ATTACHMENT 10
CORRECTIVE MEASURES STUDY
SCOPE OF WORK

INTRODUCTION

Undertaken by the Permittee/Respondent, the Corrective Measures Study (CMS) provides an objective and standardized process for evaluating, comparing, and contrasting potential corrective measure alternatives. The primary objectives of the CMS are to:

1) Evaluate the feasibility, effectiveness, and cost of at least two (2) potential corrective action alternatives based on the findings of the RCRA Facility Investigation (RFI), and to compare and contrast those alternatives to each other and the "no action" alternative;
2) Recommend and justify a specific corrective action for the site; and,
3) Determine the benefits and consequences of the recommended corrective action.

The individual corrective action alternatives selected for evaluation as part of the CMS process must be plausible and not skew or bias the evaluation process. The alternatives considered must be capable of achieving cleanup objectives while, to the maximum extent practicable, contemplating permanent solutions and treatment technologies. Depending upon project needs, the alternatives to be evaluated are typically broken out on a media-specific basis, or sometimes on a geographic basis. For example, if contaminant impacts are to be addressed in groundwater and soil, a minimum of two corrective action alternatives (in addition to the no action alternative) for each media of concern are evaluated in most circumstances. If interim measures have been implemented or other actions taken in the past at a site, those do not necessarily need to be subjected to a comparative analysis at the time of CMS development; however, they must be described/justified in detail within the CMS Report itself with an estimate of associated implementation costs, to the extent available. The overall intent is that any interim measures taken not be inconsistent with the final selected site remedy.

CMS EVALUATION PROCESS

This guidance and scope of work (SOW) attachment outlines the primary activities to be completed as part of the CMS process necessary to satisfy the objectives stated above. At KDHE's discretion, this general process may be streamlined and focused to best serve project needs. In general, the evaluation of corrective actions alternatives must include:

- Description of the contaminants of concern (COCs) and media affected;
- Identification of human and ecological targets and an evaluation of all direct and indirect exposure pathways;
- Description of the site-specific corrective action objectives (CAOs);
- Detailed individual analysis of each alternative;
- Tabular summary of regulatory requirements and relevant guidance for each alternative; and,
- Comparative analysis of each of the proposed corrective action alternatives.

The detailed evaluation of potential corrective action alternatives provides the basis for recommending and supporting a specific remedial action or group of remedial actions for the site. Notably, any remedy selected for a site absolutely, unequivocally must satisfy the four identified threshold criteria identified in Figure 1. The seven balancing criteria represent the primary criteria upon which the CMS evaluation/comparative analysis is based.

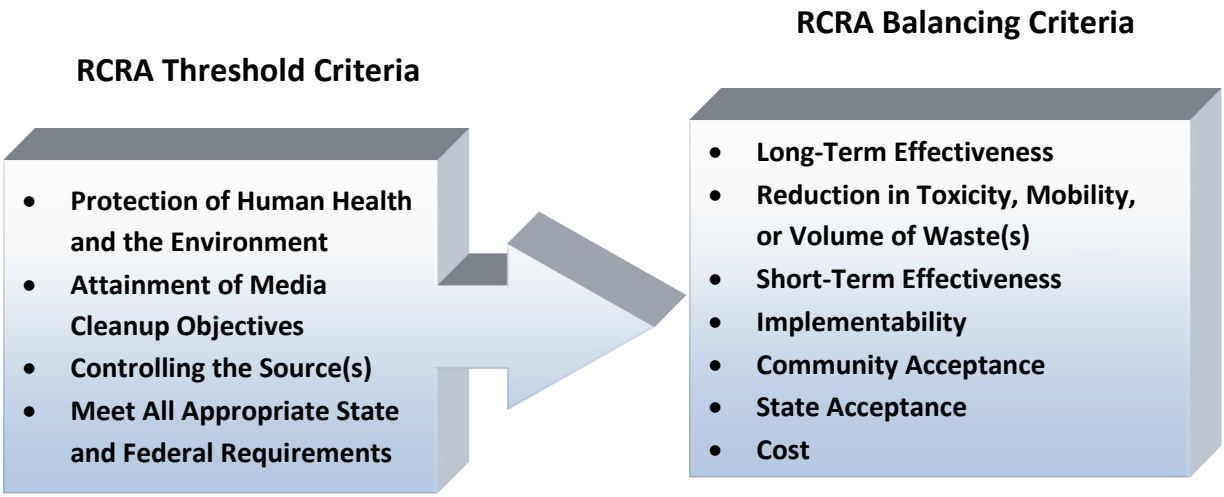

Figure 1: Criteria for evaluation of corrective action alternatives

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. By doing such, in most cases, submission of a CMS Work Plan can be avoided. However, if additional data gathering is warranted following completion of the RFI in order to evaluate potential corrective action alternatives, KDHE may require submission of a CMS Work Plan for review and approval.

The exact content requirements of any CMS Work Plan should be developed in consultation with KDHE. A detailed CMS 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 any required CMS Work Plan. In addition, any analytical data collected must be 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 as otherwise approved or required by KDHE, or to support the evaluation of potential corrective action alternatives.

In some cases, the Permittee/Respondent may propose or KDHE may require implementation of bench- or pilot-scale treatability study testing to demonstrate the efficacy of a particular technology where there might be some uncertainty in the viability or suitability to site conditions. Treatability studies are conducted to provide sufficient data to allow treatment alternatives to be fully developed and evaluated during the 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 permit a more reliable remedy selection process. 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/Respondent must first submit a treatability study work plan for KDHE review and approval. At KDHE's discretion, reporting associated with treatability study/modeling/additional data gathering activities may be reported separately or incorporated into the CMS Report.

CMS REPORTING

A CMS Report must be submitted to KDHE for review and approval, in a timeframe consistent with the implementation schedule in the approved CMS Work Plan, or as otherwise directed by KDHE. The CMS 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 attachment. The CMS Report shall include: 1) a brief summary of the findings of previous environmental investigations, including the findings of a risk assessment, if performed; 2) a description of the site-specific CAOs, including any media cleanup or risk-based standards for the protection of human health and the environment; 3) a detailed description of each corrective action alternative evaluated, including the "no action" alternative; 4) a detailed discussion of each corrective action alternative evaluated relative to the threshold and balancing criteria identified above; 5) a comparative analysis of one alternative versus the others in both narrative and tabular form; 6) a recommendation for corrective action at the site which provides a clear basis for recommending and supporting a specific corrective action or group of corrective actions for the site; and, 7) any supporting background information or literature which was used to evaluate each corrective action alternative (to be included in an appendix).

All elements of the recommended corrective action as proposed in the CMS Report must be fully substantiated. Specifically, sufficient data must be available and presented in the CMS Report to support the recommended alternative consistent with available state and federal policy and guidance. KDHE may also require identification of a contingent remedy up front in the event the selected remedy is not able to achieve CAOs or if there is uncertainty as to the efficacy of that being proposed. Once KDHE has reviewed and approved the CMS Report, a Statement of Basis will be prepared that identifies KDHE's preferred remedy for the site. The draft decision document will be made available for public comment before KDHE issues a final remedy decision. At this juncture, the Permittee/Respondent will be required to design and perform corrective action activities under KDHE oversight.

STEP 1: Identification and Development of Corrective Measure Alternatives

Based on RFI results, the Permittee/Respondent shall identify, screen, and develop the alternatives for removal, containment, treatment and/or other remediation of the contamination based on established media cleanup objectives. At a minimum, all corrective actions concerning groundwater releases from RCRA regulated units shall be consistent with, and as stringent as, those required under 40 CFR 264.100. In general, the media cleanup objectives, established in conjunction with KDHE, shall be based upon available KDHE and EPA guidance, public health

and environmental criteria, information gathered during the RFI, and generally include the following components:

- Cleanup levels which are media-specific concentrations that achieved before the final remedy is considered complete;
- Point(s) of compliance representing where the media-specific cleanup levels are to be achieved; and,
- Remedy construction timeframe and estimate of time needed to achieve media-specific cleanup levels at the point(s) of compliance.

Multiple technologies (e.g., treatment train) can be combined to constitute the overall corrective action alternative being carried through the evaluation. Again, each of the alternatives being considered must be screened against the threshold criteria shown in Figure 1. If a given alternative does not meet all of the threshold criteria, then the alternative does not warrant further consideration.

STEP 2: Detailed Evaluation of Corrective Measure Alternatives

For those alternatives that satisfy the threshold criteria screening in Step 1, the Permittee/Respondent must fully describe and evaluate each alternative and its individual components relative to the balancing criteria depicted in Figure 1.

Long-Term Effectiveness

The Permittee/Respondent shall demonstrate the expected long-term effectiveness, reliability, and risk of failure of the alternatives in terms of:

- Effectiveness of the alternative under analogous site conditions;
- Potential impact resulting from alternative failure, including failures from uncontrollable changes affecting the site (e.g., heavy precipitation events, off-site pumping well influences, etc.); and,
- Estimates of alternative projected useful life, including any component technologies.

Reduction in Toxicity, Mobility, or Volume of Waste(s)

In general, the preference is for remedies capable of eliminating or substantially reducing the potential for wastes in the contaminated media to cause future environmental releases or other risks to human health and the environment. For the sake of the CMS evaluation, the Permittee/Respondent must estimate how much or to what extent the corrective measure alternatives will reduce the toxicity, mobility, or volume of waste. The assessment must include a comparison of initial site conditions to anticipated post-corrective measure conditions.

Short-Term Effectiveness

Short-term effectiveness has particular bearing when the remedial activities will be occurring in densely populated areas, or where waste characteristics pose a high risk to workers/environment

necessitating special protective measures during the implementation. Typical factors to be considered in the CMS evaluation include, but are not limited to, fire, explosion, exposure to hazardous substances and potential threats associated with treatment, excavation, transportation and redisposal, or containment of the waste material.

Implementability

The Permittee/Respondent shall fully describe the implementability of each alternative, including the relative ease of installation (or constructability) within the context of time required to achieve an anticipated result (e.g., hydraulic containment achieved). The following specific information shall be considered and included in the CMS Report:

- Administrative activities (e.g., permits, off-site approvals) needed to implement the alternative, and the length of time needed to accomplish these activities;
- Constructability, implementation time, and time for beneficial results;
- Availability of adequate off-site treatment, storage capacity, disposal services, needed technical services and materials; and,
- Availability of prospective technologies for each corrective measure alternative.

Community Acceptance

The Permittee/Respondent is responsible for involving and supporting community involvement activities as an ongoing part of the corrective action. The CMS Report shall include a discussion of any concerns raised by the community during the conduct of corrective action activities to that point in time (e.g., investigation and interim measures). In addition, the CMS Report shall discuss any aspects associated with an alternative for which there is a potential for community concerns and objections.

State Acceptance

The Permittee/Respondent shall include a discussion in the CMS Report of how the specific corrective measure activities will be conducted in compliance with all applicable state regulations (i.e., permit requirements), and KDHE policy and guidance relevant to the proposed corrective measures implementation.

Cost

The Permittee/Respondent shall develop a cost estimate for each corrective measure alternatives. Cost estimates shall include costs for engineering, site preparation, construction, materials, labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, training, operation and maintenance, long-term monitoring, etc.

STEP 3: Corrective Measure(s) Recommendation

The Permittee/Respondent shall fully justify and recommend a corrective measure(s) for implementation with a detailed summary of how the measure(s) satisfy each of the threshold criteria and why the measure(s) appears most favorable based on the balancing criteria comparative analysis evaluation. This recommendation shall include summary tables presenting the alternatives in an easily understood manner and specifically highlighting tradeoffs among the balancing criteria factors for the alternatives considered/evaluated. KDHE will then identify a proposed corrective measure(s) in the Statement of Basis. With consideration of public comment on the Statement of Basis, KDHE will make a final selection of the corrective measure(s) to be implemented.