APPENDIX A

SCOPE OF WORK FOR A REMEDIAL INVESTIGATION

AT HILTON-DAVIS CHEMICAL COMPANY

PURPOSE

The purpose of this Remedial Investigation is to determine the nature and extent of the problem at the Facility and to gather all necessary data to support the Corrective Measures Study. Defendants, Sterling Drug Company and Hilton-Davis Chemical Company and their agent(s) will furnish all personnel, materials, and services necessary for, or incidental to, performing the Remedial Investigation at Hilton-Davis Chemical Company.

SCOPE

The Remedial Investigation shall consist of eight tasks:

Task 1 - Description of Current Situation — Approved
Task 2 - Investigation Support — Approved
Task 3 - Site Investigation
Task 4 - Site Investigation Analysis
Task 5 - Laboratory and Bench-Scale Studies
Task 6 - Reports (Full RI)
Task 7 - Additional Requirements —
Task 8 - Community Relations Support

(1-8 RI)

See p 18-19

TASK 1 - DESCRIPTION OF CURRENT SITUATION

Defendants and their agent(s) will describe the background information pertinent to the Facility and its problems and outline the purpose for the Remedial Investigation at the Facility. The data gathered during any previous investigations or inspections and other relevant data should be included.

a. Site Background

Defendants and their agent(s) will prepare a summary of the regional location, pertinent area boundary features, general Facility physiography, hydrogeology, and historical use of the Facility for the treatment, storage and disposal of solid and hazardous waste.

This summary shall at a minimum include:

1. Maps depicting the following:

A. The general geographic location;

B. All active solid or hazardous waste treatment, storage or disposal areas;

C. HD property lines and any adjacent property lines with the owners of all adjacent property clearly indicated;

D. All known past solid or hazardous waste treatment storage or disposal areas;

E. All known past and present product and waste underground tanks or lines;

F. All wetlands, surface water features, tanks, buildings, utilities, paved areas, easements, right-of-ways, and other features; and,

G. Maps should be of sufficient detail and accuracy to locate and report all existing and future work performed at the site.

2. A history of solid and hazardous waste treatment, storage and disposal activities at the Facility. In developing a history, Defendants shall conduct employee interviews in a manner approved by Ohio EPA.

3. Details on past product and waste spills including date, volume, nature, location, and cleanup activities.

4. A description of current operations at the site.

b. Nature and Extent of Problem.

Prepare a summary of the actual and potential off-site and on-site health and environmental effects. This summary shall include: the types, physical states, and amounts of hazardous wastes/hazardous waste constituents/hazardous substances; the existence and condition of drums, tanks, landfills, surface ponding, and other containers; affected media and pathways of exposure; and contaminated releases such as leachate and runoff. Include discussion of the population in the area potentially affected by release of contaminants from the Facility. Describe any reports of human or animal illness that may be related to the Facility.

c. History of Response Actions.

Prepare a summary of any previous response actions conducted by either local, State, Federal, or private parties, including site inspections or other technical reports, and their results. A list of reference documents and their location should be included. The scope of the remedial investigation should be developed to address the problems and questions that have resulted from previous work at the site.

d. Site Visit.

Conduct an initial site visit to become familiar with site topography, access routes, and proximity of receptors to possible contamination and collect data for preparation of the site safety plan. The visit should be used to verify the site information developed in this Task.

e. Interim Measures.

The owner/operator will detail any interim measures being undertaken at the facility. This shall include:

- objectives: design, construction, operation, maintenance requirements;
- schedules for design, construction and monitoring;
- schedule for progress reports.

TASK 2 - INVESTIGATION SUPPORT

Defendants or their agent(s) shall conduct preliminary work necessary to scope and conduct the site investigations and feasibility study.

a. Health and Safety Plan.

1. Defendants and their agent(s) will prepare a site Health and Safety Plan, the major elements of which will include:

A. Site description including availability of resources such as roads, water supply, electricity and telephone service;

B. Hazard evaluation;

C. Monitoring requirements;

D. Levels of protection;

E. Work limitations;

F. Authorized personnel;

G. Decontamination; and

H. Emergency information.

2. The Facility Health and Safety Plan must be consistent with:

A. Interim Standard Operating Safety Procedures;

B. Section III(C)(6) of CERCLA;

C. EPA Order 1440.1 - Respiratory Protection;

D. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities.

E. EPA Occupational Health and Safety Manual;

F. EPA Interim Standard Operating Safety Guide (September, 1982);

G. OSHA regulations in 29 CRF 1910 - 1926;

H. Site conditions.

b. Data Management Plan.

Defendants or their agent(s) shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan should identify and set up laboratory and data documentation materials and procedures, project file requirements, and project-related progress and financial reporting and documents.

c. Permitting Requirements Plan.

Defendants or their agent(s) will prepare a plan addressing the procedures to be employed if tasks required in the RI will require permitting action by any governmental authority.

d. Community Relations Plan.

Defendants and their agent(s) will prepare a plan, based upon on-site discussions, for the dissemination

of information to the public regarding investigation, activities and results. Opportunities for comments and input by citizen, community and other groups must also be identified and incorporated into the plan. Staffing and budget requirements for implementation also must be included. (Not required if Community Relations Plan has been prepared).

e. Pre-Investigation Evaluation.

Prior to starting any remedial investigations, Defendants and their agent(s) shall assess the site conditions to identify potential remedial technologies applicable to the site and associated data needed to evaluate alternatives based on these technologies for feasibility studies. A report shall be prepared for Ohio EPA review identifying broad categories of remedial technologies that may be applicable to the site and data needs.

TASK 3 - SITE INVESTIGATION

Defendants and their agent(s) will conduct only those investigations necessary to characterize the site and its actual or potential hazard to human health and environment. The investigations should result in data of adequate technical content to support the development and evaluation of remedial alternatives during the Corrective Measures Study. Investigation activities will focus on problem definition and data to support development and evaluation of alternative possible corrective measures.

The site investigation activities will follow the plans set forth in Task 2. All sample analyses will be conducted at laboratories following EPA protocols or their equivalents. Strict chain-of-custody procedures will be followed. All sampling locations will be identified on a site map.

a. Work Plan.

Defendants and their agents shall prepare and submit for Ohio EPA review and concurrence a detailed work plan outlining data needs for characterizing the site and for support of the corrective measures study. The work plan shall include an outline of proposed investigation activities, a time schedule, personnel and equipment requirements. The work plan shall also include a sampling plan for indicating rationales for sampling activities, location, quantity, and frequency of sampling, sampling and analysis methods, constituents for analysis, and quality assurance procedures. In addition

to these general sampling plan elements, other requirements will be identified in the following subtasks as they apply:

1. Sampling Plans.

Defendants and their agent(s) will prepare detailed Sampling Plans to address each of the Site Investigation activities.

A. The objective of the Sampling Plan is to:

i. Provide specific guidance for all field work;

ii. Provide a mechanism for planning and approving site activities;

iii. Provide a basis for estimating costs of field efforts;

iv. Ensure that sampling activities are limited to those that are necessary and sufficient; and

v. Provide a common point of reference for all parties to ensure comparability and compatibility between all activites performed at the site.

B. A Sampling Plan should discuss the following items:

i. Investigation objectives;

ii. Parameters of interest;

iii. Number of each sample type for each matrix;

iv. Locations of samples;

v. Justification for sample type and location;

vi. Collections methods;

vii. Sample number and frequency;

viii. Analytical procedures (refer to QAPP);

ix. Operational plan and schedule;

x. Differentiation between samples that will be analyzed in the field (on-site) and those that will be sent to a laboratory;

xi. Sampling Logistics Plan including: and

(1) Identification of team members;

(2) Documentation procedures;

(3) Field equipment listing;

(4) Sampling order; and

(5) Decontamination procedures.

xii. Monitor well and piezometer construction materials and techniques.

2. Chain of Custody. Any field sampling collection and analysis conducted shall be documented in accordance with chain of custody procedures as rovided by U.S. EPA. Defendants and their agent(s) shall prepare and submit as part of the work plan a description of the chain-of-custody procedures to be used.

3. Quality Assurance Project Plan. Defendants and their agent(s) will prepare a Quality Assurance Project Plan (QAPP). The QAPP will be prepared in accordance with "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (QAMS-005/80, U.S. EPA, December 1980), and the requirements of U.S. EPA's Contract Laboratory Program. The QAPP should be prepared as soon as possible to allow adequate time for possible review and revision.

A. The goals of the QAPP are:

i. To ensure that the procedure used will not detract from the quality of results; and

ii. To ensure that all activities, findings and results follow an approved plan and are documented.

B. Specifically, the QAPP must address the following items and issues:

i. Title page with provision for approval signatures

ii. Table of contents

iii. Project description

iv. Project organization and responsibility

v. QA objectives for measurement data in terms of precision, accuracy, completeness, representativeness, detection limits, and comparability

vi. Sampling procedures

vii. Sample custody

viii. Calibration procedures and frequency

ix. Analytical procedures

x. Data reduction, validation and reporting

xi. Internal quality control checks and frequency

xii. Performance and systems audits and frequency

xiii. Preventative maintenance procedures and schedules

xiv. Specific routine procedures to be used to assess data precision

xv. Corrective action

xvi. Quality assurance reports

xvii. Turnaround time

b. Waste Characterization

1. A sampling and analysis program to characterize all materials of interest at the Facility will be completed as set forth in subsection (2) below. The materials of interest will at a minimum include:

a. Solid and hazardous wastes stored above or below ground in tanks, containers, lagoons, piles or other structures;

b. Solid or hazardous waste generated at the Facility and disposed of off-site;

c. Solid or hazardous wastes treated or disposed of on-site.

2. The waste characterization program may be completed in phases dependent upon the current availability of records pertaining to past treatment, storage, and disposal activities (e.g. waste characterization of solid waste management unit contents may be based upon contaminants identified during the groundwater and soils and sediments investigation if adequate records of past hazardous waste practices are obtainable.) Defendants or their agent(s) shall collect analytical data to characterize the wastes completely, including type, quantity, physical form, degree of contamination, disposition (contaminant or nature of deposits), and facility characteristics affecting release (e.g., site security, and engineered barriers). The following specific characteristics should be quantified:

- Quantity/concentration
- Chemical composition
- Acute toxicity
- Persistence
- Biodegradability
- Radioactivity
- Ignitability
- Reactivity/corrosivity
- Infectiousness
- Solubility
- Volatility
- Density
- Partition coefficient
- Compatibility woth other chemicals
- Treatability ...

c. Hydrogeologic Investigation

Defendants and their agent(s) shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

1. A description of the regional geologic and hydrogeologic characteristics in the vicinity, including:

   A. regional stratigraphy: description of strata including strike and dip, identification of stratigraphic contacts, petrographic analysis

   B. structural geology: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.)

   C. depositional history

   D. regional groundwater flow patterns

E. identification and characterization of areas of recharge and discharge.

2. An analysis of any topographic features that might influence the groundwater flow system (Note that steroscopic analysis of aerial photographs should aid in this analysis).

3. A classification and description of the hydrogeologic properties of all the hydrogeologic units found at the site (i.e., the aquifers and any intervening saturated and unsaturated units), including:

   A. hydraulic conductivity, effective porosity,

   B. Lithology, grain size, sorting, degree of cementation,

   C. an interpretation of hydraulic interconnections between saturated zones, and

   D. the soil's attenuation capacity and mechanisms.

4. Using a topographic map or aerial photograph as a base, submit maps of structural geology and at least four hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of all hydrogeologic units within the scope of the RI, identifying:

   A. sand and gravel deposits in unconsolidated deposits,

   B. zones of fracturing or channeling of consolidated or unconsolidated deposits,

   C. zones of higher permeability or lower permeability that might direct or restrict the flow of contaminants,

   D. perched aquifers, and,

   E. the uppermost aquifer (includes all water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation).

5. A description of water level of fluid pressure monitoring including:

   A. water-level contour and/or potentiometric maps,

B. hydrologic cross sections showing vertical gradients,

C. an interpretation of the flow system, including the vertical and horizontal components of flow, and,

D. an interpretation of any change in hydraulic gradients due, for instance, to tidal or seasonal influences.

6. An interpretation of man-made influences that may affect the hydrogeology of the site, identifying:

A. local water-supply and production wells with an approximate schedule of pumping; and,

B. man-made hydraulic structures (pipelines, french drains, ditches).

d. Groundwater Quality Investigation

Defendants and their agent(s) shall conduct a Groundwater Quality Investigation to characterize any plumes of contamination at the Facility utilizing monitor wells constructed of teflon or stainless steel 316. This investigation shall at a minimum provide the following information:

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

2. The horizontal and vertical direction of contamination movement;

3. The current speed of contaminant movement;

4. The maximum concentration of Appendix IX, 51 F.R. 26632 (July 24, 1986) constituents in the plume(s);

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

6. An extrapolation of future contaminant movement.

e. Soils and Sediments Investigation

Defendants and their agent(s) shall conduct a program to determine the location and extent of contamination of surface and subsurface soils. This investigation shall

study soils and sediments which are or may be affected by contamination from the facility. This process may overlap with certain aspects of the hydrogeologic study (e.g., characteristics of soil strata are relevant to both the transport of contaminants by goundwater and to the location of contaminants in the soil; cores from groundwater monitoring wells may serve as soil samples). A survey of existing data on soils and sediments may be useful. The horizontal and vertical extent of contaminated soils and sediments should be determined. Information on local background levels, degree of hazard, location of samples, techniques utilized, and methods of analysis should be included. The investigation should identify the locations and probable quantities of subsurface wastes, such as buried drums, old spill areas, inactive surface impoundments or landfills. Geophysical methods may be used to supplement sampling results.

Defendants or their agents shall include in this program a study to characterize the soil and rock units above the water table in the vicinity of the contaminant release. Such characterization shall include the following information:

1. A description of the rock and soil units;

2. Permeability, variability, porosity and moisture content; and,

3. A description of the chemical characteristics of the rock and soil units.

f. Surface Water Investigation

Defendants or their agent(s) shall conduct a program to determine the extent of contamination of surface water. This investigation shall study surface waters which are or may be affected by contamination from the facility. This process may overlap with the soils and sediments investigation; data from river sediments sampled may be relevant to surface water quality. A survey of existing data on surface water flow quantity and quality may be a useful first step, particularly information on local background levels, location and frequency of samples, sampling techniques, and method of analysis. This program shall also evaluate the impacts of the contaminants on the floral and faunal communities in the surface water, sediments, and any adjacent wetlands.

This program should characterize the surface water bodies in the vicinty of the facility. Such characterization shall include the following information:

1. A description of the temporal and permanent surface water bodies including:

   a. Lakes; discuss elevation, location, size, inflow, outflow, depth and volume;

   b. Impoundments; discuss elevation, location, size, depth, volume, freeboard, and purpose at impoundment;

   c. Streams, discuss elevation, location, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100 year event);

   d. Drainage patterns; and

   e. Evapotranspiration.

g. Air Investigation

Defendants or their agent(s) shall conduct a program to determine the extent of atmospheric contamination from the hazardous waste and solid waste management units. The program should address the tendency of substances (identified through the Waste Characterization) to enter the atmosphere, local wind patterns, and the degree of hazard.

This program should provide information characterizing the climate in the vicinity of the facility. Such information shall include:

1. A description of the annual and seasonal

   a. Precipitation;
   b. Temperatures;
   c. Wind speed and directions;
   d. Development of inversions; and

2. A description of weather extremes that have been known to occur in the vicinity of the facility. Such weather extremes include:

   a. Storms;
   b. Floods; and
   c. Winds.

TASK 4 - SITE INVESTIGATION ANALYSIS

Defendants and their agent(s) will prepare a thorough analysis and summary of all site investigations and their results. The

objective of this task will be to ensure that the investigation data are sufficient in quality (e.g., QA/QC procedures have been followed) and quantity to support the Corrective Measures Study.

a. Data Analysis

Defendants and their agent(s) will analyze all site investigation data and develop a summary of the type and extent of contamination at the site. The summary will describe the extent of contamination (qualitative/quantative) in relation to background levels indicative for the area.

b. Exposure Information

Defendants or their agent(s) will provide a detailed listing of Appendix IX constituents determined to be present during the Site Investigation (Task 3). The following items will be documented for each constituent.

1. Constituent Properties

   A. physical and chemical properties

   B. chemical transformation

2. Toxicological Properties (reference documents to be used)

   A. metabolism

   B. Acute toxicity

   C. subacute and chronic toxicity

   D. carcinogenicity

   E. mutagenicity

   F. teratogenicity/reproductive effects

   G. other health effects

   H. epidemiological evidence

   I. aquatic species toxicity, environmental improvement

3. Demographic Profile of Population

Defendants or their agent(s) will provide data on describing the type and extent of human contact with various media. At a minimum, this information will include:

- Local use of surface waters draining the site
  - Drinking water
  - Recreation (swimming, fishing)

- Local use of groundwater as a drinking water source
  - Distance of wells from site
  - Expected direction of groundwater flow

- Human use of or access to the site and adjacent lands
  - Recreation
  - Hunting
  - Residential
  - Commercial
  - Relationship between population locations and prevailing wind direction.

c. Application to Preliminary Technologies

Defendants and their agent(s) will analyze the results of the site investigations in relation to the potential remedial technologies applicable to the site. Data supporting or rejecting types of corrective action technologies, compatibility of wastes and construction materials, and other conclusions should be presented.

d. Groundwater Protection Standards

Defendants and their agent(s) shall develop Groundwater Protection Standards for all of the Appendix VIII constituents found in the groundwater during the Site Investigation (Task 3).

1. The Groundwater Protection Standards shall consist of:

   A. for any constituents listed in Table 1 of 40 CFR 264.94, the respective value given in that table if the background level of that constituent is below the value given in Table 1; or

   B. the background level of that constituent in the groundwater; or

   C. An Ohio EPA approved Alternate Concentration Limit.

2. Alternate Concentration Limits (ACL's) may be developed by Defendants and their agent(s) and submitted to the Ohio EPA for approval. For any proposed ACL's Defendants and their agent(s) shall include a justification based upon the criteria set forth in O.A.C. 3745-54-94(B).

3. Within forty-five (45) days of receipt of any proposed ACL's, Ohio EPA shall notify Defendants in writing of approval, disapproval or modifications. Ohio EPA shall specify in writing the reason(s) for any disapproval or modification.

4. Within twenty (20) days of receipt of the Ohio EPA's notification of disapproval of any proposed ACL, the Respondent shall amend and submit the Ohio EPA revised ACL's.

e. Post-Investigation Evaluation

Either during or following the site investigations, Defendants or their agent(s) will assess the investigation results and recommend preliminary remedial technologies likely to apply to the site problem. These will provide the basis for developing detailed alternatives during the corrective measures study. The work during the remedial investigation will generally be limited to the following;

1. Recommending types of remedial technologies appropriate to the site conditions.

2. Recommending whether or not to remove some or all of the waste for treatment, storage, or disposal.

3. Determining the compatibility of groups of wastes with other wastes and with materials considered as part of the potential remedial action (e.g., slurry walls, lagoon liners). Recommending alternatives for treatment, storage, or disposal for each category of compatible waste.

TASK 5 - LABORATORY AND BENCH-SCALE STUDIES

Defendants and their agent(s) shall conduct, as necessary laboratory and/or bench scale studies to determine the applicability of remedial technologies to site conditions and problems. Analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

A testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, the data management and interpretation guidelines shall be developed and submitted to Ohio EPA for review and approval.

Upon completion of the testing, evaluate the testing results to assess the technologies with respect to the site-specific questions identified in the test plan. Scale up those technologies selected based on testing results.

Prepare a report summarizing the testing program and its results, both positive and negative.

TASK 6 - REPORTS

we have not commented on this report (7/23)

Defendants and their agent(s) shall prepare a Remedial Investigation Report to present Tasks 1-7. The Remedial Investigation Report will be developed in draft form for Ohio EPA review. A public meeting may be held to discuss the Draft. The Remedial Investigation will be developed in final format incorporating all comments received on the Draft Remedial Investigation Report.

Five (5) copies of both the Draft and Final Remedial Investigation Reports will be provided by the contractor to Ohio EPA.

TASK 7 - ADDITIONAL REQUIREMENTS

a. Reporting Requirements

Monthly Technical Progress Reports are required of Defendants and their agent(s). For each on-going work assignment, the Respondent and its agent(s) shall submit progress reports with the following elements:

1. Identification of site activity.
2. Status of work at the site and progress to date.
3. Percentage of completion.
4. Difficulties encountered during the reporting period.
5. Actions being taken to rectify problems.
6. Activities planned for the next month.
7. Changes in personnel.

The monthly progress report will list target and actual completion dates for each activity including project completion and provide an explanation of any deviation from the milestones in the work plan schedule.

b. Laboratory Certification

In addition to QAPP development, Defendants and their agent(s) will be required to pass a laboratory performance audit prior to performing any task after Task 1. The audit will include analysis of the following performance evaluation samples.

Sample Type	Performance Evaluation Sample	# of Samples	U.S. EPA Analysis Procedure
Organic	Base/Neutrals	2	SW846
Organic	Acids	1	"
Organic	PCB's	2	"
Organic	Aromatic Purgeables	1	"
Organic	Halogenated Purgeables	1	"
Organic	GC/MS Purgeables	1	"
Inorganic	Metals	1	"
Inorganic	Minerals	1	"
Inorganic	Nutrients	2	"
Inorganic	CN	1	"
Inorganic	COD/BOD	1	"

Defendants and their agent(s) are expected to qualify as well as quantify the parameters of interest. The results shall incude all supporting data as required for QAPP as specified by Ohio EPA and described when samples are forwarded to the laboratory.

An on-site laboratory visit may be performed by an Ohio EPA Quality Assurance Officer to verify compliance with required analysis procedures.

Task 8 - COMMUNITY RELATIONS SUPPORT

Defendants and their agent(s) will provide support to Ohio EPA staff as required for community relations activities.

SCOPE OF WORK FOR A (CLEAN-UP) CORRECTIVE MEASURES STUDY

HILTON-DAVIS CHEMICAL COMPANY

PURPOSE

The purpose of this Corrective Measures Study is to develop and evaluate corrective action alternatives and to recommend the corrective action(s) to be taken at Hilton-Davis Chemical Company. Defendants and their agent(s) will furnish the necessary personnel, materials, and services necessary to prepare the corrective action feasibility study, except as otherwise specified.

SCOPE

(CLEAN-UP)

The Corrective Measures Study consists of eight tasks:

Task 9 - Description of Current Situation
Task 10 - Work Plan
Task 11 - Development of Alternatives
Task 12 - Initial Screening of Alternatives
Task 13 - Detailed Analysis of Alternatives
Task 14 - Draft Corrective Measures Study Report
Task 15 - Final Corrective Measures Study Report
Task 16 - Evaluation and Selection of Preferred Alternative (OEPA)

4-16 CMS

Residential vs Industrial

TASK 9 - DESCRIPTION OF CURRENT SITUATION

Information on the site's background, the nature and extent of the problem, and the previous response activities presented in Task 1 of the Remedial Investigation may be incorporated by reference. Any changes to the original project scope described in the Task 1 description should be discussed and justified based on the results o the remedial investigation.

Following the summary of the current situation, a site-specific statement of the purpose for the response, based on the results of t Remedial Investigation, should be presented. The statement of purpo should identify the actual or potential exposure pathways that shoul be addressed by remedial alternatives.

TASK 10 - WORK PLAN

A work plan that includes a technical approach, personnel requirements, and schedules shall be submitted to Ohio EPA for revie and concurrence for the proposed corrective measures study.

TASK 11 - DEVELOPMENT OF ALTERNATIVES

Based on the results of the Remedial Investigation, Defendants and their agent(s) shall develop a limited number of alternatives for source control, off-site corrective action or on-site corrective action, based on the objectives established for the corrective actio and the scoping decision.

a. Establishment of Remedial Response Objectives.

Defendants and their agent(s) in conjunction with Ohio EPA wil establish site-specific objectives for the corrective action. These objectives shall be based on public health and environmental concerns, scoping decisions, information gathere during the Remedial Investigation, U.S. EPA interim guidance,

and the requirements of any other applicable federal and state statutes. At a minimum, all corrective actions concerning groundwater must be consistent with and as stringent as those required under O.A.C. 3745-55-01.

b. Identification of Remedial Technologies.

Based on the remedial response objectives established above and the statement of purpose identified in Task 9, identify appropriate remedial technologies as a basis for the development of remedial alternatives. These technologies shall be identified on a media-specific basis, although consideration should be given to the interrelationship of the media. The technologies should be able to meet the response objectives. The technologies developed in Tasks 2e and Task 4c shall be considered a master list of applicable technologies and shall be screened based on site conditions, waste characteristics, and technical requirements, to eliminate or modify those technologies that may prove extremely difficult to implement, will require unreasonable time periods to implement, or will rely on insufficiently developed technology.

c. Identification of Remedial Alternatives.

Defendants and their agent(s) shall develop appropriate remedial technologies, response objectives, and other appropriate considerations in a comprehensive, site-specific approach. Alternatives developed should include the following (as appropriate):

- Alternatives which attain applicable and/or relevant state public health or environmental standards.

- Alternatives which exceed applicable and/or relevant public health or environmental standards.

There may be overlap among the alternatives developed. Further, alternatives outside of these categories may also be developed. The alternatives shall be developed in close consultation with Ohio EPA. Document the rationale for excluding any technologies in Task 2e in the development of alternatives.

TASK 12: INITIAL SCREENING OF ALTERNATIVES

The alternatives developed in Task 11 will be screened by Defendants and their agent(s) and Ohio EPA to eliminate alternatives that are clearly not feasible or appropriate prior to undertaking detailed evaluations of the remaining alternatives.

a. Considerations to be Used in Initial Screening.

Three broad considerations must be used as a basis for the initial screening:

1. Environment effects. Alternatives posing significant adverse environmental effects will be eliminated. Significant adverse environmental effects shall include failure to meet the Groundwater Protection Standards both and off-site.

2. Environmental protection. Only those alternatives that satisfy the corrective action objectives and contribute substantially to the protection of public health, welfare, or the environment shall be considered further. Source control alternatives shall achieve adequate control of source materials. On and off-site alternatives shall minimize or mitigate the threat of harm to public health, welfare, or the environment.

3. Implementability and reliability. Alternatives that may prove extremely difficult to implement, will not achieve th corrective action objectives in a reasonable time period, o rely on unproven technology will be eliminated.

TASK 13 - DETAILED ANALYSIS OF ALTERNATIVES

Defendants and their agent(s) will evaluate the alternatives that pas through the Initial Screening in Task 12. Alternative evaluation wil be preceded by detailed development of the remaining alternatives.

a. Technical Analysis

The Technical Analysis will at a minimum:

1. Describe appropriate treatment, storage, and disposal technologies;

2. Discuss how the alternative does (or does not) comply with specific requirements of other environmental programs. When an alternative does not comply, discuss how the alternative prevents or minimizes the migration of wastes and public health or environmental impacts an describe special design needs that could be implemented to achieve compliance;

3. Outline operation, maintenance, and monitoring requirements of the remedy;

4. Identify and review potential off-site facilities to ensure compliance with applicable RCRA and OEPA

environmental program requirments, both current and proposed. Potential disposal facilities should be evaluated to determine whether off-site management of site wastes could result in a potential for a future release from the disposal facility;

5. Identify temporary storage requirements, off-site disposal needs, and transportation plans;

6. Describe whether the alternative results in permanent treatment or destruction of the wastes, and, if not, the potential for future release to the environment;

7. Outline safety requirements for corrective measures implementation (including both on-site and off-site health and safety considerations);

8. Describe how the alternative could be phased into individual operable units. The description should include a discussion of how various operable units of the total remedy could be implemented individually or in groups, resulting in significant improvement to the environment;

9. Describe how the alternative could be segmented into areas to allow implementation in differing phases; and

10. Describe the special engineering requirements of the remedy or site preparation considerations.

11. Evaluate the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost will be presented as a present worth cost and will include the total cost of implementing the alternative and the annual operating and maintenance costs. Both monetary costs and associated non-monetary costs will be included. A distribution of costs over time will be provided.

b. Environmental Assessment

Defendants and their agent(s) will perform an Environmental Assessment (EA) for each alternative. The EA should focus on the site problems and pathways of contamination actually addressed by each alternative. The EA for each alternative will include, at a minimum, an evaluation of beneficial effects of the response, adverse effects of the response, and an analysis of measures to mitigate adverse effects.

c. Public Health Analysis

Each alternative will be assessed in terms of the extent to which it mitigates long-term exposure to any residual contamination and protects public health both during and after completion of the remedial action. The assessment will describe the levels and characterizations of contaminants on-site, potential exposure routes, and potentially affected population. Each remedial alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of migration measures, the relative reduction of impact will b determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to EPA. For source control measures or when the criteria, standards, or guidelines are not available, the comparison should be based on the relative effectiveness of technologies.

d. Institutional Analysis

Each alternative will be evaluated based on relevant institutional needs. Specifically, regulatory requirements permits, community relations, and participatory agency coordination will be assessed.

TASK 14 - DRAFT CORRECTIVE MEASURES STUDY REPORT

Defendants and their agent(s) will prepare and submit to Ohio EPA, a Draft Corrective Measures Study Report presenting the results of Task 9 through 13. A public hearing will be scheduled to discuss the Draf Corrective Measures Study Report and the Remedial Investigation Repor

TASK 15 - FINAL CORRECTIVE MEASURES STUDY REPORT

Defendants and their agent(s) will prepare a Final Corrective Measure Study Report for submission to Ohio EPA.

TASK 16 - EVALUATION AND SELECTION OF PREFERRED ALTERNATIVE

Ohio EPA shall review the results of the detailed analysis of alternatives prepared under Task 13 and select the preferred alternative.

The following considerations shall be used as the basis for selecting the alternative:

a. Reliability. Alternatives that minimize or eliminate the potential for release of hazardous wastes and constituents into the environment will be considered more reliable than other alternatives. For example, recycling of wastes and off-site incineration would be considered more reliable tha land disposal. Institutional concerns such as management requirements can also be considered as reliability factors.

b. Implementability. The requirements for implementing the alternatives will be considered, including phasing alternatives into operable units and segmenting alternatives into project areas on the site. The requirements for permits, zoning restrictions, rights of way and public acceptance are also examples of factors to be considered.

c. Effects of the Alternative. The alternative posing the greatest improvement to (and least negative impact on) public health, welfare, and environment will be favored.

d. Safety Requirements. The alternatives with the lowest adverse safety impacts will be favored.

e. Whenever two or more alternatives are identified as meeting the Remedial Response Objectives, established under Task 11(a), above, the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, safety, or the environment will be the selected alternative. Total cost includes implementation of the alternative and the operation and maintenance of the proposed alternative.

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