
Scope of Work for Midland Area Soils Remedial Investigation (RI)

I. Purpose and Objectives

This revised Scope of Work (SOW) is being submitted pursuant to the Part 111 Hazardous Waste Facility Operating License (License) of The Dow Chemical Company (Dow) Michigan Operations-Midland Plant in Midland, Michigan (Facility). Condition XI.B.3. of the License requires Dow to submit a SOW to the Michigan Department of Environmental Quality (MDEQ) for conducting a Remedial Investigation (RI) for certain offsite areas. This SOW addresses the Midland Area Soils, one of the areas identified in Condition XI.B.2. of the License.

The objective of this SOW is to provide a general description of the process, steps and schedule Dow will use to plan and implement the RI for the subject area. Specific RI planning and implementation details are being developed and will be presented within the RI Work Plan (RIWP). The SOW consists of this document and the attached four figures:

- Figure 1 – Remedial Investigation (RI) Overview
- Figure 1A – Human Health Risk Assessment Portion of Remedial Investigation
- Figure 1A(i) – Bioavailability Study
- Figure 2 – Preliminary RI Schedule

The figures illustrate the primary elements and proposed sequence of key RI activities. This document briefly describes the information presented in the flowcharts and provides supplemental information, as discussed with MDEQ staff in May and June 2005.

II. RI Purpose and Overview

The Midland Area Soils RI will be conducted to meet applicable requirements of the License, Parts 111 and 201 of Act 451, as well as relevant Resource Conservation and Recovery Act (RCRA) regulations.

The RI Work Plan will be designed to provide the information necessary to support a risk-based decision process and achieve the goal of a remedial investigation as set forth in R 299.5528: *“The purpose of a remedial investigation is to assess site conditions in order to select an appropriate remedial action, if one is required, that adequately addresses those conditions.”* The RI Work Plan will also be designed to address the factors described in R299.5528 (3), *“...as appropriate to the facility...”*.

Figure 1 illustrates the primary tasks and general sequence of events associated with development and implementation of the RI. The following subsections provide a brief description of each of the primary tasks.

III. Planning of Remedial Investigation Work

A) RI Work Plan Background Information

Dow has been obtaining and summarizing existing information pertaining to the Midland Area Soils for use in development of the RI Work Plan. Information relevant to the RI will be summarized in a description of current conditions within the RI Work Plan.

B) RI Work Plan Development

The RI Work Plan is being developed in accordance with applicable Part 201 and RCRA regulations and standards of practice. It will include, but not be limited to, the following elements:

- A description of current conditions will summarize existing information on relevant facility history as well as on the area to be investigated as defined by the License. Existing information will be evaluated to determine if there are continuing sources of contamination that may impact Midland area soils.
- A preliminary conceptual site model (PCSM) will integrate existing information on physical conditions, nature and extent of contaminants, environmental fate and transport, land use and potential receptors. The RI will be coordinated with the onsite portions of the License, which already require Dow to identify the potential for continuing sources. This will include coordination with work being done under License Conditions X.J. Facility Shallow Groundwater Monitoring Program, X.K. Ambient Air Monitoring, X.L. Soil Monitoring Programs, and XI.R. Source Control.
- Data Quality Objectives (DQOs) are being developed to clearly identify the questions that will be answered by RI data and to ensure that the proper type and quality of data will be collected. Types of questions to be addressed by the RI will include, for example:
 - What are the characteristics of soils within the City of Midland?
 - What is the nature and extent of potential constituents of interest (PCOIs)?
 - Do conditions in soils present risk(s) to the public health, safety and welfare and to the environment and natural resources?
- To begin to address these questions, the RI will include:
 - Collection of data to establish soil characteristics for use in the Bioavailability Study
 - Coordination with the onsite corrective action activities previously mentioned in order to develop a PCSM and appropriate target analyte list for use in the RI
- Field sampling and analysis will be performed in at least two phases. As shown Figure 2, Phase I is scheduled to begin in April of 2006 and Phase II is scheduled

to begin when appropriate site specific and/or area wide cleanup criteria have been established. This information will be used, in part, to define the nature and extent of contamination.

- The RI Work Plan will provide details regarding the specific areas to be investigated, as well as the proposed analyte lists, within the Sampling and Analysis Plan (SAP). The RI Work Plan will also include maps and figures, as well as Standard Operating Procedures (SOPs) to describe the protocols and methodologies proposed for the collection and quality evaluation of data. In accordance with Conditions XI.B.2. and XI.B.3. of the License, this RI will evaluate the Midland Area Soils and will include areas with various land use (e.g., residential, recreational, etc.) designations.

C) Human Health Risk Assessment (HHRA) Work Planning

The RI Work Plan will include a work plan element for human health risk assessment activities during the RI. The RI will provide the information required to evaluate potential risks to human health within the area to be investigated as defined by the License. The primary RI steps associated with evaluation of potential risks to human health are illustrated in Figure 1.A.

The RI Work Plan will include identification of potential exposure pathways for each relevant land use and DQOs related to HHRA work as appropriate. Part 201 provides generic criteria for direct contact exposure to PCOIs. There may be additional exposure pathways that do not have Part 201 generic criteria. Dow is currently reviewing and evaluating these potential exposure pathways with MDEQ. The RIWP will identify which of these potential exposure pathways will be addressed in the RI through the development of additional information as shown in Figure 1.A. Specific elements in the process follow:

- The HHRA will include the following elements to identify and refine relevant land uses, potential exposure pathways, and DQOs related to HHRA work, as appropriate for inclusion in the RI Work Plan.
 - Exposure Pathway Identification and Refinements (qualitative)
 - Exposure Algorithm Identification (quantitative)
 - Exposure Data Needs, Collection and Analysis (qualitative/quantitative)
 - Toxicity Criteria Identification/Derivation (qualitative/quantitative)
 - Screening-Level Risk Assessment (quantitative)
 - Perform Fully Probabilistic Risk Assessment and Generate Site-Specific and/or Area-Wide Clean-up Criteria (quantitative)
 - Risk Management Decision(s) (qualitative)
- Part 201 only has generic clean-up criteria and exposure pathways for ingestion, inhalation, and dermal absorption of contaminated soils and groundwater under various land use scenarios. Potential land uses and exposure pathways exist that lack Part 201 criteria and require additional evaluation. Land uses for the area to be investigated as defined by the License include residential, commercial, industrial, and recreational. Tentative residential exposure pathways for the area include ingestion of soil and dust (interior and exterior), ingestion of local

vegetables and produce (including meat, milk, and eggs), ingestion of local fish and game, ingestion of sediment and surface water (primarily recreational), inhalation of soil and dusts, and dermal exposure via soil, dusts, sediments, and surface water. Tentative non-residential exposure (commercial and industrial workers) will focus primarily on exposure via the same routes to soil and dusts. Recreational exposure could include ingestion of soils and dusts (interior and exterior), ingestion of sediments and surface water, ingestion of fish and game, inhalation of soils and dusts, and dermal exposure to soils, dusts, sediments, and surface water.

- The RIWP will propose potential Tittabawassee floodplain exposure pathways that will need to be fully addressed in the RI. All exposure pathways evaluated will be identified and the rationale for inclusion or exclusion in the final human health risk assessment will be provided.
- The proposed process for the development of human health risk assessment and site-specific cleanup criteria (SSCC) and/or area-wide cleanup criteria (AWCC) is conceptually illustrated in Figure 1.A, and will be further developed in coordination with MDEQ. This process, which is part of the RI, will be documented in separate work plans and submitted to MDEQ for preliminary review and then jointly submitted to an independent science advisory panel for review. After the science advisory panel reviews the proposed process, it will be submitted to MDEQ for final review and approval. Work currently underway on bioavailability studies (as shown in Figure 1.A.i) will support efforts to evaluate potential exposure pathways. Other data needs, which would require the development of DQOs and an approach to obtain the data, may also be identified for the area to be investigated as defined by the License and will be coordinated with overall RI work as necessary.

D) Ecological Risk Assessment (ERA) Work Planning

Both the need for and scope of an ecological risk assessment will be evaluated during the RI. The CCR will summarize existing ecological data and the RI Work Plan will outline other activities to identify whether an ecological assessment is warranted for the Midland area. The conclusions of this initial assessment, along with either a recommendation to perform an ecological risk assessment or justification as to why an ecological risk assessment is not needed, will be presented for MDEQ review and approval in the RI Work Plan.

E) Preliminary Feasibility Study Planning

Preliminary feasibility study evaluations will be done to identify potential remedial action alternatives that may be necessary to manage risk to human health and the environment. The objective of this element of the RI Work Plan will be to ensure that DQOs are developed to include remedy considerations and that information is obtained through the RI to support future risk management decisions.

F) Public Participation Plan

An interim public participation plan, as required by Condition XI.B.3. of the License and envisioned by Section III.A.1. of the Framework, is in place and being implemented. A revised and consolidated public participation plan will be submitted as part of the RIWP. The interim plan includes the approved Communications Interim Response Activity (IRA), which is being implemented, as well as a series of public meetings. Dow has conducted meetings with residents and sent them informational mailings regarding the implementation of the Midland Area Soils Interim Response Activities Work Plan for Priority 1 properties. MDEQ and Dow also have held a series of public meetings with the public to develop a stakeholder participation process. The stakeholder process is still in development. Elements of the stakeholder process that is being developed will be incorporated as appropriate into the consolidated public participation plan.

IV. RI Deliverables and Schedule Milestones

A schedule for the elements discussed within this SOW is provided in Figure 2. Figure 2 is considered a “contingent” schedule at this time because it was built using assumed durations for agency, science advisory and public review and approval timeframes. The RI Work Plan will provide a detailed implementation schedule for the RI. Key deliverables and their expected sequence or schedule milestones are:

- The RI Work Plan will be submitted to MDEQ by December 31, 2005.
- Implementation of the RI will commence within 45 days of MDEQ approval of RI WP, in accordance with Section XI.F.3 of the License.
- Phase I RI Report will be submitted to MDEQ within 60 days of completion of the Phase I RI work and will (pursuant to License Condition XI.B.3.(b)) present information on appropriately detailed maps and figures as are currently being provided to MDEQ in the form of GIS shape files.
- Draft Work Plan for Development of Site-specific and/or area-wide Cleanup Criteria
- Final Work Plan for Development of Site-specific and/or Area-wide Cleanup Criteria
- Site-specific and/or Area-wide Cleanup Criteria Proposal
- Phase II RI Work Plan will be submitted to MDEQ in accordance with the schedule approved as part of the Phase I RI Report.
- Phase II RI Work Plan will be submitted to MDEQ in accordance with the schedule approved as part of the Phase I RI Report and will (pursuant to License Condition XI.B.3.(b)) present information on appropriately detailed maps and figures as are currently being provided to MDEQ in the form of GIS shape files.

Dow will provide MDEQ with RI data pursuant to the License.

V. Interim Response Activities

Condition XI.B.3. (a) of the License requires Dow to propose Interim Response Activities (IRAs) in the SOW. This SOW condition was satisfied by submittal and subsequent approval by MDEQ of the:

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- Midland Area Soils Interim Response Activities Work Plan, February 2004, which was modified and approved by the Michigan Department of Environmental Quality in January 2005”.
 - Interim Response Activity Work Plan: Communications, February 2004; modified and approved by the Michigan Department of Environmental Quality, October 2004.

Dow will continue to perform IRAs in compliance with Conditions XI.B. and XI.G. of the License. New information will be evaluated as it becomes available to determine if additional IRAs or additional action for previously conducted IRAs are necessary.

Figure 1 - Remedial Investigation (RI) Overview
Midland Area Soils Scope of Work

10/12/2005 SUBMITTAL

Notes:

- 1) The shaded boxes are repeated on Figure 1A to show additional detail on the HHRA and ERA activities.
- 2) The Feasibility Study and Remedial Action Plan are shown conceptually to indicate steps beyond the RI.
- 3) The circles reference License conditions being addressed.
- 4) Triangle symbols indicate near-term decision points to be discussed with MDEQ prior to submittal of the next phase of work.

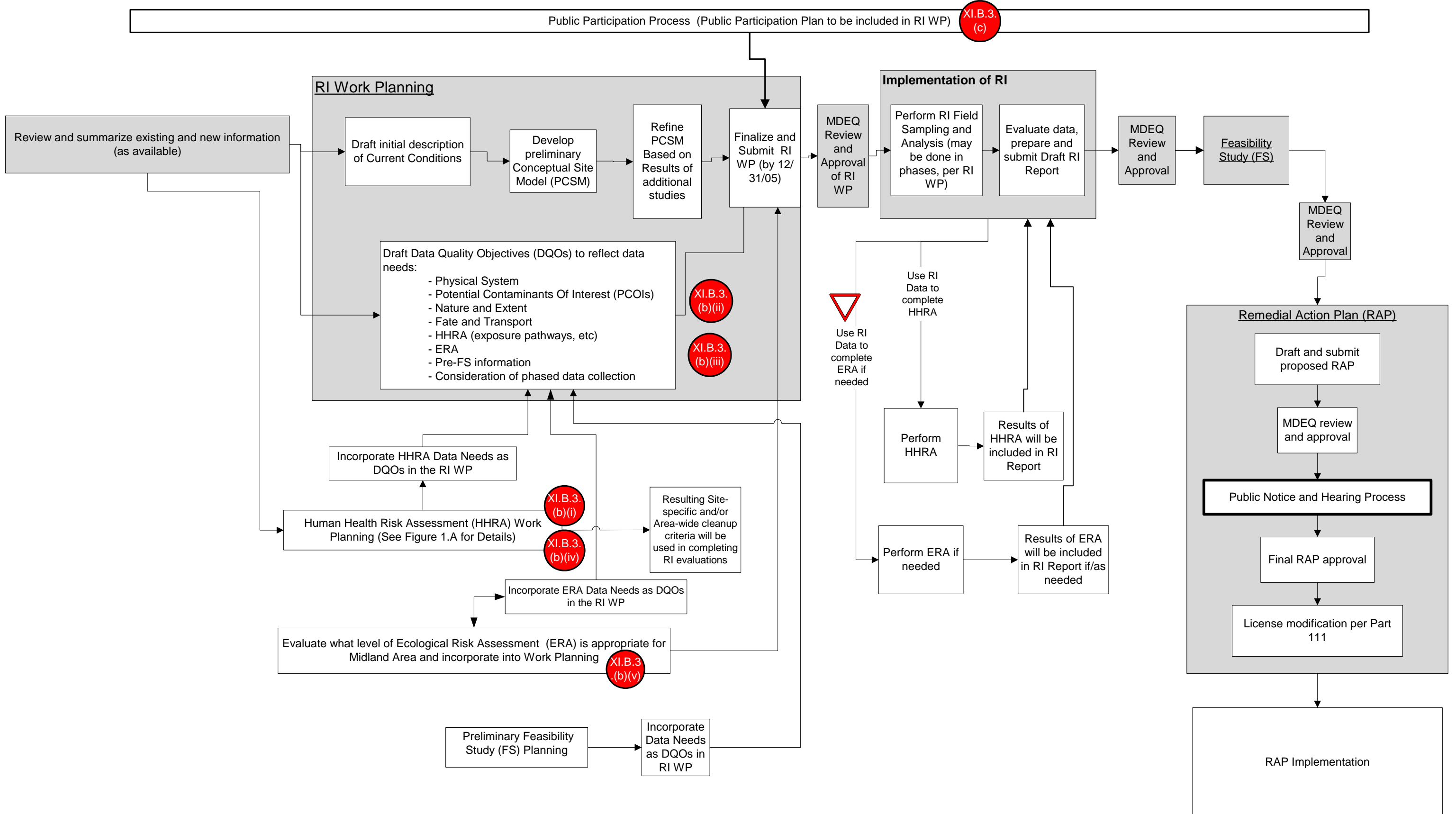


Figure 1.A Human Health Risk Assessment Portion of Remedial Investigation Midland Area Soils Scope of Work

10/12/2005 SUBMITTAL

Notes:

- 1) The shaded boxes are repeated from Figure 1: Remedial Investigation Overview to show where HHRA work occurs within RI
- 2) The Feasibility Study and Remedial Action Plan are shown conceptually to indicate steps beyond the RI
- 3) Triangle symbols indicate near-term decision points to be discussed with MDEQ prior to submittal of next phase of work.
- 4) Additional HHRA activities may need to be added to the RI process if additional PCOIs are identified in addition to dioxins and furans

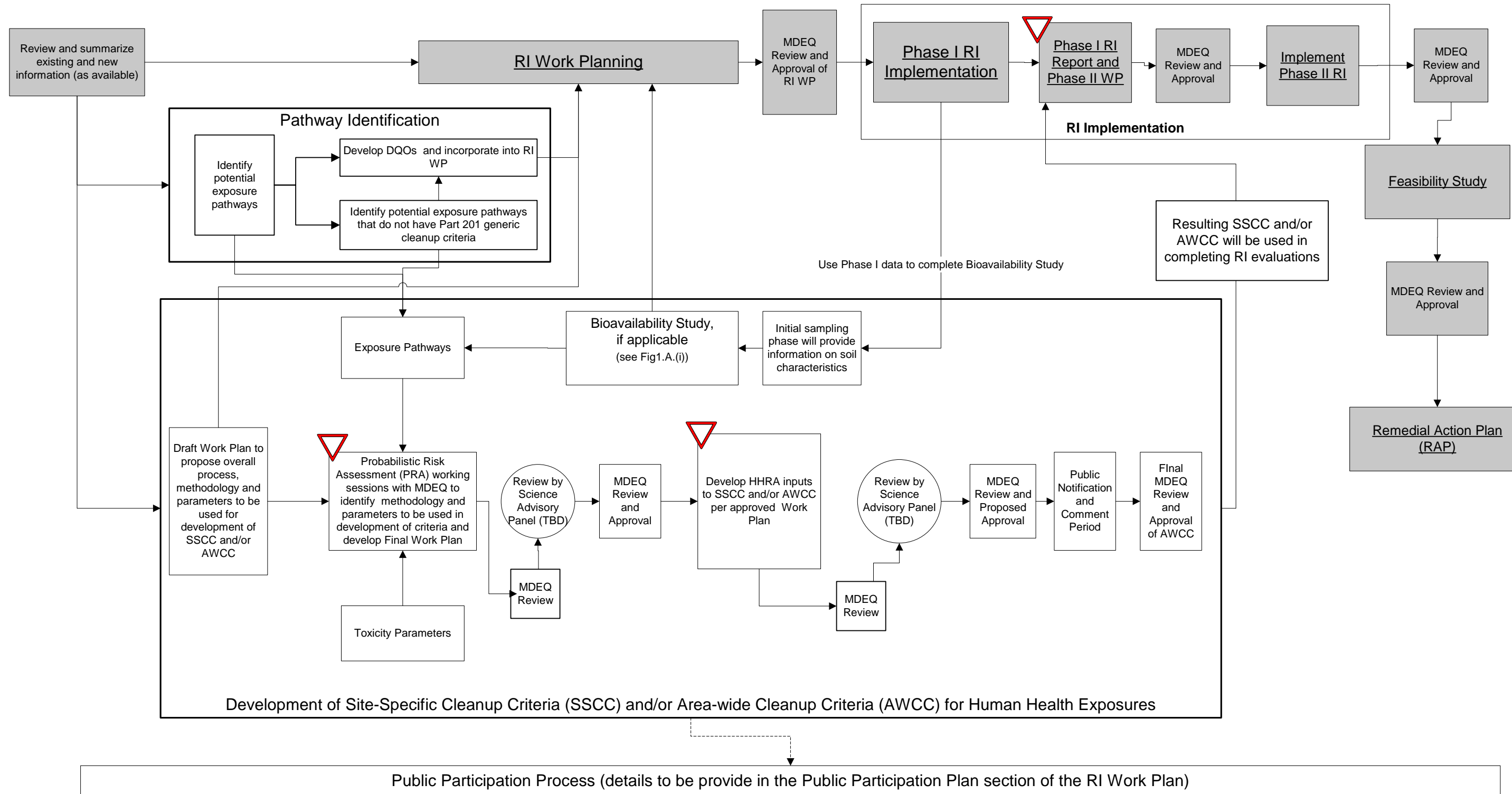


Figure 1.A.(i) Bioavailability Study for Dioxins and Furans
 Midland Area Soils Scope of Work

10/12/2005 SUBMITTAL

Note - Triangle symbols indicate near-term decision points to be discussed with MDEQ prior to submittal of next phase of work.

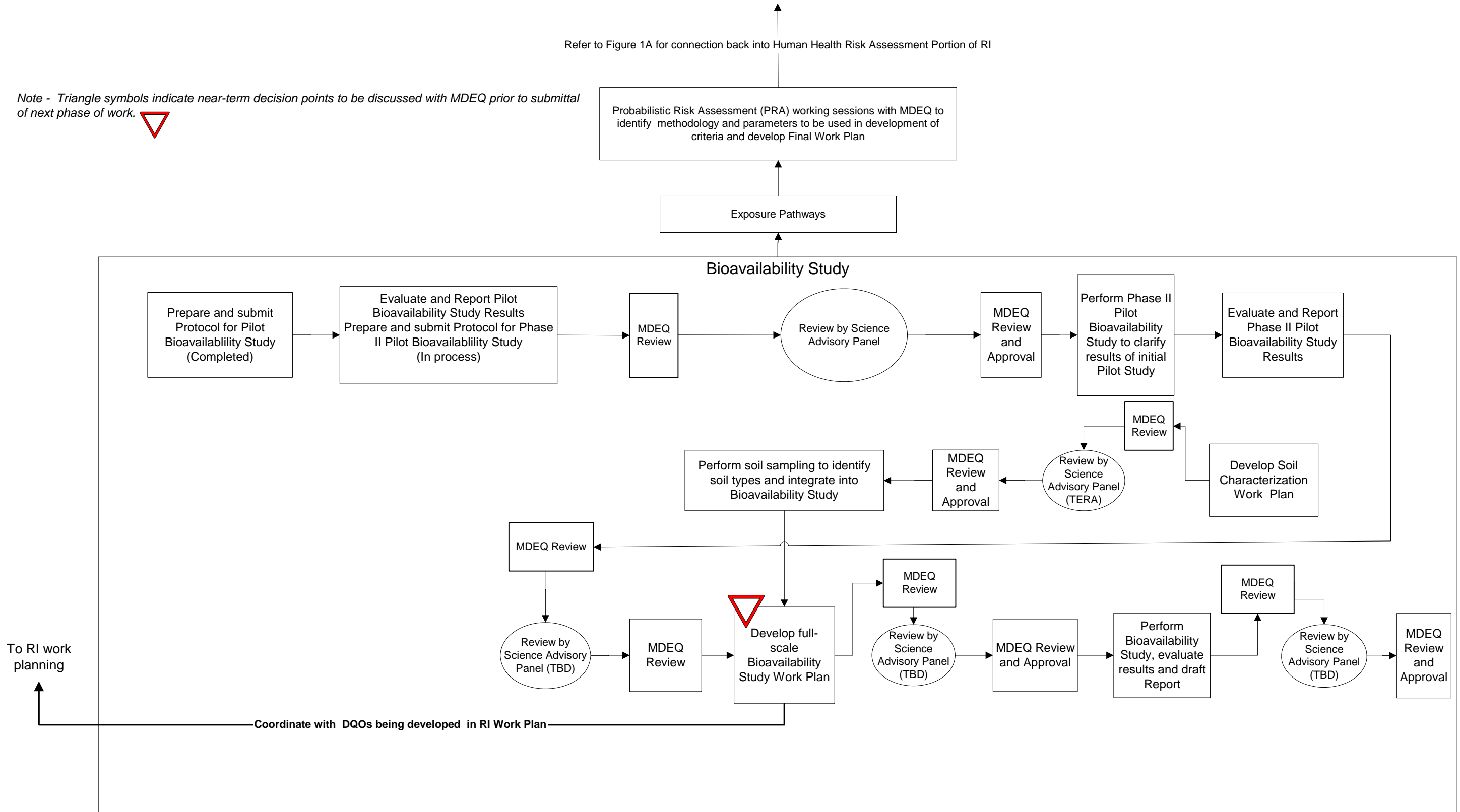


Figure 2 - Preliminary RI Schedule: Midland Soils

