ATTACHMENT 7
RCRA FACILITY INVESTIGATION
SCOPE OF WORK

PURPOSE

The purpose of a RCRA Facility Investigation (RFI) is to determine the nature, extent, direction, rate, movement, and concentration of releases of hazardous wastes or hazardous constituents from regulated units, solid waste management units (SWMUs), areas of concern (AOCs), and other source or release areas at the site. The information gathered during the RFI is used to determine potential human health and ecological risks, and to support development and implementation of interim measure (IM) and/or corrective measure (CM) activities, as necessary. The RFI should be tailored to the site-specific conditions and focused on the units, releases, and exposure pathways of concern. Subject to Kansas Department of Health and Environment (KDHE) approval, the RFI may be implemented in a phased manner based on site-specific needs as long as all RFI objectives are fully and timely satisfied. For clarification, the term "site" as used throughout this attachment means the subject facility, in addition to all areas and media to which hazardous waste and/or hazardous constituents, and any other contamination or pollution connected with the subject facility, have been released and/or migrated.

OBJECTIVES

The RFI must meet the following primary objectives:

1) Determine and describe current site conditions, as required;

2) Identify and fully evaluate the known and suspected primary origin(s) or source(s) of contamination at the site, including identification of all chemicals used and wastes generated/managed/stored/disposed, to facilitate determining the mechanisms of release, estimating the quantities of release, and determining whether these releases are ongoing or inactive;

3) Delineate and fully characterize the nature, and lateral and vertical extent of contamination for all known and suspected contaminants of concern (COCs) for all affected or potentially affected environmental media at the site;

4) Characterize the environmental setting, including regional and local geology, hydrogeology, and hydrology, particularly as those physical characteristics may pertain to contaminant transport and fate mechanisms or may affect the evaluation, selection, and design of corrective action alternatives for the site;

5) Characterize the physiochemical properties of all known and suspected COCs, their mobility and persistence in the environment, and their important fate and transport mechanisms as they relate to the physical characteristics of the site;

6) Identify and evaluate all potential human and ecological receptors that may be threatened or affected by all COCs associated with the site;

7) Develop a conceptual site model (CSM) of site conditions depicting what is known or suspected about the sources, releases and release mechanisms, contaminant fate and transport, exposure pathways and potential receptors, and human health and ecological risks;

8) Revise/update the CSM as more information becomes available to determine the need for additional investigation, to support risk-based decisions, and to aid in identification and design of potential corrective action alternatives;

9) Utilize KDHE's October 2010 *Risk-Based Standards for Kansas RSK Manual – 5th Version* (RSK Manual), and any subsequent updates, and/or other applicable KDHE-approved threshold levels, to perform rapid assessment of human health risk, and to facilitate determination of cleanup goals for the site;

10) Utilize U.S. Environmental Protection Agency (EPA) Region 6 Ecological Exclusion Criteria Worksheet and Ecological Assessment Checklist to perform a rapid assessment of ecological risk, and to facilitate determination of cleanup goals for the site;

11) As determined necessary, perform a site-specific quantitative baseline human health risk assessment (HHRA) and screening level ecological risk assessment/baseline ecological risk assessment (SLERA/BERA) to determine whether and the extent to which the site requires corrective action;

12) Perform bench- or pilot-scale treatability study testing, as necessary, to support development of potential corrective action alternatives and/or corrective action design;

13) Develop a preliminary list of site-specific corrective action objectives and corresponding potential corrective action alternatives; and,

14) Evaluate the need for IM implementation for source control purposes and/or to mitigate imminent threats to human health and/or the environment consistent with KDHE's *RCRA Interim Measures Scope of Work* (Attachment 9).

Besides all known or suspected discharges, releases, or spills, the RFI is required to also fully assess any and all secondary contamination issues (e.g., daughter/degradation products, from mobilization of naturally-occurring elements/substances in the presence of site-related contamination, etc.). In addition, if there is any uncertainty in site history and potential release mechanisms, KDHE may require a broader, more robust sampling and analytical program up front to ensure complete identification/quantification of all known and suspected site-related COCs. Also, consideration of current and anticipated future land use may result in a more rigorous sampling and analytical program. Initial RFI results will be used to focus, to the extent possible, any future sampling and analysis associated with the site.

SCOPE

After a Corrective Action Agreement Meeting[1] to establish framework, objectives, criteria, and expectations; identification of SWMUs, AOCs, and other source or release areas (or conduct of an RCRA Facility Assessment (RFA), as necessary); and, an RFI Scoping Meeting[1], an RFI will be developed and implemented consisting of the following steps:

STEP 1: DESCRIPTION OF CURRENT CONDITIONS (as required)

As required, prior to or as a component of the RFI Work Plan, the Permittee/Respondent shall submit for KDHE approval a Description of Current Conditions (DCC) Report providing the background information pertinent to the site. Consistent with KDHE's *Description of Current Conditions Report Scope of Work* (Attachment 6), the DCC Report shall include information gathered during any previous investigations, inspections, interim measure activities, and any other relevant data, which helps to identify potential sources of contamination and characterize the current site conditions.

STEP 2: RFI WORK PLAN DEVELOPMENT AND IMPLEMENTATION

An RFI Work Plan describing in detail all activities proposed to satisfy the RFI objectives must be prepared and submitted to KDHE for review and approval before any investigation activities commence, unless otherwise requested or approved by KDHE. The RFI Work Plan shall minimally include the following project- or site-specific components: 1) field sampling plan; 2) quality assurance project plan (QAPP); and, 3) health and safety plan. A detailed RFI working schedule, presented graphically in the form of a milestone chart (e.g., Gantt chart) to show the duration and interdependencies of the various activities must be included in the RFI Work Plan.

A field sampling plan provides the guidance for all fieldwork by defining in detail the sampling and data gathering methods and standard operating procedures (SOPs) to be used. The field sampling plan should be written so that a field sampling team unfamiliar with the site would be able to gather the required samples and field information. A QAPP describes the policy, organization, functional activities, and quality assurance and quality control protocols necessary to achieve the data quality objectives dictated by the intended use of the data. KDHE requires that QAPPs be prepared in general accord with available EPA guidance titled *Requirements for Quality Assurance Project Plans* (QA/R-5) (EPA 2001) and *Guidance for Quality Assurance Project Plans* (G-5) (EPA 2002). EPA has compiled a set of helpful references pertaining to data quality at www.epa.gov/quality/index.html. Key components of a QAPP include quality assurance objectives for data, sample custody and handling, data generation and acquisition, standard operating procedures, report and data management, project management elements, laboratory QAPP, and data validation and usability. It is often necessary to update the QAPP throughout a project's lifecycle to ensure that the document encompasses all site-related activities. A health and safety plan prepared to support the field effort must conform to the Permittee's or contractor's health and safety program, which must, in turn, be in compliance with requirements of the Occupational Safety and Health Administration (OSHA). Although submittal is necessary for completion of the Administrative Record (AR) file for a given site,

please note that KDHE does not customarily review and approve the Permittee's health and safety plan.

In general, a detailed description of field activities to satisfy the primary objectives of the RFI must be included in the RFI Work Plan. RFI activities may include any of several components including, but not limited to, the following: investigation of waste, soil, groundwater, surface water, sediment, air or biota; geotechnical evaluations; inspection and tightness testing of tanks, pipelines, sewers, etc.; geophysical surveys; land elevation surveys; personnel interviews; etc. All data gathered during the investigation must be included in the RFI Report. Sufficient biased/unbiased grid sampling must be proposed to ensure meeting RFI objectives. With KDHE's advance approval, the RFI may be implemented in a phased manner; however, the expectation is that the total duration of the investigative effort be limited to the extent possible, generally within six months to a year. If a phased investigation program is proposed, the initial work plan submittal should describe the anticipated scope and schedule of each investigative phase to avoid unnecessary delays in the investigation process. In addition, KDHE may require interim reports/memoranda to support a phased implementation prior to submittal of the RFI Report.

The RFI Work Plan shall at a minimum include a review of available information and documented findings including, but not limited to, the following: description of physical location, including legal description, and street address; complete summary of ownership/operational history of the source facility and ownership status of other nearby affected properties; facility layout identifying operational features and chemical/waste management/storage/disposal areas or units (e.g., vapor degreaser, sumps, etc.); description of all past and present activities/operations conducted (i.e., nature of business operations, chemicals used, wastes generated, chemical and waste disposal methods, and records or descriptions of all known discharges, releases, spills, etc.); a description of the physical site characteristics (e.g., geology, hydrogeology, surface water hydrology, meteorology, past/present land use, etc.); a detailed description of the type(s) of contaminants/wastes involved, release characteristics and contaminated media; evaluation or investigation objectives; and, detailed procedures for determining waste distribution as well as the nature and extent of contamination, and evaluating all exposure pathways of concern. Environmental permits issued relative to past or present business operations should be identified. Descriptions of any previous environmental investigations conducted at the site and summaries of the significant findings of those investigations should be included. While acceptance and use of data for the purposes of the RFI is subject to KDHE approval, KDHE does encourage consideration of previously collected data or investigation results for the sake of focusing or optimizing the proposed RFI effort. However, if those previous data collection or investigation efforts were collected without KDHE oversight, then verification sampling may be required at key locations to corroborate the earlier data/results.

The RFI Work Plan must summarize available historical records (including drawings, aerial photographs, plot plans, as-builts) encompassing the entire site history to ensure comprehensive identification of all known or potential COCs; provide a listing and corresponding map of chemical/waste management/storage/disposal areas and wastewater management units; and, provide a written summary of all wastes generated and management/storage/disposition methods. Focus should be on known and suspected source areas such as, but not limited to, the following:

pits; holding ponds, waste ponds or surface impoundments; drains, oil/water separators; vapor degreasers; drum storage areas; loading docks or racks; earthen mound, fill and soil disturbance areas; landfill, landfarm or land application areas; conveyance piping; tanks; stained soil and standing liquid areas; septic tank and lateral field areas; and, any other chemical/waste management/storage/disposal areas and wastewater management units.

Through conduct of the RFI at a given site, besides assessing the distribution of any wastes present, the lateral and vertical extent of contamination for all known and suspected COCs shall be fully delineated for all affected or potentially affected environmental media. Potential media to be investigated include surface and subsurface soils, groundwater, surface water, sediment, air, including the vapor intrusion into indoor air pathway, and biota. To accomplish these activities, this component of the RFI may include monitoring well or piezometer installation, soil boring/sampling, soil or groundwater probing/sampling, field and laboratory analyses, geophysical surveys, hydrogeological evaluations, surveying, computer modeling, and biota studies, among others. Analytical data must be collected of appropriate data quality and quantity to facilitate comparison to applicable threshold levels as established in KDHE's *Risk-Based Standards for Kansas RSK Manual* (RSK Manual) or support a more thorough evaluation of risks posed through conduct of a quantitative baseline risk assessment (i.e., HHRA and SLERA/BERA), if one is to be performed, and to support the evaluation of potential remedial alternatives. In addition, a rapid assessment of ecological risk using the EPA Region 6 Ecological Exclusion Criteria Worksheet and Ecological Assessment Checklist shall be performed at this stage.

All data should be validated at the appropriate field or laboratory quality control level to determine whether it is appropriate for its intended use. Data quality is of critical importance because decisions about how to appropriately manage the relative risk to human health and the environment depend on the quality of data collected for a project. Quality Control (QC) samples are collected during each sampling event to help evaluate data quality and usability. The number and types of QC samples collected is typically specified in the QAPP and will vary depending on the types of sampling being performed, types of equipment used, number of samples collected, analytical methodology, and intended use of the data. The following are the most common types of QC samples collected and analyzed during an RFI: field duplicate samples; equipment rinsate samples; trip blank samples; field blank samples; matrix spike and matrix spike duplicate samples; performance evaluation samples; split samples; laboratory control and laboratory control duplicate samples; and, method blank samples.

STEP 3: BASELINE RISK ASSESSMENT (as required/optional)

Information and environmental data collected and validated as representative of site conditions are used to qualitatively or quantitatively assess the potential excess human health risk and/or ecological risk posed by the site in the absence of remediation. For simplicity, this is typically accomplished through direct comparison to the Tier 2 Levels which become the default cleanup goals for a site, or through other methods of analysis, as provided in KDHE's RSK Manual. However, in lieu of such direct comparison or simplified tier analysis, a site-specific quantitative baseline risk assessment (i.e., HHRA and SLERA/BERA) may either be proposed by the Permittee or requested by KDHE to evaluate human health and ecological risk and facilitate

determination of cleanup goals for a site. If KDHE determines that the completion of a quantitative risk assessment is appropriate, the Permittee may, at their option, perform such risk assessment for submittal to KDHE for review and approval. KDHE typically utilizes an outside contractor to support technical review and discussion of risk assessment documents. Alternatively, the Permittee may elect to have KDHE, utilizing outside contractor support, perform the risk assessment. In either case, KDHE's direct and indirect costs associated with oversight or conduct of risk assessment activities will be at the Permittee's expense.

Prior to performing the risk assessment, the Permittee must submit a baseline risk assessment work plan that, among other items, provides a site-specific exposure conceptual model, which either graphically illustrates or clearly identifies the impacted media and all the primary and secondary exposure pathways, lists all contaminants of concern, standard exposure parameters, current and future land use assumptions, methodologies for determining reasonable maximum exposure point concentrations, proxy determinations, and other statistical considerations. The quantitative baseline risk assessment must be performed in accordance with KDHE policy in a manner consistent with available EPA guidance at www.epa.gov/oswer/riskassessment/risk_superfund.htm and www.epa.gov/risk/. All risk assessment work plan documentation must be approved by KDHE prior to commencing risk assessment activities. Resultant risk assessment reports must then be submitted to KDHE for review and approval. Coordination with KDHE is required throughout the risk characterization process and cleanup goal determination process. However, early on scoping discussions between KDHE and the Permittee as part of work plan development will be critical to the overall success of the risk assessment effort. Ultimately, KDHE will make all final risk management decisions related to the site.

STEP 4: TREATABILITY STUDIES/MODELING/ADDITIONAL DATA ACQUISITION (as required/optional)

To keep the RFI process on schedule, it may be appropriate to identify and initiate any bench- or pilot-scale treatability study testing necessary to evaluate corrective action alternatives early in the RFI process. Treatability studies are conducted to provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the corrective measures study (CMS) process and to support the subsequent remedial design of the corrective action alternative ultimately selected by KDHE. Treatability studies also serve to reduce cost and performance uncertainties to acceptable levels for treatment alternatives under consideration to allow a more reliable remedy selection process. Examples of treatability data gathering activities that might be performed during the RFI include aquifer pumping tests, soil vapor extraction pilot tests, or bench- or pilot-scale applications of innovative technologies to evaluate their applicability to site wastes and contamination. All treatability studies/modeling/additional data acquisition activities must be completed in a manner consistent with available KDHE policy and guidance. If there is a desire or need to conduct such activities, the Permittee must first submit an appropriate work plan for KDHE review and approval. At KDHE's discretion, reporting associated with treatability study/modeling/additional data acquisition activities may be reported separately or incorporated into the RFI Report. Similar to baseline risk assessments, KDHE typically utilizes an outside contractor to support technical review and discussion of environmental modeling documents (e.g., groundwater fate and transport model work plan and report). KDHE's direct

and indirect costs associated with oversight or conduct of environmental modeling activities will be at the Permittee's expense.

STEP 5: RFI REPORT

Upon completion of all investigative/evaluation activities necessary to fully achieve the RFI objectives, an RFI Report must be submitted to KDHE, in a timeframe consistent with the implementation schedule in the approved RFI Work Plan, for review and approval. The RFI Report must include all information and data collected during the investigation and describe in detail the work performed to accomplish the objectives as set forth within this scope of work (SOW) attachment. The RFI Report format shall be consistent with this SOW attachment and include appropriate tables, figures, well logs, laboratory analytical data, references, appendices, etc. to effectively portray the data generated during the investigation and to support any conclusions drawn in the RFI Report. The RFI Report shall present the results of the RFI including, but not limited to, the following:

1) Summary of site investigation/evaluation work completed with relevant presentation of the data in figures and tables (including appendices with all ancillary documentation such as field notes; photographs; chain-of-custody records; laboratory reports; survey reports; data validation summary; etc.).

2) Description of all COCs, including a discussion and summary of data collected (with appropriate QA/QC and data validation information);

3) An evaluation of possible exposure pathways including areal extent of all COCs;

4) A preliminary list of corrective action objectives, corresponding potential corrective action alternatives and initial identification of key regulatory requirements that may have bearing on corrective action implementation;

5) Comparison of data collected to appropriate threshold levels (e.g., Tier 2 Levels in the RSK Manual); and,

6) Conclusions and recommendation(s) for further investigation or interim measure activities.

Once samples have been collected and data reported by the laboratory, it is important to consider the quality of the data to ensure it is precise, accurate, representative, complete, and comparable before relying on it to support project decisions. The procedures and thresholds for evaluating data quality are typically laid out in the QAPP. It is KDHE's general expectation that data validation be performed in accord with EPA Contract Laboratory Program's *National Functional Guidelines for Superfund Organic Methods Data Review* (EPA 2008) and *National Functional Guidelines for Superfund Inorganic Methods Data Review* (EPA 2010a), or as otherwise approved by KDHE. Together, these documents identify methods for evaluating and documenting the quality of analytical data for the majority of contaminants encountered at sites in Kansas. In all cases, data validity must be incorporated into reporting documentation in the

form of a data validation summary. The data validation summary should describe all data validation activities and discuss, in detail, the results of analysis of quality control samples and their effect on primary data. The summary should provide an overall assessment of the data evaluated with respect to precision, accuracy, representativeness, completeness, comparability, and the general acceptability and usability of the data.

Upon successful completion of the RFI effort, KDHE will determine the path forward for future site activities to be conducted by the Permittee, including further investigation, development of a presumptive remedy design concept, detailed evaluation/comparative analysis of cleanup alternatives through a separate CMS process, interim measure design/implementation, and/or implementation of the remedy selected by KDHE with consideration of public input on the Statement of Basis.

[1]Face-to-face meetings or teleconferences between KDHE and Permittee/Respondent are strongly encouraged to facilitate achieving consensus on approach and overall streamlining of the corrective action process.