PERMIT ATTACHMENT S

RCRA FACILITY INVESTIGATION - SCOPE OF WORK

The purpose of a RCRA Facility Investigation (RFI) is to determine the nature and extent of releases of hazardous wastes or hazardous constituents. The required information shall include each item specified under Tasks I-III. The Permittee shall furnish all personnel, materials, and services necessary for, and incidental to, performing the investigation.

If the Permittee believes that certain requirements of the Scope of Work are not applicable or have been sufficiently addressed in a previous document (e.g., the Permit Application), the specific requirements shall be identified and a detailed rationale for inapplicability or previous reference shall be provided to the Secretary for approval.

The RFI consists of three tasks:

Task I: RFI Work Plan

a. Introduction

b. Environmental Setting

c. Source Characterization

d. Contamination Characterization

Task II: Investigation

Task III: RFI Final Report and Summary

Task I: RFI Work Plan

The Permittee shall prepare an RFI Work Plan as specified in Permit Condition 10.1.5. and in the following conditions. The RFI Work Plan shall reference Permit Attachment R, *Facility Work Plan Outline*, as appropriate. The RFI Work Plan shall provide for and address the following information needs:

a. Introduction. - The introduction shall summarize the regional location, pertinent boundary features, general Facility physiography, hydrogeology, and historical use of the Facility and the specific unit(s) under investigation for the treatment, storage, or disposal of solid and hazardous waste. Information supplied from the Permit Application, the Permit, or existing reports and studies is acceptable, as long as the source of

this information is documented, pertinent, and reflective of current conditions. This section shall include:

1. Facility and Unit Description. - This description shall include:

   i. All maps shall be consistent with requirements set forth in 20.4.1.900 NMAC (incorporating 40 CFR 270.14) and shall be of sufficient detail and accuracy to locate all current and future work performed at the site. Maps shall include:

      - general geographic location;

      - property lines, with the owners of all adjacent property clearly indicated, and all land previously owned and/or used by the Permittee around the Facility;

      - topography, water features, and drainage patterns;

      - all tanks, buildings, utilities, paved areas, rights-of-way, and other features;

      - all solid waste management units referenced in Permit Part 10, Table 10-1;

      - all known past solid or hazardous waste treatment, storage and disposal areas or units;

      - surrounding land uses (residential, commercial, agricultural, recreational); and

      - the location of all production location of all production and ground water monitoring wells. These wells shall be clearly labeled and ground and top of casing elevations included (these elevations may be included as an attachment).

   ii. A history and description of ownership and operation of solid and hazardous waste generation, treatment, storage and disposal activities at the facility.

iii. A summary of approximate dates or periods of past waste releases, identification of the materials released, the amount released, the location released, and a description of the response actions conducted (local, State, or Federal response units, or response actions by private parties), including any inspection reports or technical reports generated as a result of the response.

iv. A reference to all environmental, geologic, and hydrogeologic studies performed by all parties, at or near the facility, with a short summary of the purpose, scope, and significant findings thereof.

v. A reference to all environmental permits, applied for and/or received, the purpose thereof, and a short summary of permit requirements.

2. Nature and Extent of Contamination

i. This section shall summarize all possible source areas of contamination including, at a minimum, consideration of all SWMUs listed in Permit Part 10, Table 10-1. For each area, the Permittee shall identify the following:

- location of unit/area on a Facility map;
- quantities of solid, hazardous, and radiochemical wastes;
- quantities of radiochemical and hazardous constituents, to the extent known; and
- identification of areas where additional information is necessary.

ii. The Permittee shall prepare an assessment and description of the existing degree and extent of contamination. This should include:

- available monitoring data and qualitative information on locations and levels of contamination at the Facility;

- all potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and
- the potential impact(s) on human health or the environment, including demography, ground water and surface water use, and land use.

3. Implementation of Interim Measures

a. Interim measures. -The Permittee shall document and report on all interim measures that have been or are being undertaken at the facility. The following information regarding interim measures shall be provided:

i. objectives of the interim measures: how the measure is mitigating a potential threat to human health or the environment and/or is consistent with and integrated into requirements for a long-term solution;

ii. schedules for design, construction and monitoring;

iii. schedule for progress reports;

iv. stabilization that has occurred at the site;

v. proposed further investigation and/or action; and

vi. justification for limiting the scope of the RFI.

b. Environmental Setting - The Work Plan shall provide for collection of information to supplement and verify existing information on the environmental setting at the Facility. The Work Plan shall provide for characterization of the following:

1. Hydrogeology. - The Work Plan shall describe in detail a program to evaluate hydrogeologic conditions at the facility and at the specific unit. This program shall at a minimum provide for the following information needs:

i. a description of the regional, local, Facility-wide, and Solid Waste Management Unit (SWMU)- or Regulated Unit-specific geologic and hydrogeologic characteristics affecting vadose zone fluid flow and ground water flow beneath the facility.

ii. an analysis of any topographic features including surface water bodies that might influence the ground water flow system.

iii. A representative and accurate classification and description of the hydrogeologic units which may be part of migration pathways at the Facility (i.e., the aquifers and any intervening saturated and unsaturated units) based on field data, tests (e.g., geophysical logging of existing and new wells, piezometers and borings), and cores.

iv. the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of migration pathways based on field studies and cores, structural geology, and hydrogeologic cross sections, including:

- unconsolidated sand and gravel deposits;

- zones of fracturing or channeling in consolidated or unconsolidated deposits; and

- zones of high permeability or low permeability that might direct and restrict the flow of contaminants.

2. A description of representative water level or fluid pressure based on data obtained from monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source. Information needs include: potentiometric surface maps; hydrologic cross sections showing vertical gradients; vertical and horizontal components of flow; temporal changes in hydraulic gradients; and flow nets.

3. A description of man-made influences that may affect site hydrogeology such as active and

inactive local water supply and production wells, pipelines, french drains, and ditches.

4. The Permittee shall describe in detail a program designed to characterize soil and rock units above the water table. Such characterization shall include, but is not limited to, the following information: surface soil distribution; soil profile, including American Society of Testing and Materials (ASTM) and US Conservation Service (USCS) classifications of soils; transects of soil stratigraphy; saturated hydraulic conductivity; porosity; cation exchange capacity (CEC); soil pH; particle size distribution; depth to water table; moisture content; effect of stratification on unsaturated flow; infiltration; evapotranspiration; residual concentration of contaminants in soil; total natural organic carbon content; and mineral and metal content.

   c. Source Characterization - The Permittee shall describe in detail a program designed to completely characterize the wastes and the areas where wastes have been placed, including: type, quantity, physical form, composition, disposition (containment and nature of wastes), and the Facility characteristics affecting releases (e.g., Facility security, engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

      1. Unit/disposal area characteristics, including but not limited to:

         i. location of unit/disposal area;

         ii. type of unit/disposal area;

         iii. design features;

         iv. operating practices (past and present);

         v. period of operation;

         vi. age of unit/disposal area;

         vii. general physical conditions; and

         viii. method used to close the unit/disposal area.

2. Waste characteristics, including but not limited to:
   i. type of waste placed in unit (hazardous classification, quantity, chemical composition);
   ii. physical and chemical characteristics (physical form, physical description, temperature, pH, general chemical class, molecular weight, density, boiling point, viscosity, solubility in water, solubility in solvents, cohesiveness, vapor pressure); and
   iii. migration and dispersal characteristics of the waste (sorption coefficients, biodegradability, photodegradation rates, hydrolysis rates, chemical transformations).

d. Contamination Characteristics - The Permittee shall describe in detail a program to collect analytical data on ground water, soils, surface water, sediment, and subsurface gas contamination when necessary to characterize contamination from a SWMU. The data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data required shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individual(s) performing the sampling and analysis. All media (ground water, surface water and sediments, soil, air, and gas) must be investigated. If the permittee believes certain media could not be affected by a release from a specific unit, a detailed justification for not investigating those media must be provided. The Permittee shall address the following types of contamination at the facility as appropriate:

1. Ground Water Contamination - The Work Plan shall describe in detail a program of ground water investigation to characterize any ground water plumes of contamination at the facility that are not subject to corrective action requirements of 40 CFR Section 264.100. The program shall at a minimum provide for the following information needs:

i. a description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Facility;

ii. the horizontal and vertical direction of contamination movement;

iii. the velocity of contaminant movement;

iv. the horizontal and vertical extent of concentrations of any 20.4.1.500 NMAC (incorporating 40 CFR 264, Appendix IX) constituents;

v. an evaluation of factors influencing the plume movement; and

vi. an extrapolation of future contaminant movement.

2. Soil Contamination - The Permittee shall describe in detail a program to characterize contamination of soil and rock units above the water table in the vicinity of the contaminant release. The program shall provide for the following information needs:

i. a description of the vertical and horizontal extent of contamination;

ii. a description of contaminant and soil chemical properties within the contaminant source area. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation, natural total organic carbon content, and other factors that might affect contaminant migration and transformation; and

iii. plume migration and transformation, specific contaminant concentrations, the velocity and direction of contaminant movement, and an extrapolation to future contaminant movement.

3. Air Contamination - The Permittee shall describe in detail a program to characterize particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information: a description of the horizontal and vertical

direction and velocity of contaminant movement; the rate and amount of the release; and the chemical, radiochemical, and physical composition of the contaminants released, including horizontal and vertical concentration profiles.

4. Subsurface Gas - The Permittee shall describe in detail a program to characterize the nature, rate and extent of releases of reactive gases from the units. Such a program shall include, but is not limited to: provisions for monitoring subsurface gases released from the unit, and an assessment of the potential for threat to human health and/or the environment.

Task II: Investigation

The Facility investigation activities shall follow the RCRA Facility Investigation Work Plan. All sampling and analyses shall be conducted in accordance with the Corrective Action Data Collection Quality Assurance Plan in the Facility Work Plan. All sampling locations shall be documented in a log and identified on a detailed site map. During the investigation, it may be necessary to revise the RFI Work Plan to increase or decrease the level of detail of information collected to accommodate the facility specific situation.

The Permittee shall conduct investigations of SWMUs previously identified with known or suspected releases of contamination to characterize the Facility (Environmental Setting), define the source (Source Characterization), define the degree and extent of contamination (Contamination Characterization), and identify actual or potential receptors.

The investigations should result in data of adequate technical quality to develop and evaluate corrective measures alternatives during the Remedy Identification, when necessary.

Task III: RCRA Facility Investigation Final Report and Summary

The Permittee shall analyze all Facility investigation data collected during the RFI process and prepare a detailed report on the type and extent of contamination at the Facility including sources and migration pathways. All information generated during the investigation shall be presented and analyzed. All evidence and procedures used for making any determinations (e.g., velocity of groundwater, extent of contamination) shall be fully documented. The report shall describe extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area. The report shall contain the results of all tests, calculations, inspections, record searches, and observations. It shall

contain soil and ground water contamination profiles, statistical comparisons, and the results of all sampling events conducted as part of the investigation. It shall display results in tables, graphs, maps, and cross sections as discussed in the Corrective Action Data Management Plan.

The Permittee shall identify all relevant and applicable standards for the protection of human health or the environment (e.g., National Ambient Air Quality Standards, Federally-approved State water quality standards, ground water protection standards, and other pertinent standards)

Data shall be evaluated to ensure it is sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, to evaluate the potential threat to human health or the environment, and to support a remedy identification, if required. The report shall present all data in an Appendix.

General RCRA Facility Investigation Reporting Requirements

a. Two hard copies and one IBM compatible disk copy of all reports and data shall be submitted by the Permittee to the Secretary.

b. The RFI Work Plan shall be submitted by the Permittee to the Secretary as described in Permit Condition 10.1.5.a.

c. The RFI Final Report and Summary shall be submitted by the Permittee to the Secretary as described in Permit Condition 10.1.5.c.

d. The Permittee shall provide the Secretary with signed, monthly progress reports as specified in Permit Conditions 10.1.3.i. and 10.1.7.d.