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CATEGORICAL EXCLUSION DETERMINATION CERCLA RCRA UNIT 5 (CRU5) RI/FS SOIL WASHING TREATABILITY STUDY NEPA DOCUMENT NO. 410

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NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

CATEGORICAL EXCLUSION (CX) DETERMINATION

CERCLA RCRA Unit 5 (CRU5) RI/FS Soil Washing Treatability Study
NEPA Document No. 410
Fernald Environmental Management Project (FEMP), Fernald, Ohio

Proposed Action

The United States Department of Energy (DOE) proposes to perform a Soil Washing Treatability Study in support of the CRU5 RI/FS at the Fernald Environmental Management Program (FEMP). A RI/FS has been initiated to develop the remedial actions at the FEMP. This study will involve the removal of contaminants from soils using physical/chemical processes. It is intended to confirm the feasibility of soil washing and provide preliminary process design information.

Location

The proposed action will take place at the former Drum Reconditioning Area located in Building 8C. Plant 8 is located in the southwest quarter of the FEMP process area. The 1050 acre FEMP site is located 18 miles northwest of downtown Cincinnati, Ohio.

Background

A variety of chemical and metallurgical processes were used at the FEMP for the manufacture of uranium products. These manufacturing processes occurred largely within the former production area, which covers approximately 136 acres near the center of the FEMP and consists of several processing plants and waste storage areas. As a result of these processes, ground water and soil in some areas within the vicinity of the FEMP have become contaminated. Also, airborne deposition of uranium from the production area has occurred over the site. Additional airborne material has been released in the waste storage area by fugitive emissions from the waste pits. The incinerator in the sewage treatment plant area was also a source of airborne contamination.

Based on characterization data (1988 RI/FS Work Plan and the 1989-1990 Additional Suspect Areas Addendum to the RI/FS Work Plan), it has been determined that soils in the CRU5 contain radioactive components as well as other inorganic and organic constituents of concern. The technical strategy adopted under the RI/FS was to divide the site into five operable units to facilitate the remedial actions. CRU5 consists of the groundwater, surface water, sediments, flora, fauna, and soils not included in the definitions of CRU 1-4.

Several viable treatment technologies have been identified for the remediation of soils. A literature review has been completed for the soil washing process. This review revealed that water washing with extraction agents is applicable for cleaning nonvolatile hydrophilic and hydrophobic organics and heavy metals from soils (U.S. EPA, 1989, "Summary of Treatment Technology Effectiveness for Contaminated Soil," EPA, Office of Emergency and Remedial Response, Washington, DC.) and has been successfully used on soil contaminated with radionuclides. However, this has been largely limited to the mining industry. Information was

not found on its application to the specific soils and contaminants (e.g. radionuclides, inorganics and organics) that are found at the FEMP. Therefore, due to the lack of information available to adequately address the overall effectiveness of this process, as well as the other EPA remedy evaluation criteria necessary during the detailed analysis of alternatives, a decision was made to proceed with treatability testing of the soil washing process at the FEMP.

The EPA's "Guide for Conducting Treatability Studies Under CERCLA" (1989b) outlines a three-tiered approach (remedy screening, remedy selection and remedy design) to conducting treatability studies for a Superfund site. This NEPA document requests approval for the remedy selection phase.

Description of Proposed Action

The objective of the proposed action is to assess the performance of the soil washing technology on CRU5 soil in support of the RI/FS. This new soil remediation technology has the potential to reduce clean-up cost and time required through effective soil treatment and waste management.

Soil washing has been selected as a treatment technology to be considered for the remediation of CRU5 soils. Soil washing involves dislodging contaminants bound to soil particles by a physical/chemical process using aqueous washing solutions. The experimental design of the proposed action will focus on washing soils contaminated with (1) radionuclides and (2) radionuclides plus inorganic and organic constituents. The work plan for the treatability study has been prepared in accordance with EPA's "Guide for Conducting Treatability Studies Under CERCLA" (EPA 1989b) and the Fernald RI/FS Quality Assurance Project Plan (QAPP) (DOE 1988).

Four soil sample locations will be used for the Treatability Study. Two of the four locations were selected based on moderate to high levels of uranium (250-500 μg/g) and essentially no organic and inorganic contaminants. These samples will be labeled ID-A and ID-B. The other two locations contain inorganic and organic constituents as well as radionuclides, and these samples will be labeled OU5-A and OU5-B. These four soils are considered to be representative of the contamination problem at the FEMP.

The equipment for the soil washing treatability study will be mounted on steel skids in the Drum Reconditioning Area within Plant 8C. The skids will be joined by flexible connectors to allow for easy rearrangement of the process configuration. The skid configuration will occupy a space of approximately 80 ft. by 30 ft. All utilities necessary for the study are available in Plant 8C. The floor in the process area will be sealed with an acid resistant coating, and the entire process area will be surrounded by a dike for secondary containment of the piping and tertiary containment of the tanks.

During the initial treatment technology investigation, 55-gallon drums of soil will be processed one drum at a time. Additional soil may be processed during subsequent testing of the soil washing process.

The soil washing process will incorporate physical and chemical separation techniques. Contaminated soil will be transferred from a 55-gallon drum to a

conveyor where it will be carried to a trommel screen for initial grain size separation of greater than and less than 4.75 mm. Material greater than 4.75 mm will be radiologically screened and put into an empty drum as the first process stream. Material less than 4.75 mm will be fed to a two deck vibrating screen.

The vibrating screen will separate the soils into three sizes: greater than 2 mm, 150 μm to 2mm, and less than 150 μm. The soil fraction less than 150 μm and wash water will be transferred to a holding tank where it will be stored until the end of the screening process. The two larger fractions will be combined and pumped to an attrition scrubber where they will be scrubbed with a low concentration (0.5 molar) of dispersant. The scrubber effluent will be pumped to a holding tank where it will be agitated until the next screening stage is ready.

The next screening stage requires the removal of the 150 μm mesh lower screen. The contents of the holding tank will be pumped to the screen where it will be separated at greater than and less than 2 mm. The material greater than 2 mm will be radiologically monitored and collected as the second process stream. The material less than 2 mm will be collected separately in a holding tank and later combined with the less than 150 μm soil fraction and wash water from the initial screen step to form a slurry.

This slurry will be pumped to a multigravity separator (horizontal centrifuge) where the materials will be separated based on the specific gravities of the particles. The heavier uranium will be removed and drummed for disposal. The lighter soil fraction will be transferred to a holding tank before being pumped to the hydrocyclone (water jet). The hydrocyclone will separate the grains into 2 mm to 25 μm and less than 25 μm. The larger sized soil fraction will be pumped to a holding tank and then to a filter press to remove residual water from the slurry. The residual water will be pumped back to the trommel screen for reuse or will be collected for analysis and treatment in the wastewater system. The filter cake will be radiologically screened and collected in drums as the third process stream.

The less than 25 μm material from the hydrocyclones will be transferred to a holding tank and then processed through one of two reactor vessels. One vessel is a fiberglass reinforced plastic-lined tank that uses a dilute caustic for ambient temperature extractions. The other vessel is a glass-lined metal-jacketed vessel for high temperature inorganic acid processing. In either vessel, the soil and extractant mixture will be agitated for up to four hours. After the mixture is allowed to cool, it will be pumped to a filter press. The filter cake will be water washed, reslurried, refiltered, and collected as the fourth process stream. The spent extraction solution will be collected and treated by precipitation or ion exchange. The precipitate and liquid will be separated using the filter press. The final liquids and solids will be drummed separately for analysis.

The output of this process will include drums of material greater than 4.75 mm (first process stream), 2-4.75mm material (second process stream), heavy particulate uranium, filter cake of 2 mm to 75 μm soil (third process stream), filter cake of clean fine soil 25 μm and less (fourth process stream), and the remaining solids and spent wash solutions. All of the residuals from the process streams will be initially stored on the Plant 1 Pad. Reagents may be recycled back into the system. Each run (each 55-gallon drum of soil washed) will produce

approximately ten 55-gallon drums of spent wash solution. The wastewater stream from the ID soils will be analyzed and if all residual uranium has been precipitated out, as expected, it will be processed in the Plant 8 Sump System.

The wastewater stream from the OU5 soils will be collected and analyzed to determine whether the water contains concentration of substances requiring classification as a RCRA material. In the event a water sample indicates concentrations of substances requiring its classification as RCRA waste material, the entire batch will be held for further treatment or disposal as a RCRA waste. This material (if still RCRA) will not be discharged into the general sump. If operation continues past the initial drums, more dispersant, reagents, and extracting agents (acids) may be required.

Processes which may emit dust, fumes or hazardous gases will be designed to comply with Best Achievable Control Technology (BACT). Conveyors, screens, drum dumping and mixers will be covered with ventilation through a particulate collection device. The device will end with a HEPA unit, as there are concerns that radionuclides might be part of the dust.

According to the Treatability Study Work Plan for OU5 Soil Washing, the remedy selection soil washing tests are expected to last 12 months and will cost approximately $1,000,000. Equipment used will be decontaminated for possible use in the remedy design phase.

Categorical Exclusion to be Applied

The authority for finding this project to be subject to NEPA Categorical Exclusion is contained in Subpart D of the revision to 10 CFR part 1021, entitled "National Environmental Policy Act; Implementing Procedures and Guidelines." The Final Rule and Notice, effective May 26, 1992, includes a revised and expanded list of categorical exclusions that are classes of actions that normally do not require the preparation of either an Environmental Impact Statement or an Environmental Assessments.

The Final Rule and Notice specifically lists in Part 1021, Appendix B to Subpart D, Sec. 1021.410, B6.2, the following types of actions that are Categorical Exclusions applicable to Specific Agency Actions:

> The siting, construction, and operation of temporary (generally less than 2 years) pilot-scale waste collection and treatment facilities, and pilot-scale (generally less than one acre) waste stabilization and containment facilities (including siting, construction, and operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis) if the action: (1) Supports remedial investigations/feasibility studies under CERCLA, or similar studies under RCRA, such as RCRA facility investigations/corrective measure studies, or other authorities, and (2) would not unduly limit the choice of reasonable remedial alternatives (by permanently altering substantial site area or by committing large amounts of funds relative to the scope of the remedial alternatives).

The OU5 RI/FS Soil Treatability Study meets the requirements for the Categorical Exclusion listed above. Furthermore, the proposed action will not violate applicable statutory, regulatory, or permit requirements; it will not require siting and construction or major expansion of waste disposal, recovery or treatment facilities; and it will not impact any environmentally sensitive areas (e.g., wetlands, floodplains, or the sole-source aquifer).

Compliance Action

I have determined that the proposed action meets the requirements for the CX referenced. Therefore, the proposed action is categorically excluded from further NEPA review and documentation.

Approval: Tom Rowland

Thomas J. Rowland, Acting Manager
U.S. Department of Energy, Fernald Field Office

Date: 4/2/93