APPENDIX A
RCRA FACILITY INVESTIGATION

TASK I: DESCRIPTION OF CURRENT CONDITIONS

The Permittee shall submit to the Director for approval, a report providing the background information pertinent to the Facility (Tooele Army Depot facility) and a description of contamination and interim measures. The data gathered during any previous investigations or inspections and other relevant data shall be included.

A. BACKGROUND INFORMATION

1. The Permittee shall include maps of sufficient detail and accuracy to locate and report all current and future work performed at the site. The maps shall depict:

    a. All solid or hazardous waste treatment, storage, or disposal areas including all solid waste management units active after November 19, 1980;

    b. All known past solid or hazardous waste treatment, storage or disposal areas including solid waste management units regardless of whether they were active on November 19, 1980;

    c. All known product and waste underground tanks piping past or present; and

    d. The location of all production and groundwater monitoring wells. These wells shall be clearly labeled. Ground and top of casing elevations and construction details shall be included.

2. The Permittee shall provide a history and description of ownership and operation, solid and hazardous waste generation, treatment, storage, and disposal activities at the TEAD.

3. The Permittee shall provide dates of past product and waste spills, type of materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted, including any inspection reports or technical reports generated as a result of the response; and

4. A list of relevant environmental documents and studies prepared for the TEAD.

B. Nature, Extent and Rate of Migration of Contamination

The Permittee shall prepare and submit for the Director's approval a preliminary report describing the existing information on the nature and extent of contamination.

1. The report shall summarize all possible source areas of contamination. This will include all regulated units, solid waste management units, waste and product spill areas, and other suspected source areas of contamination. For each area, the Permittee shall identify:

    a. Location of area (on a TEAD map);

    b. Quantities of solid and hazardous wastes;

    c. Hazardous waste or constituents, to the extent known; and

    d. Areas where additional information is necessary.

2. The report shall include an assessment and description of the existing degree and extent of contamination. This shall include:

    a. Available monitoring data and qualitative information on locations and levels of contamination at the TEAD;

    b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, hydrogeo-chemistry, water quality, meteorology, and air quality; and

    c. The potential impacts(s) on human health and the environment, including demography, groundwater and surface water use, and land use.

C. Past/Current Activities

The Permittee shall document all investigatory and remedial activities which were or are being undertaken at the TEAD. These shall include:

1. How the activities are mitigating potential threats to human health and the environment, or are consistent with and integrated into RCRA Facility Investigation work at the Facility, or both;

2. Design, construction, operation, and maintenance requirements; and

3. Schedules for all activities, including progress reports.

D. RFI – Phase I

1. For each SWMU in which a release of hazardous waste or hazardous waste constituents has not been documented, as specified on Table VII-2, the Permittee shall conduct a RFI – Phase I to document a release or absence of a release of hazardous waste or hazardous waste constituents.

2. The Permittee shall prepare and submit a RFI – Phase I Workplan to the Director for approval. The RFI – Phase I Workplan shall include the development of several plans, which shall be prepared concurrently. During the RFI, it may be necessary to revise the RFI – Phase I Workplan to increase or decrease the amount of information collected to accommodate the TEAD specific situation. The Facility Investigation Workplan shall include, but not be limited to the following:

   a. RFI – Phase I Project Management Plan:

   The Permittee shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, and personnel. The Project Management Plan shall evaluate each SWMU based on its actual or potential threat to human health and the environment and prioritize the investigatory and remedial activities accordingly. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RCRA Facility Investigation, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

   b. RCRA Facility Investigation – Phase I Data Collection Quality Assurance Plan:

   The Permittee shall submit a Data Collection Quality Assurance Plan documenting all monitoring procedures including: sampling, field measurements and sample analyses performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are statistically valid, and properly documented. The Data Collection Quality Assurance Plan shall include, at a minimum:

      i. A Data Collection Strategy section, including, at a minimum:

         A. The level of precision and accuracy for all data. Factors which should be considered include, environmental conditions at the time of sampling, number of sampling points, and the representativeness of selected media and selected analytical parameters.

         B. Description of methods and procedures to assess the precision, accuracy, and completeness of the measurement data;

         C. Description of the measures to be taken to assure that data generated by the Permittee and by outside laboratories or consultants during the RCRA Facility Investigation – Phase I are comparable. These data shall be comparable during the entire RCRA Facility Investigation.

         D. Details relating to the schedule and information to be provided in quality assurance reports. The reports shall include, but not be limited to:

1) Periodic assessment of measurement data accuracy, precision, and completeness;

2) Results of performance audits;

3) Results of system audits; and

4) Potential Quality Assurance problems and recommended solutions.

ii A sampling section including, at a minimum a discussion of:

A. Selecting appropriate sampling locations, depths, and methods;

B. Providing a statistically significant number of sampling sites;

C. Determining conditions under which sampling should be conducted;

D. Determining which media are to be sampled;

E. Determining which parameters are to be measured and where;

F. Selecting the frequency of sampling and length of sampling period;

G. Selecting the type of samples and number of samples to be collected;

H. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;

I. Documenting field sampling operations and procedures, including:

1) Procedures for preparation of reagents or supplies which become an integral part of the sample (e.g. filters, and adsorbing reagents);

2) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

3) Specific sample preservation method;

4) Calibration of field devices;

5) Collection of replicate samples;

6) Submission of field-biased blanks, where appropriate;

7) Interferences present at the TEAD;

8) Construction materials and techniques associated with monitoring wells and piezometers;

9) Field equipment listing and types of sample containers;

10) Parameter sampling order; and

11) Decontamination procedures.

J. Selecting appropriate sample containers;

K. Sample preservation; and

L. Chain-of-custody, including:

1) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and

2) Prepared sample labels containing all information necessary for effective sample tracking.

iii. A Field Measurements section including a discussion of:

A. Selecting appropriate field measurement locations, depths, etc;

B. Providing a statistically significant number of field measurements;

C. Measuring all necessary ancillary data;

D. Determining conditions under which field measurements should be conducted;

E. Determining which media are to be addressed by appropriate field measurements;

F. Determining which parameters are to be measured and where;

G. Selecting the frequency of field measurements and length of field measurements period; and

H. Documenting field measurement and procedures, including:

1) Procedures and forms for recording raw data and the exact location, time, and TEAD-specific considerations associated with the data acquisition;

2) Calibration of field devices;

3) Collection of replicate measurements;

4) Submission of field-biased blanks;

5) Potential Interferences present at the Facility;

6) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;

7) Field equipment list;

8) Order in which field measurements were made; and

9) Decontamination procedures.

iv. A Sample Analysis Section, which shall specify:

A. Chain-of-custody procedures, including:

1) Identification of a responsible party at the laboratory authorized to sigh for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

2) A laboratory sample custody log consisting of standard lab-tracking report sheets: and

3) Laboratory sample custody procedures for sample handling, storage and disbursement for analysis.

B. Sample storage procedures and storage times;

C. Sample preparation methods;

D. Analytical procedures, including;

1) Scope and application of the procedure;

2) Sample matrix;

3) Potential interferences;

4) Precision and accuracy of the methodology; and

5) Method detection limits.

E. Calibration procedures and frequency;

F. Data reduction, validation, and reporting;

G. Internal quality control checks, laboratory performance and systems audits, including:

1) Method blank(s);

2) Laboratory control sample(s);

3) Calibration check sample (s);

4) Replicate sample(s);

5) Matrix-spiked sample(s);

6) "Blind" quality control sample(s);

7) Control charts;

8) Surrogate samples;

9) Zero and span gases; and

10) Reagent quality control checks.

H. Preventive maintenance procedures and schedules;

I. Corrective action (for laboratory problems); and

J. Turnaround time.

c. RCRA Facility Investigation-Phase I Data Management Plan:

The Permittee shall develop and initiate a RCRA Facility Investigation-Phase I Data Management Plan to document and track investigation data and results. This plan shall specify data documentation materials and procedure, project file requirements, and project related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

i. The data record shall include the following;

A. Unique sample or field measurement code;

B. Sampling or field measurement location and sample or measurement type;

C. Sampling or field measurement raw data;

D. Laboratory analysis ID number;

E. Result of analysis.

ii. The following data shall be presented in tabular displays:

A. Raw data;

B. Results for each medium, and for each constituent monitored;

C. Data reduction for statistical analysis;

D. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

E. Summary data.

iii. The following shall be presented in graphical formats:

A. Sampling location and sampling grid;

B. Boundaries of sampling area and areas where more data are required;

C. Levels and extent of contamination at each sampling location;

D. Contamination levels, averages, and maximum;

E. Changes in concentration in relation to distance form the source, time, depth and or other parameters; and

F. Features affecting intramedial transport and potential receptors.

d. RCRA Facility Investigation-Phase I Health and Safety Plan:

The Permittee shall prepare a Health and Safety Plan, which shall include:

i. TEAD description including delineation of work area and availability of roads, water supply, electricity, and telephone service;

ii. Known hazards and risks associated with each activity conducted;

iii. Key personnel and alternatives responsible for site safety, response operations, and for protection of public health;

iv. Levels of protection to be worn by personnel in work areas and justification for levels;

v. Procedures to control site access;

vi. The TEAD Health and Safety Plan shall be consistent with all applicable federal, state, and local regulations including but not limited to;

A. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (19854);

B. EPA Order 1440.1 – Respiratory Protection;

C. EPA Order 1440.3 – Health and Safety Requirements for Employees engaged in Field Activities;

D TEAD Contingency Plan;

E. EPA Standard Operating Safety Guide (1984);

F OSHA regulations, particularly in 29 CFR 1910 and 1926; including Interim Final Rule (29 CFR Part 1910) published in the December 19, 1986, Federal Register;

G. State and local regulations; and

H. Other applicable EPA guidance.

3. Determination of Further Action

a. The Permittee shall provide recommendations for further investigation under a RCRA Facility Investigation – Phase I at the identified Solid Waste Management Unit(s) based on documentation of known or prior release from the specified Solid Waste Management Unit(s) in the final Task I report.

b. The list of recommended Solid Waste Management Unit(s) for further investigation under a RCRA Facility Investigation – Phase I shall be prioritized based on the actual or potential threat to human health or the environment.

TASK II: RCRA FACILITY INVESTIGATION – PHASE II WORKPLAN

The Permittee shall prepare a RCRA Facility Investigation – Phase II Workplan. This RCRA Facility Investigation – Phase II Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RCRA Facility Investigation – Phase II Workplan to increase or decrease the amount of information collected to accommodate the Facility specific situation. The RCRA Facility Investigation – Phase II Workplan shall include, but not be limited to:

A. Project Management Plan

The Permittee shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan shall each evaluate each SWMU based on its actual or potential threat to human health and the environmental and prioritize the investigatory and/or remedial activities accordingly. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RCRA Facility Investigation, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

B. Data Collection Quality Assurance Plan

The Permittee shall prepare a plan documenting all monitoring procedures, including; sampling, field measurements and sample analyses performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented.

1. The Data Collection Strategy section of the Data Collection Quality Assurance Plan shall include, but not be limited to:

a. The level of precision and accuracy for all data. Factors which should be considered include, environmental conditions at the time of sampling, number of sampling points, and the representativeness of selected media and selected analytical parameters.

b. Description of methods and procedures to assess the precision, accuracy, and completeness of the measurement data;

c. Description of the measures to be taken to assure that data generated by the Permittee and by outside laboratories or consultants during the RCRA Facility Investigation – Phase II are comparable. The data shall be comparable during the entire RCRA Facility Investigation.

d. Details relating to the schedule and information to be provided in quality assurance reports. The reports shall include, but not be limited to:

i) Periodic assessment of measurement data accuracy, precision, and completeness;

ii) Results of performance audits;

iii) Potential quality assurance problems and recommended solutions.

2. The Sampling section of the Data Collection Quality Assurance Plan shall include:

a. Selecting appropriate sampling locations, depths, methods;

b. Providing a statistically significant number of sampling sites;

c. Determining conditions under which sampling should be conducted;

d. Determining which media are to be sampled (e.g., groundwater, air, soil, sediment, etc.);

e. Determining which parameters are to be measured and where;

f. Selecting the frequency of sampling and length of sampling period;

g. Selecting the type of samples (e.g., composites versus grabs) and number of samples to be collected;

h. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;

i. Documenting field sampling operations and procedures, including;

i) Procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters, and adsorbing reagents);

ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

iii) Specific sample preservation method;

iv) Calibration of field devices;

v) Collection of replicate samples;

vi) Submission of field – biased blanks, where appropriate;

vii) Interferences present at the TEAD;

viii) Construction materials and techniques associated with monitoring wells and piezometers;

ix) Field equipment list and types of sample containers;

x) Parameter sampling order; and

xi) Decontamination procedures.

j. Selecting appropriate sample containers;

k. Sample preservation; and

l. Chain-of custody, including:

i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and

ii) Prepared sample labels containing all information necessary for effective sample tracking.

3. The Field Measurements section of the Data Collection Quality Assurance Plan shall include:

a. Selecting appropriate field measurement locations, depth, and methods;

b. Providing a statistically significant number of field measurements;

c. Measuring all necessary ancillary data;

d. Determining conditions under which field measurements should be conducted;

e. Determining which media are to be addressed by appropriate field measurements;

f. Determining which parameters are to be measured and where;

h. Selecting the frequency of field measurements and length of field measurements period; and

i. Documenting field measurement and procedures, including;

i) Procedures and forms for recording raw data and the exact location, time and TEAD-specific considerations associated with the data acquisition;

ii) Calibration of field devices;

iii) Collection of replicate measurements;

iv) Submission of field-biased blanks;

v) Interferences present at the Facility;

vi) Construction materials and techniques associated with monitoring wells and piezometers use to collect field data;

vii) Field equipment list;

viii) Order in which field measurements were made; and

ix) Decontamination procedures.

4. The Sample Analysis Section of the Data Collection Quality Assurance Plan shall specify:

a. Chain-of-custody procedures, including:

i) Identification of responsible party at the laboratory authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

ii) A laboratory sample custody log consisting of standard lab-tracking report sheets; and

iii) Laboratory sample custody procedures for sample handling, storage, and disbursement for analysis.

b. Sample storage procedures and storage times;

c. Sample preparation methods

d. Analytical procedures, including:

i) Scope and application of the procedure;

ii) Sample matrix;

iii) Interferences;

iv) Precision and accuracy of the methodology; and

v) Method detection limits.

e. Calibration procedures and frequency;

f. Data reduction, validation, and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

i) Method blank(s);

ii) Laboratory control samples(s);

iii) Calibration check sample(s);

iv) Replicate sample(s);

v) Matrix-spiked sample(s);

vi) "Blind" quality control sample(s);

vii) Control charts;

viii) Surrogate samples;

ix) Zero and span gases; and

x) Reagent quality control checks.

h. Preventive maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turnaround time.

C. Data Management Plan

The Permittee shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and setup data documentation materials and procedures, project file requirements, and project related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. The data record shall include;

a. Unique sample or field measurement code;

b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis measurement raw data;

e. Results of Analysis.

2. The following data shall be presented in a table:

a. Raw data;

b. Results for each medium and for each constituent monitored;

c. Data reduction for statistical analysis;

d. Sorting of data by potential stratification factors; and

e. Summary data.

3. The following shall be presented in graphical formats:

a. Sampling location and sampling grid;

b. Boundaries of sampling area, and areas where more data are required;

c. Levels and extent of contamination at each sampling location;

d. Contamination levels, averages, and maximum;

e. Changes in concentration in relation to distance from the source, time depth or other parameters; and

f. Features affecting intramedia transport and potential receptors.

D. Health and Safety Plan

1. The Permittee shall prepare a Health and Safety Plan, which shall include:

a. Facility description including delineation of work area and availability of resources;

b. Known hazards and risks associated with each activity conducted;

c. Key personnel and alternatives responsible for site safety, response operations, and for protection of public health;

d. Levels of protection to be worn by personnel in work areas and justification for the levels;

f. Procedures to control site access;

2. The Facility Health and Safety Plan shall be consistent with all applicable federal, State, and local regulations including, but not limited to:

a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

b. EPA Order 1440.1 – Respiratory Protection;

c. EPA Order 1440.3 – Health and Safety Requirements for Employees engaged in Field Activities;

d. TEAD Contingency Plan;

e. EPA Standard Operating Safety Guide (1984);

f. OSHA regulations, particularly in 29 CFR 1910 and 1926; including Interim Final Rule (29 CFR Part 1910) published in December 19, 1986, Federal Register;

g. State and local regulations; and

h. Other applicable EPA guidance.

E. Community Relations Plan

The Permittee shall prepare a plan for the dissemination of information to the public regarding investigation activities and results.

TASK III: RFI PHASE I FACILITY INVESTIFATION

The Permittee shall conduct a facility investigation adequate to characterize the environmental setting at TEAD, define the source(s) and degree and extent of contamination, and identify actual or potential receptors. This investigation shall be conducted in accordance with Task II and shall produce data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study.

A. Environmental Setting

The Permittee shall collect information on the environmental setting at the TEAD, as follows:

1. Hydrogeology

a. A description of the regional and site specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the Facility, including:

i) Regional and site specific stratigraphy; description of strata including strike and dip, identification of stratigraphic contact;

ii) Structural geology; description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);

iii) Depositional history;

iv) Locations and amounts of recharge and discharge;

v) Regional and site specific groundwater flow, including seasonal and temporal variation in the groundwater flow regime.

b. An analysis of any topographic features that might influence the groundwater flow system.

c. Based on field data, test, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the TEAD, including:

i) Hydraulic conductivity and porosity (total and effective);

ii) Lithology, grain size, sorting, degree of cementation;

iii) An interpretation of hydraulic interconnections between saturated zones; and

iv) The attenuation capacity and mechanisms of the natural earth materials.

d. Based on field studies and cores, structural and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:

i) Sand and gravel deposits in unconsolidated deposits;

ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

iii) Zones of high and low permeability;

iv) For the uppermost aquifer, geologic formation or unit, group of formation, or formation capable of yielding a significant amount of groundwater to wells or springs; and

v) Water-bearing zones above the first confining layer that may serve as pathways for contaminant migration including perched zones of saturation.

e. Based on data obtained from ground-water monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source(s), a representative description of water level or fluid pressure monitoring including:

i) Potentiometric maps;

ii) Hydrologic cross sections showing vertical gradients;

iii) The flow system, including the vertical and horizontal components of flow; and

iv) Any temporal changes in hydraulic gradients.

f. A description of manmade influences that may affect the hydrogeology of the site, identifying:

i) Active and inactive local water-supply and production wells with an approximate schedule of pumping; and

ii) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, National Pollution Discharge Elimination System or Utah Pollution Discharge Elimination System outfalls, retention areas, etc.).

2. Soils

The Permittee shall characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). Such characterization shall include but not be limited to:

a. SCS soil classification;
b. Surface soil distribution;
c. Soil profile, including ASTM classification of soils;
d. Transects of soil stratigraphy;
e. Hydraulic conductivity (saturated and unsaturated);
f. Relative permeability;
g. Bulk density;
h. Porosity;
i. Soil sorptive capacity;
j. Cation exchange capacity;
k. Soil organic content;
l. Soil Ph;
m. Particle size distribution
n. Depth of water table;
o. Moisture content;
p. Effect of stratification on unsaturated flow;
q. Infiltration;
r. Evapotranspiration;
s. Storage capacity;
t. Vertical flow rate;
u. Mineral content; and

v. Redox potential.

3. Surface Water and Sediment

The Permittee shall characterize the temporal and permanent surface water bodies in the vicinity of the Facility. Such characterization shall include, but not be limited to:

a. Location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume for lakes;

b. Location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment for surface impoundments;

c. Location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100 year event) for streams, ditches, drains, swamps, and channels;

d. Drainage patterns; and

e. Evapotranspiration.

f. Description of chemistry of the natural surface water and sediments including determining the Ph, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total organic carbon, specific contaminant concentrations.

f. Description of sediment characteristics including, deposition area, thickness profile, and physical and chemical parameters.

4. Air

The Permittee shall provide information characterizing the climate in the vicinity of the TEAD. Such information shall include, but not be limited to:

a. A description of:

i) Annual and monthly rainfall averages;

ii) Monthly temperature averages and extremes;

iii) Wind speed and direction;

iv) Relative humidity/dew point;

v) Atmospheric pressure;

vi) Evaporation data;

vii) Development of inversions; and

viii) Climate extremes that have been known to occur in the vicinity of TEAD, including frequency of occurrence.

b. A description of topographic and manmade features which affect air flow and emission patterns, including:

i) Ridges, hills or mountain areas;

ii) Canyons or valleys;

iii) Surface water bodies;

iv) Wind breaks and forests; and

v) Buildings.

B. Source Characterization

The Permittee shall collect analytical data to characterize the wastes and the areas where wastes have been placed, collected or removed including type, physical form, disposition, and TEAD characteristics affecting release including security, and engineered barriers. This shall include quantification of the following specific characteristics at each source area:

1. Unit/Disposal Area Characteristics:

a. Location of unit/disposal area;
b. Type of unit/disposal area;
c. Design features;
d. Operating practices (past and present);
e. Period of operation;
f. General physical conditions; and
g. Method used to close the unit/disposal area

2. Waste Characteristics:

a. Type of waste placed in the unit;

i) Hazardous waste name and listing
ii) Quantity; and
iii) Chemical composition.

b. Physical, chemical, and biological characteristics;

i) Physical form (solid, liquid, gas);
ii) Physical description;
iii) Temperature;
iv) Ph;
v) General chemical class;
vi) Molecular weight;
vii) Density;
viii) Boiling point;
ix) Viscosity;
x) Solubility in water;
xi) Cohesiveness of the waste;
xii) Vapor pressure;
xiii) Flash point;
xiv) Sorption;
xv) Biodegradability, bioconcentration, biotransformation;
xvi) Photodegradation rates;
xvii) Hydrolysis rates; and
xviii) Chemical transformations.

The Permittee shall document the procedures used in making the above determinations.

C. Contamination Characterization

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, air, and subsurface gas contamination in the vicinity of the TEAD. These data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, medial sampled, concentrations found, and conditions during sampling, and the identity of the individuals performing the sampling and analysis. The data shall also include an assessment of the risk of explosion from each SWMU. The Permittee shall address the following types of contamination at the TEAD:

1. Groundwater Contamination

The Permittee shall conduct a ground-water investigation to characterize any plumes of contamination at TEAD. This investigation shall provide:

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

b. The horizontal and vertical direction of contamination movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of reasonably suspected chemical agents ;

e. An evaluation of factors influencing the plume movement; and

g. An extrapolation of future contaminant movement.

2. Soil Contamination

The Permittee shall conduct an investigation to characterize any contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include:

a. A description of the vertical and horizontal extent of any contamination;

b. A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachabiltiy, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation:

c. Specific contaminant concentrations;

d. The velocity and direction of contaminant movement; and

e. An extrapolation of future contaminant movement.

3. Surface Water and Sediment Contamination

The Permittee shall conduct an investigation of surface water, contamination at the Facility. The investigation shall include, but not be limited to, the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved contaminant plume(s) originating from the Facility, and the extent of contamination in underlying sediments;

b. The horizontal and vertical direction of contaminant movement;

c. The contaminant velocity;

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

e. An extrapolation of future contaminant movement; and

f. A description of the chemistry of the contaminated surface waters and sediments, including determining the pH, total dissolved solids, specific contaminant, and concentrations;

4. Air Contamination

The Permittee shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the release; and

c. The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

5. Subsurface Gas Contamination

The Permittee shall conduct an investigation to characterize subsurface gases, emitted from buried hazardous waste and hazardous constituents in the ground water. This investigation shall include the following information:

a. A description of the horizontal and vertical extent of subsurface gases migration;

b. The chemical composition of the gases being emitted;

c. The rate of emission and the amount and density of the gases being emitted; and

d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

The Permittee shall document all the procedures used in making the above determinations.

D. Potential Receptors

The Permittee shall collect data describing the human populations and environmental systems that may be affected by contaminant exposure from TEAD. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

1. Current and possible future uses of ground water and surface water, including type of use and location of ground water users.

2. Human use of or access to the TEAD and adjacent lands, including but not limited to:

a. Recreation;
b. Hunting;
c. Residential;

d. Commercial;
e. Zoning; and
f. Relationship between population locations and prevailing wind direction.

3. A description of the biota in surface water bodies on, adjacent to, or affected by the TEAD.

4. A description of the ecology overlying and adjacent to TEAD.

5. A demographic profile of the people who use or have access to TEAD and adjacent land, including but not limited to age, sex, and sensitive subgroups.

6. A description of any endangered or threatened species near TEAD.

TASK IV: INVESTIGATION ANALYSIS

The Permittee shall submit to the Director for approval an analysis and summary of all TEAD investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to produce the Corrective Measures Study.

A. Data Analysis

The Permittee shall analyze all TEAD investigation data outlined in Task IV and prepare a report on the type and extent of contamination at the TEAD including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels at the TEAD.

B. Protection Standards

1. Ground-water Protection Standards

For regulated units, the Permittee shall provide information to support the Director's selection of Ground-water Protection Standards for all of the constituents listed in R315-50-14 and detected in the ground water during the Facility Investigation (Task IV).

a. The Ground-water Protection Standards shall consist of:

i) Any of the constituents listed in R315-50-14, if the background level of the constituent is below its threshold value; or

ii) An Director-approved Alternate Concentration Limit (ACL).

2. Soil Protection Standards

For regulated units, the Permittee shall provide information to support the Director's selection/development of Soil Protection Standards for all of the Utah Admin. Code R315-50-14 constituents found in the soil during the Facility Investigation (Task IV).

a. The Soil Protection Standards shall consist of:

i) The background concentration levels for any detected inorganic constituents listed in Utah Admin. Code R315-50-14.

ii) The background concentration levels for any detected organic constituents listed in Utah Admin. Code R315-50-14.

iii) Or; a Director-approved alternate Significance Limit.

b. The levels of contamination shall not be allowed to increase beyond the existing contamination levels determined through appropriate monitoring or the use of other data accepted by the Director, in accordance with Utah Admin. Code R315-101-3.

3. Other Relevant Protection Standards

The Permittee shall document all relevant and applicable standards for the protection of human health and the environment including, but not limited to National Ambient Air Quality Standards, State or federal approved water quality standards.

TASK V: SCHEDULE OF ACTIVITIES AND REPORTS

A. Progress Reports

The Permittee shall present semi-annual progress reports as part of the Technical Review Committee/Restoration Advisory Board on all activities conducted pursuant to the Conditions of Appendix A. The semi-annual reports may contain but are not limited to the following:

1. A description and estimate of the percentage of the RCRA Facility Investigation-Phase I and the RCRA Facility Investigation-Phase II completed.

2. Summary of all findings;

3. Summaries of all changes made in the RCRA Facility Investigation during the reporting period;

4. Summary of all contacts with representatives for the local community, public interest groups or State government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and

B. RCRA Facility Investigation – Task I Final Report

1. The Permittee shall submit RCRA Facility Investigation Task I Final Report to the Director for approval. The final Report shall include an Executive Summary and shall describe the procedures, methods, and results of all the RCRA Facility Investigations – Phase I findings for the Solid Waste Management Units under investigation in Phase I and their releases, including information on the type and extent of contamination at TEAD, Sources, and migration pathways, and actual or potential receptors. The Report shall present all information gathered under the approved RCRA Facility Investigation –Phase I Workplan and schedule. The Final Report shall contain adequate information to support corrective action decisions at TEAD.

2. The Director shall either approve or disapprove the Final Report in writing.
If the Director determines that the Final Report is not adequate, the Director shall notify the Permittee in writing of the Report's deficiencies and specify a due date for submittal of a revised Final Task I Report.

C. RFI Task III & IV Final Report

1. The Permittee shall submit to the Director for approval a RCRA Facility Investigation – Phase II, Task III & IV Final Report. The Final Report shall include an Executive Summary and shall describe the procedures, methods, and results of all TEAD investigations of Solid Waste Management Units and their releases, including information on the type and extent of contamination at the Facility, sources, and migration pathways, and actual or potential receptors. The Report shall present all information gathered under the approved Task IV Workplan and schedule. The Final Report shall contain adequate information to support further corrective action decisions at the Facility.

2. The Director shall either approve or disapprove the Final Report in writing.
If the Director determines that the Final Report is not adequate, the Director may notify the Permittee in writing of the Report's deficiencies. The permit shall be modified in accordance to Utah Admin. Code R315-3-2.4 to include the approved Final Report.

D. RCRA Facility Investigation Schedule

The Permittee shall perform the RCRA Facility Investigation activities in accordance with the schedules specified in Tables VII-5, VII-6, and VII-7 of this permit.