at various moisture levels
- Performance in different weather conditions
- Minimum effective thickness
- Resistance to sloughing
- Amount of waste generation conditions

All surfactants will be evaluated for composition to determine the potential for leachate generation, and chemical and physical interaction between the waste and the surfactant. Material Safety Data Sheets (MSDS) for each surfactant that requires an MSDS will be used to determine interaction potential and to identify personal protection requirements for application personnel.

4.3 DEWATERING DATA COLLECTION, ANALYSIS, INTERPRETATION, AND REPORTING

4.3.1 Dewatering Data Collection

Refer to Table 1-2 for a discussion of dewatering test techniques, test purposes, test inputs and interpretations. This test will collect and evaluate the same data as the wet excavation test. The analysis will generally be the same with specific attention to changes in moisture content and shear strength. To provide specific in situ information for use in the investigation of dewatering concepts, pumping and observation wells will be installed within the waste pits. The field information logs are provided in Section 4.3.1 of the PSP; examples are provided in Attachment F to this work plan. The information to be submitted includes the following:

- Field Activity Logs
- Lithologic Logs
- Sample Collection Logs
- Surface/Groundwater Sample Collection Logs
- Well Completion Logs
- Monitoring Well Development Form

For Phases 1 and 2, the data to be collected directly from each well and well point include the following:

- Flow rate (in gpm) from the well and total flow (in gallons)
- Well water levels in both pumping wells and wells used for observation
- Well or well point discharge line pressure readings will be recorded
- Vacuum readings within the well or well point casing will be recorded

In addition, the following other data should also be collected:

- Water level data in designated observation wells
- Vacuum readings within designated observation wells

Field observations will include:

- Optimum well spacing
- Type of wells that work best
- Water flow rates based on daily measurements
- Increase in waste strength as dewatering proceeds.

All dewatering tests will collect components of the following project-related information. The comparative well test will collect the following information:

- **Installation and Development Problems with Each Well Type** - Anticipated problems associated with the installation and development of each well include the following:

- **Drilling** - Penetration, sidewall smearing, surface contamination, prevention of hole collapse

- **Development** - Screen size, screen clogging, sand-pack size, sand-pack clogging recharge rate

- **Vacuum in Pumping and Observation Wells** - Vacuum in both the pumping wells and vacuum piezometers will be evaluated to determine the effective radius of groundwater drawdown of the vacuum pumping wells. The ability of the vacuum system to maintain a vacuum will be evaluated, along with the increased well yield due to the vacuum enhancement.

- **Water Levels in Pumping and Observation Wells** - Groundwater levels within the pits will be measured to determine the aquifer drawdown in both pumping and observation wells. This drawdown information in combination with the basic geotechnical properties of the waste can be used to calculate the in situ hydraulic conductivity of the wastes in the immediate vicinity of the pumping wells along with determination of the effectiveness of each well type in the fine-grained pit waste.

- **Energy and Power Use in E-O** - The energy requirements relative to increasing water recovery will be evaluated to determine the feasibility and efficiency of E-O. The cost of E-O will be compared to waste drying to optimize the remedial design.

4.3.2 Dewatering Data Analysis and Interpretation

Well Yield - This information will be used to design the optimum dewatering well system during remedial design. This information can be used to calculate the hydraulic conductivity of the waste matrix within the immediate vicinity of the wells. The transient drawdown analysis will use the equations shown below:

(1) $T = QW(u)/4\pi s$

Where: T = transmissivity
Q = pumping rate
W(u) = well function of u
s = drawdown

(2) $S = 4Ttu/r^2$

Where: S = storage coefficient
T = transmissivity
t = time
r = distance from pumping well to observation well

(3) $T = Kb$

Where: T = transmissivity
K = hydraulic conductivity
b = aquifer thickness

The assumption is made that the waste pits, due to their presently known degree of saturation, nature of material composition, and heterogeneity, will behave as an aquifer following dewatering well installation, and well pumping rates and capture zones anticipated under dewatering conditions. Thus, determination of the Hydraulic Conductivity of the waste pit material will provide valuable information about the ability of the waste pits to produce water over the anticipated duration of dewatering. This information will allow for monitoring of the relative success of dewatering on a daily basis. It will be necessary to quantify this information in order to know at what point further dewatering will no longer be productive.

Dewatering well pumping rates will be graphically plotted versus time of pumping. Equation (1) will be used to determine the dewatering wells' Transmissivity value at the wells' location. From the Transmissivity values determined from Equation (1), Equation (2) will be used to determine the Storage Coefficient. Equation (3) will be used to determine Hydraulic Conductivity, based on the previously derived variables, and solution of the waste pit depth for the Aquifer Thickness.

Once Hydraulic Conductivity has been determined and as dewatering progresses, comparison of each wells' relative yield can be accurately assessed. When a significant drop in yield has been noted, then the Field Operations Lead, with input from dewatering project staff, can make the determination that further dewatering would no longer be cost effective and efficient. At that time, the Field Operations Lead, with input from other DEEP project staff, will stop dewatering, and progress directly into the Dry Excavation phase of DEEP.

4.5 DEWATERING RESIDUALS MANAGEMENT

4.5.1 Wastewater

The total volume of wastewater to be generated by the project is difficult to quantify, however, current estimates call for approximately 105,000 gallons of water per day to be pumped during the initial three to four days of the project. After start-up operations are complete, the pumping rate is expected to decline to a relatively stable rate of 5,000 gallons per day. Two additional 20,0000 gallon tanks will be installed within the Waste Pit area to supply surge capacity for wastewater produced during initial pumping operations. These tanks will also be used to provide storage capacity once the pumping rate stabilizes.

Figure 4-9 describes the treatment and discharge process that DEEP wastewater will undergo. Wastewater will be pumped from the 20,000 gallon tanks as needed and transferred to the existing Plant 8 treatment system using a 5000 gallon mobile tank truck. Plant 8 has a treatment capacity of 30,000 gallons per day and utilizes lime precipitation, sedimentation, and filtration to remove uranium, heavy metals and fluoride from wastewaters. At Plant 8, the wastewater will be treated to remove uranium and other heavy metals through lime precipitation, sedimentation, and filtration. The quantity of water that can be pumped in any one day is limited by the combined storage and treatment capacity of 75,000 gallons per day. Treatment will be provided for all wastewaters generated by the project. Rather than providing additional storage for the excess water produced during initial dewatering activities will be phased so the maximum quantity of water produced in any one day does not exceed the maximum storage and treatment capacity of 75,000 gallons. Treated effluent from Plant 8 will be discharged to the uranium-contaminated side of the General Sump, where it will be combined with other wastewater and discharged to the Bio-Denitrification (BDN) Facility.

There is a clear discrepancy between the total wastewater storage and treatment capacity, in that the total dewatering water which potentially can be produced is 105,000 gallons per day, while the total available treatment capacity is 75,000 gallons per day. To address the potential for the dewatering system exceeding the total available water treatment system capacity, a phased dewatering and water quantity generation approach will be utilized. Each dewatering system will be equipped with a flow meter and totalizer. Potential overload of total treatment system capacity will be monitored in the following manner:

1. Twice per day, after dewatering commences, the Field Operations Lead/designee will inspect the dewatering system totalizers to evaluate the potential for exceeding the available treatment system's capacity.

2. If the Field Operations Lead determines that the total treatment system capacity may be exceeded, then the dewatering system(s) in use at that time will be halted.

3. If the dewatering system proves to be so successful that the total treatment system capacity may be exceeded on a daily basis, then either more temporary wastewater storage capacity will be obtained and utilized, or else dewatering will be confined to after hours and weekends, when the normal hydraulic load to the treatment system is less, thus freeing up more treatment capacity flow for the DEEP wastewater.

The BDN facility consists of the BDN Surge Lagoon (BSL), a High Nitrate Storage Tank (HNT), four BDN Towers, followed by the BDN Effluent Treatment System (NPDES outfall *4605). At the BDN facility, removal of organic constituents will occur through aeration within the BDN Towers and through activated sludge processes at the BDN-Effluent Treatment System (BDN-ETS). After treatment at the BDN-ETS, the wastewater will be discharged through the NPDES-permitted outfall *4605 (BDN-ETS), with ultimate disposition occurring to the Great Miami River (GMR) via outfall *4001 (MH-175).

DATA QUALITY OBJECTIVES - DEWATERING EXCAVATION EVALUATION PROGRAM - TREATABILITY STUDY WORK PLAN WASTE PITS 1, 2, AND 3, WET EXCAVATION TRENCH INSTALLATION

1.0 State the Problem or the Situation to be Resolved

The Dewatering Excavation Evaluation Program (DEEP) is an Operable Unit 1 (OU1) Remedial Design/Remedial Action Treatability Study for remediation of Waste Pits 1, 2, and 3. DEEP project work will be accomplished in 4 separate phases. Phase 1 of DEEP was addressed in DQO GT-005, approved on October 14, 1994. Phase 2, Wet Excavation Trench Installation, is the subject of this DQO. Phases 3 and 4 will be the subjects of future DQOs.

Phase 2 of DEEP addresses the excavation of wet (pre-dewatered) pit wastes from Waste Pits 1, 2, and 3. During the Wet Excavation phase of DEEP, 3 separate treatability investigations will be performed as part of the ongoing DEEP Treatability Study. These investigations are:

- Installation of 7 Trenches (Wet Excavation) in Waste Pits 1, 2, and 3
- Sample Pit Waste Material for Waste Dryer System Studies
- Perform Waste Reslurry and Pumping Test

The purpose of this DQO is to address Wet Excavation trench installation requirements within Waste Pits 1, 2 and 3, as well as identifying and providing a scope of work for the variety of observations which must be made in order to successfully implement the Preferred Remedial Alternative (PRA) of removing waste from Waste Pits 1, 2 and 3. Trenching is the first step in gathering the necessary field related treatability information about the Phase 2, or Wet Excavation, area of investigation, and to meet the requirements of the DEEP Treatability Study Work Plan.

Wet Excavation trenching will be performed in the following sequence and manner:

- Proposed trench locations will be identified by surveying
- Two lined storage pads will be prepared for each trench; 1 pad for excavated cap material; the other pad for excavated waste
- Storage pads will be prepared and graded such that surface runoff shall be diverted back into the excavated trench
- Waste Pit cap material shall be carefully excavated from the top of the proposed trench location, thus exposing the top of the waste surface, a dimension of 30 by 30 feet.
- Following its removal, waste pit cap material will be stockpiled on the designated storage pad
- Two trenches will be installed in Waste Pit 2 to a depth of 15 feet
- Two trenches will be installed in Waste Pit 1 to a depth of 15 feet
- Three trenches will be installed in Waste Pit 3 to a depth of 15 feet
- Following its excavation, waste material will be stockpiled on the designated storage pad
- No trench will be started until the previously excavated trench has been backfilled
- Following waste backfilling into the trench, the stockpiled cap material will be replaced

The DEEP Treatability Study is driven by the terms of Section XII.D.1 and D.2 of the Amended Consent Agreement between the U.S. Department of Energy and the U.S. Environmental Protection Agency. Wet Excavation studies proposed, and the information required under this investigation are driven both by the remedial design information necessary in the OU1 Remedial Investigation/Feasibility Study, PRA, and the DEEP Treatability Study Work Plan.

2.0 Identify the Decisions to be Made that Affect the Situation

Wet Excavation will be performed to accomplish the following:

1. Evaluate normal (pre-dewatered) conditions for the waste.

2. Evaluate the effectiveness of conventional mechanical equipment.

3. Provide a basis to evaluate the effectiveness of dewatering a wet waste to a dry waste.

A number of physical property observations will be made during Wet Excavation. These physical property observations relate to the ease of dewatering, stability of waste prior to dewatering, angle of repose of the excavated trench sidewalls, amount and rate of pit water inflow into the trench, ability of the waste surface to support excavation equipment, and waste heterogeneity. Collectively this information will be used to evaluate the best course(s) of action for additional phases of the DEEP project.

The decision is "Will wet trench excavation and the associated observational studies provide sufficient information to allow for further successful performance of planned DEEP Treatability Study Work Plan phases, or will changes be necessary"?

3.0 Identify Inputs that Affect the Decision

The following inputs will affect the decisions to be made about the DEEP project:

- Angle of Repose in Excavation and Stockpile

- Moisture Content in Situ

- Plate-Bearing Capacity

- Dust Generation from Excavation and Stockpile

- Air Emissions from Excavation and Stockpile

- Water Released from Stockpiled Waste and Ponding of Water in Excavation

- Stratigraphy of Cap and Waste

- Ease of Handling Excavated Waste

Wet Excavation inputs will provide necessary experimental design information as described:

- **Angle of Repose in Excavation and Stockpile** - A visual evaluation of the angle of repose of materials exposed in the trench excavation side walls and the waste stockpiles will be conducted and recorded.

- **Moisture Content in Situ** - Waste grab samples will be taken from the excavation and analyzed for moisture content. (These samples will be collected under the "Sample Pit Waste Material for Waste Dryer System Studies" Data Quality Objective).

- **Plate-Bearing Capacity** - A Plate-Bearing Capacity test will be performed (and recorded) on the undisturbed waste in the excavation. Three different plate-bearing capacity end pressures will be used to simulate the bearing pressure under an excavator's tracks.

- **Dust Generation From Excavation and Stockpile** - The waste stockpile and atmospheric conditions will be monitored to evaluate the potential for dust generation during waste excavation. Visual observation and air sampling will be performed and recorded. Additionally, dust suppressants will be tested for their effectiveness and reliability over the duration of the test.

- **Air Emissions From Excavation and Stockpile** - Prior to, during, and following excavation, portable air monitoring instruments will be installed both upwind and downwind of the excavation and stockpile area. Air station monitoring will be performed for the presence of particulates, radon, and organic vapors.

- **Water Released From Stockpiled Waste and Ponding of Water in Excavation** - The storage pad beneath the waste stockpiles will be graded to divert any resulting leachate drainage back into the open excavation. Grading will also include the creation of small depressions to allow observation, collection, and controlled release of leachate back into the excavation.

- **Stratigraphy of Cap and Waste** - During excavation, efforts will be made to segregate cap materials from the underlying wastes. This will be accomplished by performing visual observation of the excavated material, and utilizing mechanical and manual separation techniques, if possible. If successful, differentiation of cap material from pit wastes may allow for separate temporary storage of the cap material. This will provide information about the homogenization and segregation of the waste/cap material.

- **Ease of Handling Excavated Waste** - Anticipated and unanticipated difficulties associated with mechanical excavation of the waste will be observed and recorded. Some problems which are anticipated include the following:

  - Stickiness
  - Viscosity
  - Debris interaction
  - Splashing
  - Dust generation
  - Stiffness

- Other information derived from Wet Excavation will be used to determine the efficiency of simple bucket excavation and the need for liners for the excavation bucket and truck beds for final remedial designs.

4.0 Define the Boundaries of the Situation

Project boundaries include the horizontal and vertical extent of Waste Pits 1, 2 and 3. These boundaries are the locations of the waste pit base and sidewall liners. Maintaining the integrity of the waste pit liners is of primary concern to avoid environmental releases of material contained in the waste pits into adjacent environmental media. These boundaries were considered in the DEEP Treatability Study Work Plan, as the proposed dimensions of the trenches have built-in vertical and horizontal safety factors.

Project temporal boundaries include weather and access. Performance of Wet Excavation tasks during inclement weather can cause logistical problems related to excavation and support equipment and personnel access. Access may be limited by the nature of the surface of the waste pit area, which is directly related to the amount of precipitation, type of precipitation, and ambient air temperature during the performance of field activities.

The safety basis for operation of DEEP Phases 2, 3, and 4 and a substantial project boundary, has established the following commitments:

1. **Excavation will begin with Pit 2, then proceed to either Pit 1 or 3.**

2. **Material loss from the exposed stockpile(s) will be controlled to as low as reasonably possible.**

   This will be accomplished by limiting the duration of the open excavations, controlling the size of the stockpile(s), and protecting the stockpile surface(s) from wind erosion. Specific steps taken are:

   - One excavation will be open at any time. Only 1 Pit will be worked on at a time.

   - Wet Excavations in Pits 1, 2, and 3 will be open no longer than 72 hours.

- Individual stockpiles shall not exceed 315 yd^3 for wet excavations. The OU1 Field Operations Lead will document the stockpile size and the basis for determination (direct measurement,or estimated size of backhoe bucket times the number of bucket loads).

- Surfactants will be used to stabilize the stockpile surface for resistance to wind erosion.

- Tarpaulins will be staged in the DEEP construction area to be used to cover the stockpiles if surfactants prove less than adequate.

- In the event of adverse weather conditions (wind gusts or prolonged high wind conditions of 30 mph or greater, heavy rain), the Field Operations Lead may direct the following:

  - Additional protective covering over or around the material stockpiles

  - Closing (backfilling) an excavation

3. The non-dispersible condition of the stockpiles will be verified.

Verification will consist of a combination of area monitoring and visual inspection.

- Radiological Control Technicians (RCTs) will provide mobile area air monitors. The location of these monitors will vary with stockpile location and prevailing wind direction.

- Breathing zone monitoring of workers shall be provided by Radiological Control and Industrial Hygiene.

- Area monitoring for radon will be provided by Environmental Monitoring.

- The work area will be inspected periodically during off-shifts to verify that stockpile(s) condition has not changed. Inspections are the responsibility of the OU1 Field Operations Lead. Inspection may be delegated to other qualified personnel.

Inspector Qualifications

- Functional knowledge of DEEP project objectives.

- Functional knowledge of DEEP Health and Safety Plan with particular emphasis on who to contact in the event of an emergency.

- Functional knowledge of DEEP Auditable Safety Record.

- Meets access requirements to the DEEP project area as stated in the Health and Safety Plan.

- The OU1 Field Operations Lead will provide training to selected personnel on the inspection requirements. A list of qualified off-shift inspectors will be maintained in the DEEP project files.

Inspection Frequency

- The purpose of these inspections is to verify condition of the material stockpiles, therefore, frequency of inspection will depend upon current weather conditions and geotechnical characteristics of the stockpiled material. The OU1 Field Operations Lead, with concurrence from the OU1 Health and Safety Manager and OU1 System Safety Analyst, will determine the off-shift inspection schedule.

Qualified inspectors may inspect the area more frequently if conditions indicate the need, however, they may not decrease the number of inspections scheduled. The OU1 Field Operations Lead may provide supplemental direction or actions to be taken if certain conditions arise (if surfactant does not appear to be effective, then cover the stockpile with the tarpaulin staged in the area for this purpose) with the inspection schedule. Copies of the inspection schedules will be maintained in the DEEP project files.

Inspection Requirements

- Performance of inspections will be accomplished without entering the posted exclusion area.
- Document that weather conditions have not changed since the previous inspection.
- Document that the condition of the material stockpile has not changed. Has the stockpile configuration changed (height, width, length)? If a surfactant has been used and if the surfactant has a visual indicator such as color, sheen, or texture, has that color, sheen, or texture diminished since the previous inspection? If a tarpaulin has been used, has the tarpaulin position shifted?
- Document that berms and liners used to contain stockpile(s) remain intact.
- Document that the open excavation has not collapsed.
- If the condition of the stockpile(s), berms and liners, or open excavation has changed, then the inspector will contact the OU1 Field Operations Lead for further action.

- The adequacy of area lighting for inspection will be documented. The condition of the excavation barricades and exclusion zone barrier will be documented.

- Copies of inspection documentation will be kept in the DEEP project files.

Additional Project Requirements Resulting from this Commitment

- Adequate lighting will be provided during the off-shift so that inspectors have adequate illumination to verify stockpile and open excavation conditions.

- The open excavation shall be barricaded at the end of shift. The exclusion zone shall be clearly marked so that inspectors do not enter it.

4. **Actions will be taken if an unidentifiable item is uncovered during excavation**

- If an unidentifiable item is uncovered and appears to be leaking, off-gassing, or creating an immediately unsafe condition, personnel shall respond as directed in Section 9. Emergency/Contingency Plans of the DEEP Health and Safety Plan.

- If an unidentifiable item is uncovered during any DEEP activities, and it appears to be in a stable condition, then an attempt will be made to identify it. An item will be considered identified when the OU1 Field Operations Lead, Health and Safety Lead for Field Operations, and the Radiological Control Field Lead Technician supporting DEEP agree on what it is.

- If it cannot be identified, then work will stop and the Assistant Emergency Duty Officer (AEDO) will be notified.

- If the item is identified as an intact drum or cylinder, then the item will be removed, overpacked, and set aside. The AEDO will be contacted to determine final disposition of the overpacked item.

- If the item is identified as a solid metal item, then it may be removed, placed on the material stockpile, and covered with more material so it is not exposed to air, wind, or water. If an item is placed on the material stockpile, it will be noted in the off-shift inspection schedule, and the inspector will document during the inspections that it remains covered.

Additional Project Requirements Resulting from this Commitment

- Drums for overpacking will be staged in the DEEP project area.

5. **Lessons learned from each test will be distributed to the workers and project support personnel.**

- Tail-gate safety meetings will include lessons learned from previous excavations when the work is moved from one pit to another.

- Lessons learned from excavations in each pit will be documented in the project logbook. A final report will be issued at the completion of DEEP.

- The OU1 System Safety analyst will be informed of any accidents or reportable events prior to the event critique.

6. **Bags of contact waste will be labeled with the isotope-of-concern.**

- The isotope-of-concern is Thorium-230 unless directed otherwise by Radiological Control. The OU1 Field Operations Lead will verify that the isotope-of-concern has not changed when work moves from one pit to another.

5.0 Develop a Logic Statement

DEEP Phase 2, Wet Excavation trenching installations, are designed to provide the necessary observational information and to perform treatability studies which will identify the inputs needed to evaluate the feasibility of safely conducting mechanical excavation of the wastes from Waste Pits 1, 2 and 3.

6.0 Establish Constraints on the Uncertainty of the Decision

Individual errors will be controlled by performing a thorough review of the Wet Excavation Project Specific Plan (PSP) with all project personnel. Also, all project personnel involved in field activities will receive training specific to the PSP and Health and Safety Plan. Technical guidance will be provided by OU1 management, engineering, geology, and health and safety staffs during the performance of all field work.

To eliminate the potential for creation of contaminant pathways into the subsurface, all trenchings will be located well within the waste pits, and will not be excavated to within 5 feet of any waste pit base or sidewall liner.

A project "false positive" is defined as an erroneous experimental design observation which appears to show that the result is acceptable or accurate for the Wet Excavation inputs described in Section 3.0, when if fact the observation is not.

A logical "given" consequence of a "false positive" is alteration of project schedule and budget. Additionally, consequences of "false positive" errors would result in a partial or total failure of the experimental design observations listed in Section 3.0 as follows:

- **Angle of Repose in Excavation and Stockpile** - Difficulty of mechanical excavation due to instability of waste sidewall, resulting in sloughing of sidewall into pit. Mechanical excavation schedule and methodology would be altered.

- **Moisture Content in Situ** - Excessive moisture content in the waste material - not a relevant issue as dewatering of the waste material prior to excavation is proposed.

- **Plate-Bearing Capacity** - Erroneous information which demonstrates that the waste material surface is capable of supporting heavy excavation equipment. Ultimately the potential for a change of excavation equipment type and excavation methods would result.

- **Dust Generation from Excavation and Stockpile** - Generation of particulates into the environment during the time that the excavation is open and material is stockpiled. Assuming: 1) total failure of dust suppressant and stockpile covering measures, 2) total failure of perimeter fixed station air monitoring instruments, 3) particulate releases not observed by project staff, 4) high wind event while excavation and stockpiles are in use, the result would be exposure to on-site and off-site receptors.

- **Air Emissions from Excavation and Stockpile** - Generation of inorganic and organic emissions into the environment during the time that the excavation is open and material is stockpiled. Assuming: 1) total failure of dust suppressant and stockpile covering measures, 2) total failure of perimeter fixed station air monitoring instruments, 3) emissions not observed by project radiological and industrial hygiene monitoring staff, 4) high wind event while excavation and stockpiles are in use, the result would be exposure to on-site and off-site receptors.

- **Water Released from Stockpiled Waste and Ponding of Water in Excavation** - Release of limited quantity of water into adjacent waste pit surface cap material, or ultimately release of a limited quantity of water into the Waste Pit Area storm water collection system.

- **Stratigraphy of Cap and Waste** - Inadequate segregation of the waste pit cap material from the waste, or mixing of the cap material with the waste. Ultimately the waste pit cap material will be handled as waste material and remediated in a manner similar to the waste, so the most negative consequence would be the loss of some cap material to cover the trench excavation during backfilling. Lost cap material could be replaced.

- **Ease of Handling Excavated Waste** - An erroneous indication regarding the ease of handling the material. Resultant specialized equipment needs and different excavation techniques, would be created.

A project "false negative" is defined as an erroneous experimental design observation which appears to show that the result is unacceptable or inaccurate for the Wet Excavation inputs described in Section 3.0, when if fact the observation is accurate.

A logical "given" consequence of a "false negative" is alteration of project schedule and budget. Additionally, consequences of "false negative" errors would result in a partial or total failure of the experimental design observations listed in Section 3.0 as follows:

- **Angle of Repose in Excavation and Stockpile** - Over-design and procurement of excavation and stockpiling resources which are not necessary. Excessive project costs and time would be incurred.

- **Moisture Content in Situ** - Over-design and procurement of dewatering resources which are not necessary. Excessive project costs and time would be incurred.

- **Plate-Bearing Capacity** - Over-design and procurement of excavation and handling resources which are not necessary. Excessive project costs and time would be incurred.

- **Dust Generation from Excavation and Stockpile** - Over-design of dust monitoring and control systems, and procurement of unnecessary resources. Excessive project costs and time would be incurred.

- **Air Emissions from Excavation and Stockpile** - Over-design of air emissions monitoring and control systems, and procurement of unnecessary resources. Excessive project costs and time would be incurred.

- **Water Released from Stockpiled Waste and Ponding of Water in Excavation** - Over-design and procurement of water control measures which are not necessary. Excessive project costs and time would be incurred.

- **Stratigraphy of Cap and Waste** - Over-design and preparation of waste/cap excavation and segregation systems which are not necessary. Excessive project costs and time would be incurred.

- **Ease of Handling Excavated Waste** - Over-design and procurement of excavated waste handling resources which are not necessary. Excessive project costs and time would be incurred.

7.0 Optimize a Design for Obtaining Quality Data

Data quality will be optimized by performing field activities in accordance with the Sitewide CERCLA Quality Assurance Plan (SCQ), established FEMP procedures and ASTM Standards, and the DEEP Treatability Study Work Plan.

Wet Excavation field activities will be planned and executed in accordance with a PSP which details each activity to be performed. This PSP will be prepared in accordance with SCQ requirements which are applicable to treatability studies. In addition, the PSP will be subject to Quality Assurance oversight, and will be approved by applicable FERMCO management. Also, the PSP provides detailed information relative to health and safety, field observation, sampling, sample handling, decontamination and reporting of analysis results.

The information to be obtained is necessary to support OU1 Remedial Design. Of the waste material and liquid samples to be collected, none will be analyzed for the purposes of contaminant content amount or characterization. With the exception of moisture content laboratory analysis, the information to be obtained under this DQO is qualitative and observational in nature; thus Analytical Support Level A (ASL A) has been selected as appropriate.

DQO SUMMARY FORM

Revision: DRAFT #1

Effective Date:

1.A. Task/Description: Removal and segregation of waste pit cap materials, excavation of 7 trenches into Waste Pit 1 (2 trenches), Waste Pit 2 (2 trenches) and Waste Pit 3 (3 trenches), excavated waste stockpiling and particulate suppressant techniques application. Observation of physical properties of pit wastes, sampling of pit wastes, backfilling of trenches, replacing cap material, and revegetation. **CRU #:** 1

1.B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☐ RA ☐ R_vA ☐ OTHER ☒ Specify: Engineering Design

1.C. DQO No.: MS-015

DQO Reference No.: ______

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2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐ Soil ☐

Waste ☒ Wastewater ☐ Surface water ☐ Other (specify) ________

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3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site CharacterizationRisk Assessment

A ☐ B ☐ C ☐ D ☐ E ☐ A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of AlternativesEngineering Design

A [X] B [ ] C [ ] D [ ] E [ ]A [X] B [ ] C [ ] D [ ] E [ ]

Monitoring during remediation activitiesOther (Explain)

A [ ] B [ ] C [ ] D [ ] E [ ]A [ ] B [ ] C [ ] D [ ] E [ ]

4.A. Drivers: The DEEP Treatability Study is driven by the terms of Section XII.D.1 and D.2 of the Amended Consent Agreement between the Department of Energy and the U.S. Environmental Protection Agency.

4.B.Objective: The Wet Excavation phase of the DEEP Treatability Study will install seven trenches into Waste Pits 1, 2, and 3. Experimental design information will be obtained.

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5. Site Information (Description): All proposed Wet Excavation field work will be performed within the OU1 Waste Pit Area. A total of 7 trenches will be installed in Waste Pits 1, 2, and 3. Specifically, 2 trenches each will be installed in Waste Pits 1 and 2, and 3 trenches will be installed in Waste Pit 3.

DQO Number: MS-015

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH ☐ 2. Uranium ☐ 3. BTX ☐

Temperature ☐ Full Radiologic ☐ TPH ☐

Specific Conductance ☐ Metals ☐ Oil/Grease ☐

Dissolved Oxygen ☐

Cyanide ☐

Silica ☐

4. Cations ☐ 5. VOA ☐ 6. Other (specify)

Anions ☐ ABN ☐ 1. Experimental Design

TOC ☐ Pesticides ☐

TCLP ☐ PCB ☐

CEC ☐

COD ☐

6.B. Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A Backhoe/Endloader Bucket	SCQ Section: N/A
ASL B ____________	SCQ Section: ________
ASL C ____________	SCQ Section: ________
ASL D ____________	SCQ Section: ________
ASL E ____________	SCQ Section: ________

7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased ☐ Composite ☐ Environmental ☐ Grab ☐ Grid ☐

Intrusive ☒ Non-Intrusive ☐ Phased ☐ Source ☐

Other (specify): ________________________ DQO Number: TS-00?

7.B. Sample Work Plan Reference: (List the samples required. Reference the work plan or sampling plan guiding the sampling activity, as appropriate.) Section 3 of the DEEP Treatability Study Work Plan and the Draft PSP for Operable Unit 1 Dewatering Excavation Evaluation Program Wet Trench Excavation, dated December 9, 1994.

Background samples: ________________________

7.C. Sample Collection Reference: (Please provide a specific reference to the SCQ Section and subsection guiding sampling collection procedures.) SCQ, Appendix G, Table G-1.

Sample Collection Reference: Section 3 of the DEEP Treatability Study Work Plan and the Draft PSP for Operable Unit 1 Dewatering Excavation Evaluation Program Wet Trench Excavation, dated December 9, 1994.

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8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks ☐ Container Blanks ☒

Field Blanks ☐ Duplicate Samples ☒

Equipment Rinsate Samples ☐ Split Samples ☐

Preservative Blanks ☐ Performance Evaluation Samples ☐

Other (specify) N/A

8.B. Laboratory Quality Control Samples:

Method Blank ☐ Matrix Duplicate/Replicate ☐

Matrix Spike ☐ Surrogate Spikes ☐

Other (specify) N/A

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.