ATTACHMENT C

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RCRA FACILITY INVESTIGATION

1. RCRA Facility Investigation (RFI) Plan requirements:

   a. General Description of Current Conditions Section

      The Permittee shall provide background information pertinent to the facility, contamination, and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included.

      (1) Facility Background

         The Permittee shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage, or disposal of solid and hazardous waste. The Permittee shall include in this section the following:

         Map(s) depicting the following:

         (a) General geographic location;

            (i) Property lines, with the owners of all adjacent property clearly indicated;

            (ii) The location of all known past solid or hazardous waste treatment, storage, or disposal areas and the site of all known spills, fires or other accidental or intentional release locations, including the approximate locations of any groundwater contamination plumes presently identified;

            (iii) All known past and presently operating product and hazardous or solid waste underground tanks or piping;

            (iv) The location of all production and groundwater monitoring wells, whether or not they are associated with the particular SWMU under investigation. These wells shall be clearly labeled. Ground, top of casing and screened interval elevations shall also be provided;

            (v) Topography (with a contour interval of 10 feet, and a scale of 1 inch = 100 feet), waterways, all wetlands, floodplains, water features, drainage patterns;

            (vi) All tanks, buildings, utilities, paved areas, easements, right-of-way,

and other features; and

(vii) Surrounding land uses (residential, commercial, agricultural, recreational).

All maps shall be consistent with the requirements set forth in 40 C.F.R. § 270.14(b) (19) and be of sufficient detail and accuracy to locate and report all current and future work performed at the site;

(b) A history and description of ownership and operation, solid and hazardous waste generation, and treatment, storage, and disposal activities at the facility;

(c) Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location of the spills, and a description of the response actions conducted (local, State, or Federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

(d) A summary of past permits requested and/or received any enforcement actions and their subsequent responses.

(2) Nature and Extent of Contamination

The Permittee shall submit information in this section, describing the existing nature and extent of contamination.

(a) The Permittee shall summarize all possible source areas of contamination. This, at a minimum, should include all regulated units; solid waste management units, spill areas, and other suspected source areas of contamination. For each area, the Respondent shall identify the following:

(i) Location of unit/area (which shall be depicted on a facility map);

(ii) Quantities of solid and hazardous wastes;

(iii) Hazardous waste or hazardous constituents, to the extent known; and

(iv) Identification of areas where additional information is necessary.

(b) The permittee shall prepare an assessment and description of the existing degree and extent of contamination. This should include:

(i) Available monitoring data and qualitative information on locations and levels of contamination at the facility;

(ii) All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and

(iii) The potential impact(s) on human health and the environment, including demography, ground water and surface water use, and land use.

(3) Implementation of Interim Measures

The Permittee shall provide information documenting interim measures which were or are being undertaken at the facility. This shall include:

(a) Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility;

(b) Design, construction, operation, and maintenance requirements;

(c) Schedules for design, construction, and monitoring; and

(d) Schedule for progress reports.

b. Potential Corrective Measure Technologies Section

Based on existing information, the Permittee shall identify:

(1) The potential corrective measure technologies that may be used at the Facility or beyond the boundaries of the Facility to respond to releases of hazardous waste or hazardous constituents at or from the Facility; and

(2) Any field, laboratory, bench-scale or pilot-scale data that needs to be collected in the RFI to facilitate the evaluation and selection of the final corrective measure(s), if any, for releases at or from the Facility (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of wastes, etc.).

c. Project Management Plan Section

The Permittee shall submit a Project Management Plan which shall include a discussion of the technical strategy, schedules, budget, and personnel that will be used for the study. The plan shall also include a description of the qualifications of personnel performing or directing the RFI, including contractor personnel, and document the overall management approach to the RFI.

d. Community Relations Plan Section

(1) The Permittee shall prepare a fact sheet describing the scope and objectives of the RFI. This fact sheet shall be mailed by the Permittee to all persons on the Facility mailing list compiled under 40 C.F.R. § 124.10 (c) (1) (ix) and to the appropriate units of State and local governments at least ten (10) business days prior to start of the field activities.

(2) An executive summary of the RCRA Facility Investigation (RFI) Report shall be included with the RFI Report (permit condition II.C.5). Within ten (10) business days of receipt of the Regional Administrator's approval of the RFI Report, the summary report shall be mailed to all individuals on the facility mailing list compiled under 40 C.F.R. § 124.10(c) (1) (ix).

(3) Notification of groundwater contamination. If at any time the Permittee discovers that hazardous constituents, which may have been released from a SWMU or AOC at the Facility, in groundwater have migrated beyond the Facility boundary in concentrations that exceed the levels specified in Attachment B, the Permittee shall, within fifteen (15) calendar days of such discovery, provide written notice to the Regional Administrator and any person who owns or resides on the land which overlies the contaminated groundwater.

(4) Notification of air contamination. If at any time the Permittee discovers that hazardous constituents, which may have been released-from a SWMU or AOC at the Facility, in air have migrated or are migrating to areas beyond the facility boundary in concentrations that exceed health-based levels[1], and that residences or other places at which continuous, long-term exposure to such constituents might occur are located within such areas, the Permittee shall, within fifteen (15) calendar days of such discovery:

(a) Provide written notification to the Regional Administrator; and

(b) Provide notice to all individuals who have or may have been subject to such exposure.

[1]The health-based levels for such hazardous waste or hazardous constituents as derived in a manner consistent with EPA guidelines set forth in 51 Federal Register 33992, 34006, 34014, 34028. The health-based level for carcinogens represents a concentration associated with an excess upper bound lifetime risk of 1×10^{-6} due to continuous constant lifetime exposure, and for systemic toxicants represents a concentration to which the human population, exposed to on a daily basis, is not likely to suffer an appreciable risk of deleterious effect during a lifetime. Any list prepared by EPA according to these procedures may be used. As these lists may be revised at any time based on new information, contact EPA for guidance.

e. Schedule

The Permittee shall provide a schedule for performance of the RFI tasks and the submission of an RFI Report, within the RFI Plan.

2. RCRA Facility Investigations

a. Environmental Setting Investigation

The Permittee shall collect information to supplement and verify existing information on the environmental setting at the Facility. The Permittee shall characterize the following:

(1) Geology and Hydrogeology

The Permittee shall conduct a program to evaluate the hydrogeologic conditions at the Facility. The program shall provide:

(a) A description of the regional and site-specific geologic units underlying the Facility, including:

(i) Stratigraphy: strike and dip, and identification of stratigraphic contacts;

(ii) Structural features: folding, fracturing, channeling, faulting, jointing; and

(iii) Soil: classification, description of appearance, and consistency;

(b) A description of regional and site-specific hydrogeologic characteristics, including:

(i) Regional and Facility specific groundwater flow patterns;

(ii) A characterization of seasonal variations in the groundwater flow regime, including any perched groundwater zones;

(iii) Identification and characterization of areas of recharge and discharge;

(iv) An analysis of any topographic or geomorphic features that might influence the groundwater flow system; and

(v) A description of the stratigraphic units including:

(a) Hydraulic conductivity;

(b) An interpretation of hydraulic interconnections between

saturated zones, including any perched zones; and

(c) Attenuation capacity and mechanisms of the soils (e.g., ion exchange capacity, organic carbon content, mineral content, redox potential, etc.);

(c) Using a topographic map as a base, and at least two approximately perpendicular geologic cross-sections for each SWMU/AOC and the surrounding area, provide a description of the extent (depth, thickness, lateral extent) of each geologic unit including:

(i) Generalized soil (based on testing, grain size, water content, Atterburg limits, etc.) and rock profiles;

(ii) Encountered features such as faults, fractures, voids, stratum changes, lenses, pinch out zones, etc.;

(iii) Location and type of sampling including blow counts, percent recovery, etc.;

(iv) Location and type of in-situ testing performed (pressuremeter, packer permeability testing, slug tests, pump tests, etc.); and

(v) Groundwater elevation and/or potentiometric elevation;

(d) A description of the Facility site flow system including:

(i) Water-level contour and/or potentiometric maps;

(ii) The vertical and horizontal components of flow;

(iii) Any temporal changes in water levels or hydraulic gradients, for example, due to tidal or seasonal influences;

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

(v) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention ponds, etc.).

(2) Soils

The Permittee shall conduct a program to evaluate the soil conditions at the Facility. The program shall provide the following information:

(a) Where remediation by removal of soils is the only corrective measures

option, provide map(s) and perpendicular cross sections showing:

(i) The extent of contamination;

(ii) Depth to groundwater; and

(iii) The consistency and distribution of soils using the Unified Soil Classification System (USCS) (ASTM D 2487);

(b) Where remediation by removal is the likely option but it is necessary to determine the extent of migration (for example, to assess the mobility of wastes from an unlined surface impoundment or landfill) provide the following in addition to the requirements immediately above:

(i) Depth to bedrock and the characteristics of the bedrock including lithologic variations, discontinuities such as faults, fissures, joints, fractures, sinkholes, etc.;

(ii) A detailed soil survey conducted according to USDA Soil Conservation Service (SCS) procedures including:

a) USDA Textural Soil Classification and soil profiles showing stratifications or zones which may affect or direct the subsurface flow;

b) Hydraulic conductivity and the SCS hydrologic group classification, A, B, C or D;

c) Relative permeability (only if the waste may have changed the soil's hydraulic conductivity, such as concentrated organics);

d) Storage capacity;

e) Shrink-swell potential (where extreme dry weather could lead to the formation of cracks);

f) Potential for contaminant transport via erosion, using the Universal Soil-Loss Equation;

g) Soil sorptive capacity;

h) Cation exchange capacity;

i) Soil organic content; and

j) Soil pH;

(iii) The following contaminant characteristics must be included (where properties have been estimated, include the basis for such estimations):

a) Physical state;

b) Viscosity;

c) pH;

d) pKa

e) Density;

f) Water solubility;

g) Henry's Law Constant;

h) K_{ow};

i) Biodegradability; and

j) Rates of hydrolysis, photolysis and oxidation;

(c) When in-situ soil treatment will likely be the remediation, the following additional information must be provided:

(i) Bulk density;

(ii) Porosity;

(iii) Grain size distribution;

(iv) Mineral content;

(v) Soil moisture profile;

(vi) Unsaturated hydraulic conductivity;

(vii) Effect of stratification on unsaturated flow;

(viii) Infiltration and evapotranspiration.

(3) Surface Water and Sediment

The Permittee shall conduct a program to characterize the surface water bodies in the vicinity of the Facility. Such characterization shall include, but not be limited to:

(a) Description of the temporal and permanent surface water bodies including:

(i) For lakes: location; elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;

(ii) For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;

(iii) For streams, ditches, and channels: location, elevation, flow, velocity, depth, width, tidal and seasonal fluctuations, and flooding tendencies (i.e., 100-year event);

(iv) Drainage patterns; and

(v) Evaporation rate;

(b) Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (ammonia, nitrate/nitrite nitrogen, phosphate), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.;

(c) Description of sediment characteristics including:

(i) Deposition area;

(ii) Thickness profile; and

(iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.).

(4) Air

If the Regional Administrator requires an RFI for air releases from a SWMU/AOC, the Permittee shall provide information characterizing the climate in the vicinity of the Facility. Such information shall include, but not be limited to:

(a) A description of the following parameters: Annual and monthly rainfall averages; monthly temperature averages and extremes; wind speed and

direction; relative humidity/dew point; atmospheric pressure; evaporation data; development of inversions; and climate extremes that have been known to occur in the vicinity of the Facility, including frequency of occurrence.

(b) A description of topographic and manmade features which affect air flow and emission patterns, including: ridges, hills, or mountain areas; canyons or valleys; surface water bodies (e.g., rivers, lakes, bays, etc.); wind breaks and forests; and buildings.

b. Source Characterization Investigation

The Permittee shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, including: type; quantity; physical form; disposition (containment or nature of deposits); and Facility characteristics affecting release (e.g., Facility 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) Age of unit/disposal area;

(g) General physical conditions; and

(h) Method used to close the unit/disposal area.

(2) Waste Characteristics:

(a) Type of waste placed in the unit, including but not limited to: Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing, or reducing agent); quantity; and chemical composition.

(b) Physical and chemical characteristics, including but not limited to: Physical form (solid, liquid, gas); physical description (e.g., powder, oily sludge); temperature; pH; general chemical class (e.g., acid, base, solvent); molecular weight; density; boiling point; viscosity; solubility in water;

cohesiveness of the waste; and vapor pressure.

(c) Migration and dispersal characteristics of the waste, including but not limited to: biodegradability, bioconcentration, biotransformation; photodegradation rates; hydrolysis rates; sorption; and chemical transformations.

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

c. Contamination Characterization Investigation

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, and subsurface gas contamination in the vicinity of the Facility. This 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, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis. The data must include the analyses of hazardous constituents as specified in Attachment B, at a minimum, unless otherwise approved by EPA prior to sampling. The Permittee shall address the following types of contamination at the Facility:

(1) Groundwater Contamination

The Permittee shall conduct a groundwater investigation to characterize any plumes of contamination at the Facility. This investigation shall provide, at a minimum, the following information:

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

(b) The horizontal and vertical direction of contamination movement;

(c) The velocity of contaminant movement;

(d) The horizontal and vertical concentration profiles of hazardous constituents in the plume(s);

(e) An evaluation of factors influencing the plume movement; and

(f) An extrapolation of future contaminant movement.

(g) Each RFI Plan shall include the locations, design and installation procedures for any additional groundwater monitoring wells required to complete the monitoring well network at each area as necessary to meet the RFI objectives. These wells may be used in conjunction with existing

wells in the area. All information required of the new wells shall also be required of the existing wells. The monitoring well network shall meet the following requirements:

(i) The upgradient wells must be capable of yielding samples that are representative of background water quality in the uppermost aquifer and are not affected by any solid waste management unit. The number and location of the wells must be sufficient to characterize the spatial variability of background water;

(ii) The downgradient wells must be capable of immediately detecting any statistically significant amounts of hazardous waste or hazardous constituents that migrate from each solid waste management unit into the groundwater; and

(iii) The monitoring system shall be designed to operate for a period of long-term duration.

When developing this information, the Permittee shall refer to the Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Well," EPA/60014-89/034, 1991 to determine methods and materials that are acceptable to EPA.

(h) Each RFI Plan shall provide a description of the groundwater monitoring wells including the following information:

(i) A description and map of well locations, including a survey of each well's surface reference point and the elevation of the top of its casing;

(ii) Size and depth of each well;

(iii) Description of well intake design, including screen slot size and length, filter pack materials and method of filter pack emplacement;

(iv) Type of well casing and screen materials. The choice of well materials shall consider the parameters to be monitored and the nature of the leachate that could potentially migrate from the facility. The well materials shall: (1) minimize the potential of absorption of constituents from the samples; and (2) maintain their integrity for the life of the system.

(v) Description of methods used to seal the well from the surface and prevent downward migration of contaminants through the well annulus; and

(vi) Description of the methods and procedures used to develop the well.

(i) The Permittee shall select a sampling regime and conduct sampling and analysis activities capable of yielding representative samples. The sampling program shall include, at a minimum, the following elements:

(i) The list of analytes as specified in Attachment B of this permit (or as modified with prior EPA approval); or,

(ii) If the groundwater investigation is phased (i.e., conducted based on the results of a soil investigation): A list of parameters capable of detecting releases of hazardous waste or hazardous constituents into groundwater. The parameters shall be representative of hazardous constituents at least as mobile as the most mobile hazardous constituent that may be present after considering:

a) The types, quantities, and concentrations of hazardous constituents in wastes managed at the SWMU/AOC. Incidental constituents which may be released into the unit area from process areas shall be included in this list of analyses;

b) The mobility, stability, and persistence of hazardous waste constituents or their reaction products in the unsaturated zone beneath the waste management area;

c) The detection ability of the indicator parameters, waste constituents of reactive products in groundwater;

d) The concentration of and the natural variation (known or suspected) of the proposed monitoring parameters in background media; and

e) The list must include the basis for selecting each proposed indicator parameter, including any analysis or calculations performed. The basis for selection shall, where possible, include chemical analysis of the unit's waste and/or leachate as appropriate. The list shall also include parameters to characterize the site-specific chemistry of groundwater at the site including, but not limited to, the major anions and cations that make up the bulk of dissolved solids in water (i.e., Cr, Fe^{+3}, Mn^{+2}, Na^{+}, $(SO_4)^{-2}$, Ca^{+2}, Mg^{+2}, K^{+}, NO^{-3}, PO^{-3}, silicate, and ammonium).

The Permittee shall document, in the RFI Report submitted pursuant to condition

3 of this Attachment, the procedures used to characterize contaminant plume(s), for example, geophysics, modeling, pump tests, slug tests, nested piezometers, etc.

(2) Soil Contamination

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

(a) A description of the vertical and horizontal extent of contamination;

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

(c) Specific contaminant concentrations according to the analyte list (or as modified with prior EPA approval) in Attachment B;

(d) The velocity and direction of contaminant movement; and

(e) An extrapolation of future contaminant movement. The Permittee shall document, in the RFI Report submitted pursuant to condition 3 of this Attachment, the procedures used in making the above characterizations and determinations of future contaminant movement.

(3) Surface Water and Sediment Contamination

The Permittee shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the Facility.

The investigation shall generate, at a minimum, the following information:

(a) A description of the horizontal and vertical extent of any immiscible or dissolved 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. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

The Permittee shall document, in the RFI Report submitted pursuant to condition 3 of this Attachment, the procedures used in making the above characterizations.

(4) Subsurface Gas Contamination

The Permittee shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste or hazardous constituents. This investigation shall generate, at a minimum 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, amount, and density of the gases being emitted; and

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

The Permittee shall document, in the RFI Report submitted pursuant to condition 3 of this Attachment, the procedures used in making the above characterizations.

(5) Air Contamination

The Permittee shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall generate, at a minimum, 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 contaminants(s) released, including horizontal and vertical concentration profiles.

The Permittee shall document, in the RFI Report submitted pursuant to condition 3 of this Attachment, the procedures used in making the above characterizations.

d. Potential Receptors Investigation

The Permittee shall collect data describing the human populations and environmental systems that may be exposed to releases of hazardous waste or hazardous constituents from the Facility. Chemical analysis of biological samples may be required. Data on observable effects in ecosystems may also be required. The following characteristics shall be identified:

(1) Local uses and possible future uses of groundwater:

(a) Type of use (e. g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

(b) Location of groundwater users, including wells and discharge areas;

(2) Local uses and possible future uses of surface waters draining the Facility:

(a) Domestic and municipal (e.g., potable and lawn/garden watering);

(b) Recreational (e.g., swimming, fishing);

(c) Agricultural;

(d) Industrial; and

(e) Environmental (e.g., fish and wildlife propagation);

(3) Human use of or access to the Facility 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;

(4) A description of the biota in surface water bodies or wetlands on, adjacent to, or affected by the Facility. An evaluation of the pollutant impacts on the ecosystems/populations potentially exposed to contamination. This evaluation may be accomplished through the use of toxicity test (acute and chronic)

population surveys, and literature reviews.

(5) A description of the ecology overlying and adjacent to the Facility must include:

(a) the location and size of each identified habitat e.g. stream reaches, roads, wetlands of forested area, within the physical boundaries defined for the assessment and

(b) a listing and physical assessment of the ecosystems and population potentially exposed to contamination.

(6) A demographic profile of the people who use or have access to the Facility and adjacent land, including, but not limited to: age, sex, and sensitive subgroups; and

(7) A description of any endangered or threatened species near the Facility.

e. Laboratory and Bench Scale Studies

If specifically required by the Regional Administrator at any time during the RFI, the Permittee shall conduct laboratory and/or bench scale studies to determine the applicability of corrective measure technology or technologies to facility conditions. The Permittee shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Permittee shall develop a testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, the Permittee shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan. The Permittee shall prepare a report summarizing the testing program and its results, both positive and negative.

f. Risk Assessment

The baseline risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases (under the assumption of no action).

The baseline risk assessment contributes to the site characterization and subsequent development, evaluation, and selection of appropriate response alternatives. There are four steps in the risk assessment process:

(1) Determine contaminants of concern: Data collection and evaluation involves the gathering and analyzing the site data relevant to the human health evaluation and

identifying the substances present at the site that are the focus on the risk assessment process.

(2) Exposure assessment: Using the procedure outline in Section d for determining potential receptors, estimate the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed. In the exposure assessment, reasonable maximum estimates of exposure are developed for both current and future land-use assumptions.

(3) Toxicity assessment: This component of the risk assessment considers the types of adverse health effects associated with chemical exposures and the relationship between the magnitude of exposure and adverse effects.

(4) Risk Characterization: This summarizes and combines outputs of the exposure and toxicity assessments to characterize baseline risk, both in quantitative expressions and qualitative statements.

3. RCRA Facility Investigation Report

The RCRA Facility Investigation Report shall include an analysis and summary of all Facility investigations and the results of such investigations.

a. Data Analysis

The Permittee shall analyze all Facility investigation data outlined in permit condition II.C, RCRA Facility Investigation, and prepare a report on the type and extent of contamination at the Facility, including sources and migration pathways. The report shall describe the extent of contamination (qualitative and quantitative) in reaction to screening levels specified in Attachment B and background levels indicative of the area.

b. Media Cleanup Standards

The Permittee shall identify the following cleanup standards:

(1) Groundwater Cleanup Standards

The permittee shall provide information to support selection/development of Groundwater Cleanup Standards for all of the hazardous constituents found in the groundwater during the RCRA Facility Investigation.

(a) The Groundwater Cleanup Standards shall consist of:

(i) The Maximum Contaminant Level (MCL) for any constituents with an EPA promulgated Maximum Contaminant Level (MCL), if the background level of the constituent is below the value of the

EPA approved MCL; or

(ii) The background level of that constituent in the groundwater; or

(iii) A standard established according to the criteria for Other Media Cleanup Standards.

(2) Other Media Cleanup Standards

The Permittee shall identify concentration levels in the affected media which protect human health and the environment.

Unless a lower concentration level is deemed necessary to protect environmental receptors, cleanup standards shall be established as follows:

(a) For any known or suspected carcinogens classified by EPA's weight of evidence classification as an A, B1 or B2 carcinogen, cleanup standards shall be established at concentrations ~~levels~~ which represent an excess upper-bound lifetime **cumulative** risk to an individual **within the EPA acceptable range** of 1×10^{-6} **to** 1×10^{-4}, or

(b) For systemic toxicants, cleanup standards shall represent concentration levels to which the human population (including sensitive subgroups) could be exposed on a daily basis without appreciable risk of deleterious effect during a lifetime.

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c. The Permittee shall recommend which SWMUS, or groups of SWMUs/AOCs, require a Corrective Measures Study. The Permittee shall also identify those corrective action alternative(s) the Permittee intends to investigate further. The Permittee may either investigate several alternatives or focus on a limited number of alternatives.