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WARZYN

AL PLANT INC.

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Work Plan
12660

Remedial Investigation And Feasibility Study Pagel's Pit Landfill Winnebago County, Illinois

Prepared for:

Respondent's Steering Committee

Prepared by:

Warzyn Engineering Inc.
Madison, Wisconsin

August 1987

WARZYN

Engineers & Scientists
Environmental Services
Waste Management
Water Resources
Site Development
Special Structures
Geotechnical Analysis

August 14, 1987
12660.00

Mr. David Favero
U.S. EPA Region V
Hazardous Waste Enforcement (5HE-12)
230 S. Dearborn Street
Chicago, Illinois 60604

Re: Pagel's Pit Landfill RI/FS
Work Plan Documents Submittal

Dear Mr. Favero:

On behalf of the Pagel's Pit Landfill respondents, attached are five copies of the Work Plan, Quality Assurance Project Plan (QAPP) and Site Safety Plan for the Pagel's Landfill Remedial Investigation and Feasibility Study (RI/FS). The documents reflect results of the extensive negotiations which have occurred since submittal of the previous version of the documents. The U.S. EPA's position on the data validation procedures and the need for matrix spike duplicates is not acceptable to the respondents, however, these documents reflect those procedures so the RI/FS can proceed. As the RI proceeds and site data is obtained, we hope you will remain open to reconsideration of the respondents' position on these issues.

If you have any question or comments regarding these documents, please contact us immediately.

Sincerely,
WARZYN ENGINEERING INC.

Robert C. Wendt
Project Chemist

James A. Hill
Project Manager

RCW/kam/DWH [kam-108-76]

Encl: As stated

cc: Mr. Richard Eick
Mr. Gary Marzorati
Mr. John Holstrom
Mr. Chuck Howard
Mr. Thomas Tulloch
Mr. Doug Crandall
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WARZYN

Remedial Investigation And Feasibility Study Pagel's Pit Landfill Winnebago County, Illinois

August 1987

TABLE OF CONTENTS

INTRODUCTION..... 1

Purpose..... 2
Objective..... 2
Background..... 3
Chronology of Regulatory Action..... 6

APPROACH OF INVESTIGATION..... 7

REMEDIAL INVESTIGATIONS/FEASIBILITY WORK PLAN..... 9

Remedial Investigation (RI)..... 10

TASK 1 - INITIAL INVESTIGATION ACTIVITIES..... 11

Subtask 1A - Quality Assurance/Quality Control (QA/QC) Review of Existing Data..... 11
Subtask 1B - Site Visit..... 11
Subtask 1C - Site Mapping..... 12
Subtask 1D - Receptor and Pathway Identification..... 12

TASK 2 - PLANS AND MANAGEMENT..... 13

Subtask 2A - Sampling Plan..... 15
Subtask 2B - Health and Safety Plan..... 16
Subtask 2C - Quality Assurance/Quality Control..... 17
Activity 2C.1 - Quality Assurance Project Plan..... 17
Activity 2C.2 - Analytical Laboratory Approval..... 18
Subtask 2D - Permitting Requirements Plan..... 19
Subtask 2E - Work Plan Preparation..... 20

TASK 3 - FACILITY INVESTIGATION..... 20

Subtask 3A - Landfill Characterization..... 23
Activity 3A.1 - Landfill Operations..... 23
Activity 3A.2 - Leachate Sampling..... 24
Activity 3A.3 - Water Balance Evaluation..... 26
Subtask 3B - Hydrogeologic Investigations..... 27
Activity 3B.1 - Groundwater Monitoring System..... 28
Activity 3B.1a - Phase I Well Installations..... 31
Activity 3B.1b - Phase 2 Well Installation..... 32
Activity 3B.2 - Surveying..... 33
Activity 3B.3 - Groundwater Flow Characterization..... 34
Activity 3B.4 - Groundwater Quality Monitoring..... 35
Activity 3B.4a - Rounds 1 and 2..... 36
Activity 3B.4b - Rounds 3 and 4..... 37
Activity 3B.5 - Interim Groundwater Quality Evaluation... 38

TABLE OF CONTENTS (CONT.)

Subtask 3C - Sediment Sample Collection..... 41
Subtask 3D - Surface Water Investigation..... 42
Subtask 3E - Air Monitoring..... 43
Subtask 3F - Biological Investigation..... 44
Subtask 3G - QA/QC Data Review..... 44

TASK 4 - FACILITY INVESTIGATION ANALYSIS..... 45

TASK 5 - LABORATORY AND BENCH SCALE STUDIES..... 47

FEASIBILITY STUDY (FS)..... 49

TASK 6 - WORK PLAN DEVELOPMENT..... 49

TASK 7 - ENDANGERMENT ASSESSMENT..... 50

TASK 8 - SCREENING OF PRELIMINARY REMEDIAL TECHNOLOGIES..... 52

TASK 9 - DEVELOPMENT OF ALTERNATIVES..... 52

Subtask 9A - Establishment of Remedial Response Objectives 53
Subtask 9B - Development of Response Action Levels..... 53
Subtask 9C - Identification of Remedial Alternatives..... 54

TASK 10 - INITIAL SCREENING OF ALTERNATIVES..... 55

TASK 11 - EVALUATION OF ALTERNATIVES..... 56

Subtask 11A - Development of Alternatives and Technical Analysis..... 56
Subtask 11B - Environmental Analysis..... 58
Subtask 11C - Public Health Analysis..... 58
Subtask 11D - Institutional Analysis..... 59
Subtask 11E - Cost Analysis..... 59
Subtask 11F - Evaluation of Cost-Effective Alternatives.... 59

TASK 12 - FEASIBILITY STUDY (FS) REPORT..... 61

ON-GOING ACTIVITIES..... 61

TASK 14 - COMMUNITY RELATIONS SUPPORT..... 62

TASK 15 - MONTHLY PROGRESS REPORTS..... 62

MEETINGS..... 63

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DRAFT WORK PLAN
PAGEL'S PIT LANDFILL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

INTRODUCTION

This Work Plan defines the scope of activities anticipated to complete a Remedial Investigation/Feasibility Study (RI/FS) for the Winnebago Reclamation Landfill (also known as Pagel's Pit Landfill), located near Rockford, Illinois. The Work Plan includes a description of all activities to be performed, an anticipated project schedule and estimated costs. Activities performed shall be consistent with (applicable guidance including but not limited to) "Guidance on Remedial Investigations under CERCLA", June 1985. The scope of the Feasibility Study shall be consistent with the "Superfund Amendments and Reauthorization Act" (SARA) of 1986. A final Statement of Work dated June 10, 1986, was submitted to U.S. EPA, which is the basis for the preparation preparation of this Work Plan.

This RI/FS investigation is being performed on behalf of the Pagel's Pit Landfill potentially responsible parties (PRPs) who have signed an Administrative Order on consent (consent agreement) with the United States Environmental Protection Agency (U.S. EPA), dated September 2, 1986.

This RI/FS is being performed under the terms of that consent agreement, which contains a Statement of Work for the RI/FS. The potentially responsible parties (PRPs) have retained Warzyn Engineering Inc. of Madison, Wisconsin to perform the RI/FS. Warzyn will be performing and directing all tasks outlined under this Work Plan.

Purpose

The purpose of this Remedial Investigation (RI) is to identify the source(s) of the observed groundwater contamination, and determine the nature and extent of release of contaminants to the groundwater air, surface water or sediments due to Pagel's Pit Landfill. The scope of the Feasibility Study (FS) will be based on the available information, the results of the RI and the Endangerment Assessment (EA), the criteria for a FS in the NCP (National Contingency Plan), and be consistent with SARA requirements. Respondents shall furnish all personnel, materials and services necessary for, or incidental to performing the Remedial Investigation at Pagel's Pit Landfill, National Priority List (NPL) site.

To the extent possible, the information and data reported in "Supplemental Investigation, Winnebago Reclammation Landfill, Rockford, IL." (SI; March, 1985), prepared by Warzyn Engineering Inc., shall be incoporated by reference into the RI.

Objective

The primary objectives of the RI/FS are to:

- Determine the extent to which observed releases of volatile organic compounds in the groundwater are attributable, if at all, to Pagel's Pit Landfill.
- Evaluate the performance of the landfill, with emphasis on whether there are, have been or may be releases of contaminants into the groundwater system.
- Provide additional definition of the groundwater flow system and groundwater quality between Pagel's Pit Landfill and Acme Solvents, and determine the source(s) of hazardous releases.
- Perform an EA to evaluate the effects of any known or potential hazardous releases from Pagel's Pit Landfill on the Public Health, Welfare and/or the Environment.

- Develop and evaluate remedial alternatives for the Pagel's Pit landfill facility.

All tasks, subtasks and activities are directed toward the accomplishment of these primary objectives.

Background

The Pagel's Pit Landfill is located about five miles south of Rockford, Illinois (see Drawing C 12660-B1.) The area around the landfill has gently rolling topography which exhibits 10 to 200 feet of relief. The surface topography is a reflection of glacial deposition. The primary drainage route in the area is via Killbuck Creek, which flows to the northwest and converges with the Kishwaukee River (approximately 2 miles downstream) and Rock River (approximately 2.5 miles downstream).

The area around Pagel's Pit Landfill is primarily used for agricultural purposes. There are a number of residences located along the roads in the area. Drawing C 12660-B4 shows private water supply wells in the vicinity; most private water supply wells are associated with a residence. Private water supply wells I and F no longer service residential homes. These properties have been bought by the landfill. The Rockford Skeet Club is located north and east of the landfill, and is designated as private water supply well E.

East of the Pagel's Pit Landfill on an approximately 20 acre parcel is Acme Solvents Reclamation Inc. (Acme). The Acme site was active from 1960 to 1973, and the property was used for disposal of waste generated by the company's solvent reprocessing facilities in Rockford, Illinois. The materials disposed of at the site are generally undocumented, but are known to have included still bottom sludges, non-recoverable solvents, paints and oils. These

wastes are generally hazardous by definition. Waste materials were transported to the Acme site in drums which were either emptied into unlined diposal lagoons or stockpiled. The Illinois Environmental Protection Agency (IEPA) indicates that four lagoons were actively used for the disposal of waste materials on site. IEPA additionally indicates that when the site was closed, between 10,000 and 15,000 drums may have been present on the site. The total quantity of waste disposed of at the site during its operation is unknown.

IEPA inspections in late 1972 and early 1973 indicate the waste materials in the Acme ponds were not removed, but were covered with soils borrowed from other portions of the site. It is also reported that an unknown number of drums stored on-site were crushed and buried, rather than removed. Clean-up of the ACME site, began in August, 1986 consisting initially of removal of buried drums and contaminated soils.

Pagel's Pit Landfill occupies approximately 60 acres west of Lindenwood Road (see Drawing C 12660-B4). The landfill facility has been in operation and licensed since 1972. The facility has a bituminious liner with an overlying sand granular blanket and leachate collection system. Leachate is collected and disposed of off-site. Wastes accepted at the landfill are primarily municipal refuse and sewage sludge. A very limited quantity of special wastes were disposed of at the facility prior to December, 1975. All special wastes accepted at the facility were permitted by IEPA. Permits were obtained for some wastes which were not actually disposed of at the facility.

In 1979, methane gas was detected in the landfill. To prevent accumulation and to put the methane gas to constructive use, the facility operators installed a gas venting and collection system. Collected gas is cleaned and and used as an energy source in a nearby alcohol plant and to dry municipal sewage sludge prior to landfilling.

The Pagel's Pit Landfill is situated in a transition area between outwash deposits associated with the Kishwaukee River to the north and a clay till to the south. The glacial deposits range in thickness from five feet or less around the Acme facility to 60 feet or greater west of the landfill.

Directly underlying the glacial deposits is bedrock of the Galena Dolomite Formation. The Galena Dolomite is characterized as a yellowish gray to buff or brown, medium to coarsely crystalline dolomite. Beneath the Galena Dolomite are the Decorah and Platteville Dolomite Formations. Based upon available published information and observations while drilling, the dolomite units are assumed to be hydraulically interconnected and fractured. Beneath the Ordovician Dolomites is the Glenwood Formation, which is an interbedded dolomite, sandstone and shale. The Glenwood Formation may provide some hydraulic separation of the overlying Ordovician Formations from the underlying early Ordovician and Cambrian Sandstones.

Groundwater flow is generally from east to west, from Acme toward Pagel's Pit Landfill. Killbuck Creek west of the landfill probably acts as a local groundwater discharge area. Due to the thin veneer of glacial soils over bedrock on the Acme site, the water table is in the dolomite. Further to the west beneath the landfill, where the bedrock surface drops sharply, the

water table is found in the glacial outwash materials. Depth to groundwater in the area is dependent upon the topography. Groundwater generally ranges from a depth of approximately 20 feet west of Pagel's Pit Landfill to approximately 40 feet beneath the Acme site.

The private wells in the area (See Drawing C 12660-B4) typically draw water from either the sand and gravel aquifer or the Galena Dolomite. Detailed well construction information is not available.

Chronology of Regulatory Action

The Pagel's Pit Landfill, due to its proximity to Acme, which is currently on the NPL, has been peripheral to investigations at Acme. The previous investigations at Acme are as follows:

- "Extent of Sources of Groundwater Contamination - Acme Solvents, Pagel Pit area near Morrisville, Illinois", Ecology and Environment Inc. (E&E) March, 1983.
- "Acme Solvents Superfund Site, Winnebago County, Illinois, Remedial Investigation", E.C. Jordan Company, September, 1984.
- "Acme Solvents Superfund Site, Winnebago County, Illinois, Preliminary Feasibility Study", E.C. Jordan Company, February, 1985.
- "Data Analysis and Summary Report for Deep Groundwater Assessment, Acme Solvents Superfund Site", E.C. Jordan, January, 1986 (Draft).

Based upon the findings of the E&E and E.C. Jordan investigations, it is alleged by U.S. EPA the Pagel's Pit Landfill may be a source of groundwater contamination. In the fall of 1984, the United States Environmental Protection Agency (U.S. EPA) nominated the landfill for inclusion on the NPL. Confirmation of NPL listing was made by U.S. EPA March 17, 1986.

In response to the nomination of the Pagel's Pit Landfill for inclusion on the NPL, the owner/operator retained Warzyn Engineering Inc. to perform an investigation around the landfill. The results of that investigation are contained in the report "Supplemental Investigation Winnebago Reclamation Landfill, Rockford, Illinois", dated March 5, 1985. Additional studies of the Acme site have been negotiated between the Acme PRPs, U.S. EPA and IEPA.

As result of the numerous investigations performed in the vicinity, there are currently 41 functional monitoring wells in the vicinity of the Acme and Pagel's Pit Landfill. Water levels have been collected from the functional wells on a monthly basis since December 1984 through May, 1986. The existing wells will be used wherever possible during remedial investigation activities.

APPROACH OF INVESTIGATION

The work performed to date by the various investigators has provided considerable data, however, a clear delineation of sources of groundwater contamination from Pagel's Pit Landfill if any and the Acme site still needs to be determined. Additional data needs to be collected to:

- Complete characterization of hazardous constituent releases, including the source of the release and the maximum extent of any release;
- Further evaluate and characterize the pathways through which releases are occurring;
- Evaluate the significance of any documented or potential releases from the Pagel's Pit Landfill upon receptors and the environment;
- Provide additional information, as needed, to assess the feasibility and cost effectiveness of remedial action alternatives.

The RI will define the nature and extent of releases from Pagel's Pit Landfill. The determination of releases will be evaluated through the performance of additional subsurface borings, which will be instrumented as groundwater monitoring wells. The additional subsurface investigation work will concentrate on the margins of the landfill and areas downgradient from the facility (currently defined as west and northwest). The subsurface exploration and well installation program will have two phases. The need for, or scope of, the second phase will be dependent upon the results of the first phase.

The hazardous constituents in the Pagel's Pit Landfill, which may potentially be released through leachate seepage or volatile gas, will be evaluated through a leachate and ambient air sampling program. Samples will be collected from various points within the facility. In addition, the landfill operations will be summarized and evaluated. The liquids balance relationship within the landfill will be evaluated using the U.S. EPA Hydrologic Evaluation of Landfill Parameters (HELP) model. The leachate collection volumes will be compared to the anticipated infiltration rates (and hence, leachate production volumes).

Characterization of groundwater will occur through the sampling of 25 previously installed wells, 15 newly installed Phase 1 wells, three new Acme wells and one private well. Sampling of existing and Phase 1 wells will occur on an approximate quarterly basis for two quarters. After the collection/analysis of the first two rounds of samples, an interim water quality data evaluation will be performed. If analytical results indicate that additional wells are required, five additional downgradient groundwater monitoring wells, (or a

modification thereof) will be installed in the Phase 2 well installation program. If necessary, two additional rounds of groundwater sampling will be performed on a limited number of wells.

To characterize groundwater flow patterns around the Pagel's Pit Landfill, groundwater levels will be collected from all functional monitoring wells on a monthly basis. Field permeability tests will be performed on 15 of the monitoring wells after Phase 1 well installations.

To evaluate potential impacts of the landfill operations on adjacent Killbuck Creek, sediment and surface water samples will be collected and analyzed for EPA Hazardous Substance List (HSL) constituents. The creek will be sampled for surface water quality and sediment quality at five locations in the vicinity of the landfill.

An air monitoring program will be performed. The program will consist of one round of sampling at one upwind and three downwind locations during conditions approaching "worst case." Any subsequent sampling rounds will depend on how well the initial round approximates "worst case" conditions. A potential maximum of three sampling rounds is planned.

REMEDIAL INVESTIGATIONS/FEASIBILITY WORK PLAN

Previous studies of the Pagel's Pit Landfill, studies of the nearby Acme site, the June 10, 1986 final Statement of Work and discussions with U.S. EPA and IEPA, provide the basis for preparing the work scope for this RI/FS. This Work Plan is prepared in accordance with the requirements of the NCP.

The following sections describe the Work Plan RI/FS objectives and activities. Cost estimates and preliminary schedule assumptions are presented for each task. Attachments 1A and 1B are estimated project completion schedules by task, subtask, or activity, as appropriate, for the remedial investigation and feasibility studies, respectively. Discussion of the assumptions used to develop individual activity costs are included in the task or subtask description sections of this Work Plan. All chemical testing of samples will be performed using Hazelton Laboratories America of Madison, Wisconsin; Radian Corporation, Research Triangle Park, North Carolina, or Warzyn's laboratories in Madison, Wisconsin.

Remedial Investigation (RI)

The RI shall consist of five distinct tasks:

Task 1 - Initial Activities
Task 2 - Plan Development and Management
Task 3 - Site Investigation
Task 4 - Site Investigation Analysis
Task 5 - Laboratory and Bench Scale Studies

The tasks in the RI will encompass the evaluation of existing data, the collection of new data and the assessment of hazardous constituents released from Pagel's Pit Landfill. The data will be consolidated into a Remedial Investigation Report, Task 4 (Site Investigation Analysis) which will assess the distribution, concentration and extent of hazardous materials releases from the facility. An evaluation of the facility, including characterization of leachate and an evaluation of the liquids balance of the facility, will be contained in the RI report. If necessary, bench scale or laboratory studies will be performed to determine the applicability of remedial technologies to site conditions and problems.

TASK 1 - INITIAL INVESTIGATION ACTIVITIES

All activities in Task 1 are directed toward the evaluation of the quality of existing data and the documentation of existing conditions. Task 1 activities will be done prior to or concurrent with Work Plan development.

Subtask 1A - Quality Assurance/Quality Control (QA/QC) Review of Existing Data

The data contained in "Supplemental Investigation, Winnebago Reclamation Landfill, Rockford, Illinois (SI)" dated March, 1985, will be evaluated by Warzyn chemists and laboratory personnel to assess if the data is of sufficient quality for inclusion in the Remedial Investigation Report. The evaluation shall include at a minimum, review of the sampling, chain-of-custody, well construction (where appropriate), and analytical laboratory procedures. The evaluation of the QA/QC will be contained in a brief technical memorandum.

Subtask 1B - Site Visit

Site inspection of the Pagel's Pit Landfill will be made by representatives of the U.S. EPA, Warzyn Engineering Inc. and the PRPs, as appropriate. The site visit will allow all parties involved to become familiar with site topography, access routes and proximity of receptors to possible contamination.

Proposed monitoring well locations will be inspected for access and mutually agreed upon by U.S. EPA, Warzyn Engineering Inc., the PRPs, and the site operators. Existing monitoring wells, planned as part of the RI sampling program will also be inspected, as time allows. It is anticipated that the site visit will be conducted within two weeks of the initiation of the RI activities. The duration of the site visit will be one field day. Level D protection is assumed to be adequate for this visit.

Subtask 1C - Site Mapping

A topographic map covering the Pagel's Pit Landfill and the immediate adjacent area, including ACME Solvents, has been prepared by U.S. EPA. Pertinent site features including surface topography, surface water bodies, drainage patterns, tanks, buildings, utilities, paved areas, easements, right of way and other features are shown on the topographic map. The contour interval on the topographic map is two feet (or as otherwise provided for) and elevations are relative to mean sea level (MSL). The horizontal scale of the map is 1 inch = 100 feet. The topographic base map will eventually be used as the base map for locating by survey:

- Monitoring wells (Activity 3B.1);
- Leachate collection points (Activity 3A.2); and
- Sediment and surface water sampling locations (Subtasks 3.E and 3.F).

The topographic map will also be used as a base map when evaluating and designing remedial action alternatives.

Subtask 1D - Receptor and Pathway Identification

Based on acceptable available data, an evaluation of potential pathways and exposure to potential receptors will be performed. The identification of potential receptors will be based upon observations made during the site visit (Subtask 1B) and on available census, air photography and/or photogrammetry, local governmental records and other data sources. The analysis will consider present knowledge of groundwater flow direction, groundwater quality conditions, surface water flow patterns and water quality, and other available information. Physical, chemical and topographic data from

previous reports, particularly the Warzyn Supplemental Investigation (1985) will be used as the basis of the analysis. The analytical data used in the analysis will be of acceptable quality (Subtask 1A).

Potential exposures of receptors to releases of hazardous constituents from Pagel's Pit Landfill will be briefly evaluated with the regard to health, safety and welfare risks.

Based upon potential releases and the potential impact upon receptors, remedial technologies will be preliminarily identified. The identified remedial technologies will:

- have the potential to reduce or minimize release of contaminants to a particular pathway or,
- mitigate any potential impacts of migration of contaminants through a pathway.

The results of the potential receptor and pathway identification will be summarized in a Technical Memorandum (TM). It is anticipated that the memorandum will be issued concurrent with the TM from the data review process (Subtask 1A). The TM will be issued to the regulatory agencies within six weeks of the initiation of the RI activities. Five copies of the TM will be issued to the U.S. EPA and the PRPs. (The same number of copies will be issued in all subsequent TM's described in this Work Plan).

TASK 2 - PLANS AND MANAGEMENT

This task encompasses the preparation of all planning documents necessary for the performance of the RI. In addition, the tasks necessary for the performance

of the Feasibility Study are also outlined in the Work Plan (Subtask 2E). Activities in this task will be performed concurrent with those in Task 1.

Project schedules are enclosed as Attachments 1-A and 1-B for the remedial investigation and feasibility studies, respectively. The schedules illustrate sequencing and duration of each of the major work elements of this RI/FS project. Document submittals, agency review times, expected laboratory turnaround times, and other potential activities, are also identified. A key decision point in the project is identified on the schedules after the second round of groundwater monitoring/analysis, and the preparation of the Interim Groundwater Quality Evaluation (see related discussion).

Specific intervals of time are allotted for completion of various tasks and reports in the attached schdules. Because of potential changes to the work, modifications to the project schedule may be required periodically to reflect necessary changes.

U.S. EPA will provide review comments within one month of receipt of all planning documents, except for the Quality Assurance Project Plan (QAPP). The QAPP will take five weeks for agency review. Upon receipt of agency comments, all planning documents will be finalized within two weeks. No work will be performed on any of the subsequent tasks outlined in this Work Plan before the documents outlined in Task 2 are approved and submitted to the agencies in final form. Copies of documents submitted will be sent to Mr. Doug Crandall of IEPA.

For cost purposes, it is assumed five copies of each draft document will be provided for U.S. EPA and the PRP review. Five copies of the final documents in Task 2 will be provided to both U.S. EPA and the PRPs. Further, except for the Work Plan, it is assumed that only one plan revision will be made of each document after draft document submittal to both the PRPs and U.S. EPA. The Work Plan is scheduled for two revisions.

Subtask 2A - Sampling Plan

The Sampling Plan will be developed to cover the sampling and data gathering efforts described in this Work Plan. The Sampling Plan will:

1) Contain a statement of sampling objectives, specifications of equipment, analyses of interest, sample types, and sample locations and frequency; and a schedule.

2) Address types of investigations conducted (e.g., landfill characterization hydrogeologic, soils and sediments, air and surface water).

3) Indicate the status of existing monitoring wells and piezometers.

4) List the remedial technologies developed in Subtask 1D., and identify data that may be needed to evaluate these technologies in the feasibility study.

5) Describe Chain of Custody requirements in accordance with National Enforcement Investigation Center (NEIC) policies.

More specifically, the Sampling Plan will address in detail the following topics:

- Sample types and locations
- Sampling equipment and procedures
- Sampling QA/QC
- Sample handling and preservation
- Chain of custody procedures
- Sample documentation
- Sample shipping
- Analytical arrangements
- Sampling team organization responsibilities and training
- Scheduling
- Investigation types and methods
- Summary of construction of existing groundwater monitoring wells

The Sampling Plan will be developed in accordance with all applicable U.S. EPA guidance documents. The Sampling Plan will be submitted as an Appendix to the QAPP (Activity 2C.1).

Subtask 2B - Health and Safety Plan

A Site Health and Safety Plan will be prepared to protect the investigation team and nearby residents and operating personnel from potential hazards which may be present as a result of on-site investigation activities. The Plan will:

1) Address applicable regulatory requirements and detail personnel responsibilities, protective equipment, procedures and protocols, decontamination, training and medical surveillance;

2) Identify problems or hazards that may be encountered and their solutions.

3) Indicate procedures for protecting third parties, if necessary, such as residents, visitors, operating personnel and transient motorists; and

4) Take into consideration facility conditions and be consistent with:

   - Section 111(c)(6) of CERCLA
   - EPA Order 1440.1 - Respiratory Protection
   - EPA Order 1440.3 - Health and Safety Requirement for Employees Engaged in Field Activties
   - EPA Occupational Health and Safety Manual
   - EPA Interim Standard Operating Safety Procedures and other EPA guidance as developed by EPA.

The Health and Safety Plan will include an assessment to determine if there are portions of the site or specific investigation activities that present potentially hazardous exposure levels in the air or through dermal contact. All investigation activities will be designed to minimize hazards to the

investigating team. All activities performed will have worst case scenario assessments, with a determination of potential solutions to releases of hazardous materials which cause health and safety concerns.

In conducting the health and safety assessment, available information on the site will be examined and reviewed to identify potential hazards. Such information will be used in selecting and implementing procedures that provide nearby residents and investigators with adequate warnings and safeguards. The Safety Plan specifies the following:

- Protective clothing and respiratory equipment to be worn.
- Air monitoring to be performed on a continual basis.
- Action levels at which respiratory protection will be upgraded.
- Decontamination procedures.
- Warning procedures/system for nearby residents.

The Health and Safety Plan will be developed in accordance with all applicable U.S. EPA guidance documents and requirements. Applicable OSHA and NIOSH requirements will be followed.

Subtask 2C - Quality Assurance/Quality Control

Activity 2C.1 - Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP) will be developed to cover both on- and off-site investigation activities. The QAPP will present the organization, objectives, functional activities, and specific QA/QC activities associated with the project. The QAPP will be designed to achieve the specific data quality goals of the RI/FS.

The QAPP will be prepared using the following guideline documents:

- U.S. EPA, Dec. 20, 1985. Guidance for preparation for Federal Land Quality Assurance Project Plans for Region V.
- U.S. EPA, 1983. NEIC Policies and Procedures, National Enforcement Investigations Center, EPA-330/9-78-001-R, May 1978, Revised May 1986

The QAPP will address chain-of-custody, laboratory documentation and maintenance of evidence file procedures necessary so that reconstruction of project activities can be achieved at a later date.

Activity 2C.2 - Analytical Laboratory Approval

It is necessary for the laboratory (ies) used for analytical services to pass a performance audit prior to performing any task after Task 2, if the laboratory has not passed an audit within the last three months and if the laboratory is not currently an active CLP laboratory. If requested, the results of previous Performance Evaluation Samples (PES) shall be submitted to U.S. EPA for review. The maximum number of PES will be two concentration levels for each matrix for each method. The PES are to be analyzed by protocols and methods to be used during the RI. If determined necessary by U.S. EPA, analysis of additional PES samples may be required.

Hazleton Laboratories America Inc., Radian Corporation, and Warzyn's analytical laboratory will be used to perform laboratory analyses on site investigation samples. PES audit samples will only be analyzed for the parameters to be determined at respective performing laboratories.

Subtask 2D - Permitting Requirements Plan

A brief Permitting Requirements Plan will be prepared, outlining required permits, if any, and measures for obtaining clearances to neighboring properties.

It is currently not envisioned that permits will be necessary to perform any of the activities outlined in this Work Plan. However, if permits are required for some activities, the Permitting Requirements Plan will provide the following information:

- Identification of permits needed, governmental authority responsible for issuing such permits, and the review period.
- Methods to satisfy any permit requirements.

In the event that it is determined that no permits are required, a statement to that effect will be included in the Permitting Requirements Plan.

The PRPs or their duly designated representative will make a good faith effort to obtain access to properties not controlled by the PRPs, as needed to perform activities outlined in this Work Plan. The Permitting Requirements Plan will contain copies of all signed property access agreements. If such agreements are not obtained, the U.S. EPA will use its discretion to determine what, if any action, U.S. EPA will take to obtain or assist in procuring access to the properties. The Permitting Requirements Plan will state which properties U.S. EPA will assist in obtaining access requirements.

The cost estimate assumes that the PRPs will be responsible for identification and actual procurement of necessary permits.

Subtask 2E - Work Plan Preparation

This Work Plan provides detailed descriptions of tasks to be performed during the Pagel's Pit Landfill RI/FS. This Work Plan was prepared based upon a review of existing site and regional data, the Statement of Work attached to the Administrative Order by Consent, conversations with U.S. EPA, landfill operators and PRP representatives. When complete, the Work Plan will be augmented by the QAPP, Sampling Plan, Health and Safety Plan, and Permitting Requirements Plan (if this is needed).

U.S. EPA guidance documents for performance of Remedial Investigations and Feasibility Studies were considered when developing this Work Plan. In addition to the detailed technical descriptions of the tasks to be performed in the Pagel's Pit Landfill RI/FS, a time table (Attachments 1-A and 1-B) is also enclosed.

TASK 3 - FACILITY INVESTIGATION

The detection, evaluation and characterization of pathways of migration of potentially hazardous constituents being released from the Pagel's Pit Landfill will be evaluated by extensive investigations. The investigations will provide data for preparation of an Endangerment Assessment (Task 7) and will provide information needed to evaluate remedial alternatives in the Feasibility Study. Investigation activities will focus on defining any release of pollutants from the site and development of data to support the Endangerment Assessment, and the identification and screening of alternative actions. The presence of the adjacent Acme facility necessitates the investigation emphasize the source determination of any hazardous constituent releases to the environment.

Data collection efforts will be in accordance with the planning documents developed in Task 2. Sample collection, handling and analyses will be as outlined in the Sampling Plan (Subtask 2A) and in the QAPP (Activity 2C.1). Analytical testing associated with site investigations will be performed by laboratories which have successfully completed the lab approval process (Activity 2A.2). Analyses will be in accordance with the procedures outlined in the QAPP (Activity 2C.1).

The investigations to be performed will include evaluation of the operational procedures, liquids balance and leachate quality within Pagel's Pit Landfill. Operational records, including waste permits, construction documentation, leachate collection system construction and gas collection system construction will be reviewed and incorporated into an operational history. An extensive bi-monthly leachate sampling program will be performed. The U.S. EPA Hydrologic Evaluation of Landfill Performance (HELP) model will be used to evaluate potential infiltration into the landfill. The results of the HELP model will be compared to leachate withdrawal information.

Twenty additional groundwater monitoring well locations have been identified around the margins and downgradient from the Pagel's Pit Landfill. A phased approach for well installation will be used, such that 15 wells are currently scheduled to be installed in Phase I. An additional 5 wells, or a modification thereof, may be installed in Phase II, if the first two rounds of water quality monitoring indicate that the Pagel's Pit Landfill is or appears likely to be responsible for contaminant impacts west of Killbuck Creek. The water quality conditions at the western end of the Pagel's Pit Landfill and the western side of Killbuck Creek will be described in the Interim Groundwater Quality

Evaluation Report (see Activity 3B.5). Concurrence from U.S. EPA is required, regarding the recommendations of the interim report on the necessity for installation of Phase II wells. The monitoring wells will be used to supplement an existing network of 41 groundwater monitoring wells on and around the Acme and Pagel's Pit Landfill facilities, and wells currently being proposed by the Acme PRPs.

All newly installed groundwater monitoring wells will be surveyed with respect to elevation and horizontal location, and referenced to U.S.G.S. datum. Monthly groundwater level monitoring for the duration of the remedial investigation will occur. Infield permeability tests will be performed on selected groundwater monitoring wells after Phase I well installation.

The 15 Phase I groundwater monitoring wells, 3 proposed wells on the Acme Solvents site which will be installed by the Acme Solvent PRPs, one private well and 25 previously installed wells, will be sampled on two occasions. If Phase II wells are installed and/or additional monitoring appears necessary, two additional sets of groundwater samples will be collected. The last two sets of samples will be collected from 15 selected monitoring wells and one private well.

Surface water samples will be collected at five locations from Killbuck Creek on two occasions coinciding with groundwater sampling. Sediment samples will also be collected at those locations on one occasion. Based on a comparison of project surface water and sediment quality data to available EPA Ambient Water Quality Criteria, the necessity and scope of a biological investigation of the creek will be determined.

An evaluation of air quality problems associated with the site will occur at the boundaries of the facility. If VOCs are found at the property boundaries in concentrations of concern, an upgraded monitoring plan wll be prepared. Threshold Limit Values (TLV's) of the American Conference of Governmental Industrial Hygienists (ACGIH) and/or National Ambient Air Quality Standards (NAAQS) will be used as comparison standards.

Subtask 3A - Landfill Characterization

In order to evaluate the landfill as a potential source area of contaminant release, an evaluation of the Pagel's Pit Landfill will be performed. The initial step in evaluation of the landfill will be to compile information on construction, waste placement, and leachate collection systems. Leachate will be sampled on a bi-monthly basis for a period of 10 months, to obtain long-term characterization of materials which may have potentially been released from the facility. The U.S. EPA HELP model will be utilized to obtain an indication of surface water infiltration rates into the landfill. The infiltration rates will be compared to leachate withdrawal records.

Activity 3A.1 - Landfill Operations

A description of the operational history of the landfill will be prepared. Operator records, interviews with landfill personnel, and available engineering reports will be evaluated. The operational history will include:

- Methods of waste placement, compaction and covering.
- Characteristics of cover materials.
- Methods and materials used for liner construction and leachate collection system construction.
- Available information on the landfill gas extraction system.

- Available information on leachate levels and pumpage.
- A summary of any prior environmental studies performed on the facility; such as the methane migration study previously completed by Warzyn.
- Any additional information which may influence the release of contaminants from the site.

The operational history of the facility will be included as part of the Remedial Investigation Report (Task 4). This Activity will be completed by the Respondents.

Any design and plan sheets for the gas recovery system will be held in confidence by U.S. EPA in accordance with the provision of 40 CFR, Part 2. The content of the plans will not be made public, or given to any unauthorized parties within the authority of 40 CFR, Part 2.

Activity 3A.2 - Leachate Sampling

On a bi-monthly basis for approximately eight months (5 sampling rounds), six samples of leachate shall be collected from the site. The bi-monthly schedule may be adjusted to distribute sampling to better characterize seasonal variations in leachate quantity and quality. The scheduling will be such that three rounds of leachate samples will be collected before issuance of the Interim Groundwater Evaluation (Subtask 3B.5). No more than five sampling events will occur over the eight month period.

The leachate extraction system consists of 70 extraction wells, which are also used for gas collection, and two independent systems of perforated leachate collection pipes which drain into manholes. It is planned that the two extraction manholes be sampled during every sampling event. The remaining four samples

obtained during each event will be collected from individual risers that will be varied with each sampling round.

All leachate samples will be analyzed for the following parameters:

- Hazleton's method for Volatile Organics analysis by Gas Chromatography (GC) with 10% confirmation by Gas Chromatography/Mass Spectroscopy (GC/MS) using CLP protocols
- Total Phenolics
- Field pH
- Field specific conductance
- Total alkalinity
- Chlorides
- Arsenic (Total)
- Barium (Total)
- Cadmium (Total)

In addition, the first round of leachate samples collected will be analyzed for EPA HSL base/neutral and acid extractable organics, pesticides/PCBs and metals (Attachment 2) using CLP protocols. Total cyanide will be determined by Warzyn. During the first round, CLP protocol analyses for metals will be performed in substitution for analysis for arsenic, barium and cadmium. Parameters may be added to the above listing above for the four later sampling events based upon first round results. The addition of any parameters would be by mutual consent of U.S. EPA, Pagel's Pit Landfill PRPs and Warzyn.

Inspections of the landfill facility will be made by landfill site personnel to document any observed leachate seeps concurrent with monthly leachate and water level monitoring. Observations will be logged to include:

- Date
- Time
- Location
- Approximate flow rate
- Description of released materials

The leachate sampling will be coordinated with the monthly water level collection (Activity 3B.3) or groundwater quality sampling (Activity 3B.4). All travel, per diem and protective equipment costs will be covered under those tasks. For cost estimation purposes, it has been assumed:

- Two persons will be required for one day to collect samples for each sampling event.
- Level C protection will be adequate.
- That additional HSL parameters will not be required for the second through fifth sampling events.
- Assistance from a representative of the landfill operators will be required for all sampling efforts.
- Each of the five scheduled sampling rounds will include 6 leachate sample analyses, one field duplicate, one field blank and a matrix spike/matrix spike duplicate.

Activity 3A.3 - Water Balance Evaluation

An evaluation of liquid infiltration into the Pagel's Pit Landfill from precipitation, the amount of leachate pumped from the site, and leachate head levels within the site, will be made. The infiltration into the facility will be estimated using the U.S. EPA HELP model. The HELP model will be run using local meteorological information and professional judgement on site slopes and soil types. Site operators will be collecting monthly leachate level readings from the leachate collection manholes and from gas collection wells (the data will be forwarded to Warzyn for review/evaluation). The calculated infiltration rate will be compared to leachate withdrawal rates and leachate head levels. It is understood that the U.S. EPA HELP model is, at best, an approximation of precipitation infiltration into the landfill, and that leachate extraction and HELP model infiltration rates may not necessarily correlate.

For cost estimation purposes, it is assumed that:

1. The leachate levels supplied by the site operator will be in a reduced, tabular format, and expressed relative to U.S.G.S datum.

2. The model will reflect existing conditions, only (pre-landfill and post-closure models will not be run).

3. The post-closure HELP model will be run, if necessary.

The liquids balance evaluation will be prepared as part of the Remedial Investigation Report (Task 4).

Subtask 3B - Hydrogeologic Investigations

A hydrogeologic investigation will be conducted to evaluate the potential vertical and horizontal extent of releases of contaminants into the groundwater system from the Pagel's Pit Landfill, to identify the source or sources of groundwater contamination, to evaluate the suitability of the facility for on-site waste containment, and to identify aquifer characteristics. An accompanying sampling program to determine the horizontal and verical distribution of contaminants and to predict the long term distribution of contaminants will be conducted. The potential for groundwater contamination beneath or into Killbuck Creek will be evaluated.

The hydrogeologic investigation will also focus on isolating the affects attributable (if any) to the Pagel's Pit Landfill versus those attributable to the Acme facility. The hydrogeologic investigation will have the following elements:

- Installation of 15 new groundwater monitoring wells.
- Collection of two rounds of samples from the 15 new monitoring wells, 28 groundwater monitoring wells installed previously, and one private well.

- If results of the sampling/analysis of the first two rounds of water quality monitoring warrant installation of additional wells, five additional groundwater monitoring wells or a modification thereof will be installed.

- If the results of the first two rounds of monitoring warrant it, 15 additional groundwater monitoring samples and one private well sample will be collected (or a modification thereof) on two subsequent occasions,

- All groundwater monitoring wells will be surveyed to obtain horizontal location and vertical elevation.

- Groundwater levels will be monitored from all functioning groundwater monitoring wells on and around the facility for the duration of the RI on a monthly basis.

- Field permeability tests will be performed on 15 selected monitoring wells after Phase 1 well installation.

Activity 3B.1 - Groundwater Monitoring System

The proposed monitoring well installation program at the site will be in two phases (1 and 2). In Phase I, monitoring wells will be placed at the southeastern and western margins of the Pagel's Pit Landfill site. In addition, some wells will also be installed west of Killbuck Creek to monitor groundwater downgradient from the site. The Phase I wells will be monitored for two rounds (see Groundwater Quality Monitoring), along with other wells already installed around the site. The purpose of the Phase I wells is to:

a. Determine water quality conditions at the margins of the Pagel Landfill site with respect to release of hazardous constituents from the site.

b. Determine the source for contamination that may be flowing downgradient of the facility under Killbuck Creek;

c. Further evaluate groundwater flow patterns around the site to more effectively place Phase II wells, if installed.

d. Determine the need for installing additional wells west of Killbuck Creek by the Respondents, based on the types of contaminants detected in the first two rounds of sampling.

e. Determine the need for additional quarterly monitoring and leachate monitoring, based on the results of the first two rounds of sampling.

An Interim Groundwater Evaluation will be prepared and submitted to the agencies (as described below), which will address the items above, prior to Phase II well installations. This report is considered a key decision point in the project.

Drilling operations will be observed by a qualified geologist or geotechnical engineer. The professional observing the rig will also operate air monitoring equipment. Air monitoring equipment to be used will include a photoionization meter for detection of volatile organics, an explosimeter and a hydrogen cyanide/hydrogen sulfide detection meter. The air monitoring is primarily for personnel protection, however, monitoring results may be useful in placement of piezometer screens, if significant levels of volatile organics are detected in soil or rock samples. All cuttings will be wasted on site. Waste water will be screened with a photoionization meter and drummed if readings are above backround.

All personnel on drilling rigs will wear at a minimum:

- Tyvek protective coveralls,
- Neoprene gloves with surgical gloves under them,
- Steel toed-steel shank neoprene boots with outer disposal latex boots,
- Hard hats.

If air monitoring indicates respiratory protection is necessary, air purifying respirators and/or self-contained breathing equipment may be necessary. The determination on upgrading of safety will be based upon the action levels specified in the site Health and Safety Plan (see Subtask 2B).

At each location where a single well or nest of wells will be installed, the deep boring performed shall be sampled to its terminus. The unconsolidated materials shall be sampled at five foot intervals using a 2-inch outside diameter split barrel sampler. Bedrock will be sampled by HW size rock coring barrel. All soil and rock samples shall be logged in the field by a geologist who will observe drilling operations. All soil and rock samples shall be retained by Warzyn.

Representative soil and rock samples shall be provided to U.S. EPA representatives at their request, in the field. These samples shall first be screened with OVA or HNu to determine the potential for contamination by organic vapors. All samples will be retained by Warzyn for a period of one year. U.S. EPA may review the samples at Warzyn's facility.

All monitoring wells shall be constructed with two-inch inside diameter, stainless steel screens and riser pipe to a level above the anticipated groundwater elevation. Galvanized steel riser pipe will be used above the seasonal high groundwater elevation to ground surface. The well construction will minimize contact of groundwater with galvanized metal. The well screens shall be five feet nominal in length for piezometers and ten feet (nominal) in length for water table wells. The annular space between the well materials and the edge of the bore hole shall be backfilled with 2 feet of bentonite pellets over the sand, followed by bentonite or bentonite cement slurry. All wells shall have locking protective casing installed at the surface.

Threaded, flush joint schedule 40 PVC may be substituted for all well pipe and screen construction materials with concurrence from U.S. EPA. All other installation procedures would be as described above.

To minimize possible cross contamination of the wells, decontamination procedures shall be used. The decontamination procedures will include cleaning of drilling rigs and drilling tools by steam cleaning prior to the start of drilling at each location. The procedures to be followed include the brushing of equipment with TSP solution and steam cleaning, as necessary, prior to drilling and between boreholes. Well construction materials will also be rinsed with clean water after decontamination.

Activity 3B.1a - Phase 1 Well Installations

Phase 1 wells include the installation of new wells B15P, G112, G113, G113A, G114, G115, G116, G116A, G117, G118, G118A, G119 and G119A. Replacement wells P3R and P4R shall (two well nest) be installed to replace abandoned wells P3, P4 and P5. Any other non-functional wells deemed necessary to the project will also be replaced, that were previously installed by Pagel's Pit Landfill representatives.

Attached Drawing C 12660-B4 shows approximate Phase I well locations. A brief discussion on each well location is provided below:

Phase I

P3R - Replacement for abandoned water table well P-3.

P4R - Replacement for abandoned piezometer well P-4.

B15P - Screened 30 feet below the water table to provide data on water quality at depth adjacent Well B-15.

G112 - A water table well (estimated to be 50 feet deep) between the landfill and two impacted water supply wells (G and H). The well may provide an indication if the landfill is impacting the water quality at the water supply wells.

G113, G113A - Nested wells (estimated to be 50 feet and 80 feet deep, respectively) adjacent to a water supply well (I), which appeared to be impacted, but is not currently functional. Determination of flow direction and groundwater quality may provide an indication of the source of contamination at the water supply well.

G114 - A water table well (estimated to be 45 feet deep) adjacent to the landfill in an area of contaminated groundwater. The well may provide an indication as to whether mounding is occurring under the landfill, and the origin of contaminated groundwater in the area.

G115 - A water table well (estimated to be 40 feet deep) located along the southwest perimeter of the landfill, to monitor for any releases from that portion of the landfill, and to provide data on the relationship between groundwater flow and Killbuck Creek.

G116, G116-A - Nested wells (estimated to be 30 feet and 60 feet deep, respectively) to be placed west of Killbuck Creek to evaluate potential migration of contaminants beneath the creek, and to help define the hydraulic relationship between Killbuck Creek and groundwater flow.

G117 - A water table well (estimated to be 30 feet deep) adjacent to the landfill. This well may provide an indication of landfill releases and data on the hydraulic relationship between groundwater flow and Killbuck Creek.

G118, G118-A - A nest of wells (estimated to be 30 feet and 60 feet deep) in an area which appears to be downgradient of monitoring wells B15 and B15R. These wells will help evaluate the extent of any releases from the landfill.

G119, G119A - A water table well (30 feet deep) and a piezometer (estimated to be 60 feet deep) to investigate the hydraulic relationship between groundwater flow toward Killbuck Creek, and to assist in the evaluation as to whether there are releases from the landfill.

Activity 3B.1b - Phase 2 Well Installation

New Wells G120, G121, G121A, G122 and G122A are identified as Phase 2 wells (see Drawing C 12660-B4). These wells, or a modification thereof, will be installed by the Respondents, if the first two rounds of water quality monitoring indicate that the Pagel's Pit Landfill is or appears likely to be responsible for contaminant impacts west of Killbuck Creek. The water quality

conditions at the western end of the Pagel's Pit Landfill and the western side of Killbuck Creek will be described in the Interim Groundwater Quality Evaluation Report.

Phase II

G120 - This well is estimated to be 30 feet deep and has a similar purpose to those stated for G119.

G-121, G121A - Nested wells (estimated to be 30 feet to 60 feet deep, respectively) placed west of Killbuck Creek, to evaluate potential migration of contaminants beneath the creek, and determine hydraulic relationship between groundwter flow and Killbuck Creek.

G122, G122-A - These wells with estimated depths of 40 and 70 feet have the same purpose as G116 and G116-A.

For cost estimation purposes, it is assumed:

- The site operators will stake and provide access to all proposed boring locations, and will provide clean drilling water.
- 700 linear feet of drilling and well installation will be required for Phase 1 drilling (of which 165 feet will be rock drilling).
- 230 linear feet of drilling and well installation will be required for Phase 2 drilling.
- A geologist will be required for 24 days to supervise Phase 1 drilling.
- A geologist will be required for 10 days to supervise Phase 2 drilling.
- All drilling will occur in Level D protection.
- A special decontamination facility is not necessary to construct.
- Poor access, poor weather conditions, difficult drilling or other unanticipated conditions may increase time and cost to complete.
- No drumming of wastewater will be required.

Activity 3B.2 - Surveying

All newly installed groundwater monitoring wells will be surveyed to establish their horizontal location and vertical elevation, and referenced to U.S.G.S. datum. All groundwater monitoring wells will be located on the topographic

map prepared for the facility (see Subtask 1C). The monitoring wells, surface water sampling locations and sediment sampling locations will be located using transit and stadia, and level circuit methods.

A permanent measuring point will be established on the top of each monitoring well casing, either painted or otherwise permanently marked. Water level measurements in each well will be taken from the permanment measuring point. The vertical accuracy of the surveying will be ±0.01 feet for top of casing elevations and ±0.10 feet for ground surface elevations. The horizontal accuracy of all surveying will be ±1.0 foot. For cost estimation purposes it is assumed that:

- One trip to the site will be sufficient to locate all groundwater monitoring wells, surface water and sediment sampling points after Phase I drilling.
- Level D level of safety protection will be adequate.
- Previous established site benchmarks are still available.

Activity 3B.3 - Groundwater Flow Characterization

Current available data indicates that the groundwater flow pattern in the vicinity of Pagel's Pit Landfill is variable, depending upon the recharge conditions of the intermittent waterways around the facility. In order to establish the range of variability and flow, monthly levels will be collected for eight months (eight events) from all functional groundwater monitoring wells. The duration of monthly monitoring will start and end with quarterly monitoring at the site.

Field permeability testing will be performed on 15 monitoring wells after Phase 1 well installation. The permeability testing will be performed using a baildown test method. Purge water will be drummed if screening with photoionizatin meter shows above backround readings. The recovery of groundwater levels will be recorded using a pressure transducer and remote data recording system. Preliminary selection of monitoring wells which will be subjected to permeability testing include: B-11, B-11A, B-15, B-15P, B-16, B-16A, G-109, G-109A, G-111, G-115, G-116, G-116A, G-117, G-119, and G-119A. The selected monitoring wells will provide permeability information on bedrock, and sand and gravel and clay till soils. Unexpected geologic conditions encountered during drilling may alter the selection of monitoring wells subjected to permeability testing. Final selection of wells will be based on observations during drilling and results of the first set of groundwater quality data (if available).

The permeability testing will be performed concurrent with the second set of groundwater sample collection, after review of the first round groundwater quality results (if available).

The costs for this task were developed assuming:

- The permeability testing could be performed in three days by two person.
- Level D safety protection will be adequate.
- The work will be done concurrent with Round 2 water quality monitoring.
- No drumming of purge water will be required.

Activity 3B.4 - Groundwater Quality Monitoring

Up to four rounds of water quality monitoring are proposed. An evaluation of the data will be made after the first two rounds of sampling/analysis to determine the need for the final two rounds of monitoring, and the need for additional wells to be installed and monitored west of Killbuck Creek (see related discussion under Activity 3B.5 - Interim Groundwater Quality Evaluation). All groundwater monitoring samples will be collected using stainless steel bailers with attached stainless steel cables. Purge water will be drummed if screening with photoionization meter shows above backround readings. Groundwater levels will be obtained prior to the collection of groundwater samples. All samples will be preserved in the field and kept on ice as required. All samples will be shipped on a daily basis to the laboratory.

Activity 3B.4a - Rounds 1 and 2

In Rounds 1 and 2, new Phase 1 wells plus existing wells B-4, B-6S, B-6D, B-7, B-9, B-10, B-11, B-11A, B-12, B-14, B-13, B-15, B-16, B-16A, G-107, G-108, G-109, G-109A, G-110 and G-111, P-1, P-6, P-7, MW-105, MW-106, replacement wells P-3R and P-4R and three newly installed wells between the two sites as part of an Acme Solvents site investigation, will be sampled (see Drawing C 12660-B4). In addition, one private well at the farm southwest of Pagel's Pit Landfill will be sampled, for a total of 44 wells. The wells will be sampled approximately 6 weeks apart.

Seventeen wells will be sampled/analyzed in Round 1 for the HSL extractables and inorganics parameters listed in Attachment 2, including:

1. Monitoring Wells B-15R and B-15P, G-109 and G-109A, G-115, G-116 and G-116A, G-117, G-118 and G-118A, MW-106 and P-1, and the two replacement wells, P-3R and P-4R.

2. One three-well nest between the two sites (total of three samples), to be installed during Acme Solvent's site investigation.

These wells will also be analyzed for pH, specific inductance, total phenols, total alkalinity and chloride. These wells are closest in proximity to the Pagel's Pit Landfill site margins, or are downgradient from the facility. The wells are expected to provide information as to whether hazardous constituents are originating from the Pagel's Pit Landfill, and further, whether additional EPA HSL screening should be extended to other wells in subsequent rounds of monitoring. Upgradient wells between Acme and Pagel's Pit Landfill are also included in Round 1 monitoring.

The remaining 27 wells to be sampled in Round 1 will be analyzed for the following:

- Hazleton's method for Volatile Organics analysis by Gas Chromatography (GC); 10% confirmation by Gas Chromatography Mass spectroscopy (GC/MS).
- Total Phenolics
- Field pH
- Field specific conductance
- Total alkalinity
- Chlorides
- Arsenic (Dissolved)
- Barium (Dissolved)
- Cadmium (Dissolved)

The second round sampling locations will be identical to the first. Parameters may be varied after mutual agreement by Pagel's Pit Landfill PRPs, U.S. EPA and Warzyn.

Activity 3B.4b - Rounds 3 and 4

Fifteen monitoring wells (including all Phase 2 wells) and one private well will be sampled in Rounds 3 and 4, except as modified by the Interim Groundwater Quality Evaluation. Parameters will be the same as for Round 2 analyses.

Costs were estimated for each quarter as a distinct activity. It is assumed:

- All four rounds will be required.
- Level D protection will be adequate.
- Groundwater levels will be collected from all groundwater monitoring wells, even those not sampled, to provide data to be used in lieu of a separate trip to collect data for Activity 3B.3.
- Five people will be required for four days for collection of each of Round 1 and 2 samples.
- One team of three people will be required for two days for collection of each of Round 3 and 4 samples.
- Round 3 and 4 sampling will consist of only 15 groundwater monitoring wells, and one private well.
- WEI will perform indicator parameters and metals analyses; subcontracted CLP lab will perform volatile analyses.
- No drumming of purge water will be required.

The table on the following page describes the quality control analyses which will be performed during Rounds 1 through 4 of sampling. The quality control analyses breakdown does not take into consideration any changes to the groundwater monitoring program for Rounds 2 through 4 effected by the U.S. EPA after Round 1 results are reviewed.

Activity 3B.5 - Interim Groundwater Quality Evaluation

At the end of Rounds 1 and 2 monitoring, an interim water quality report will be submitted to the agencies for review and comment. The report will present water quality data and supporting information to evaluate:

1. The likely sources of contaminants in groundwater at the western margins of the Pagel's Pit Landfill;
2. The likely sources of contaminants in groundwater west of Killbuck Creek, if any;
3. The likely sources of contaminants to Killbuck Creek, if any;

SUMMARY OF QUALITY CONTROL SAMPLES COLLECTED FOR GROUNDWATER

Quality Control Tests	ROUND 1				ROUND 2			ROUND 3		ROUND 4	
	A*			B*							
	HSL BNAs Pest/PCBs & Inorgs.	VOCs Only GC	VOCs Only GC/MS	Indicators Only	VOCs GC	VOCs GC/MS	Indicators	VOCs GC	Indicators	VOCs GC	Indicators
Field Duplicates	2	5	0	3	5	0	5	2	2	2	2
Matrix Spike/Matrix Spike Duplicate Samples	2	6	0	0	6	0	0	2	0	2	0
Field and/or Trip Blanks	1	2	0	2	3	0	0	1	0	1	0
Total Number of Investigative Samples	17	45	5	28	45	5	45	16	16	16	16
Total Number Analyses	22	58	5	33	59	5	50	21	18	21	18

*A HSL - refer to Attachment 2

[ndj-31-1] *B Indicator parameters include phenol, alkalinity, chloride, arsenic, barium and calcium

4. The necessity for installation of Phase 2 monitoring wells west of Killbuck Creek by the Respondents;

5. The necessity for and details of sampling and analysis in Rounds 3 and 4 by Respondents.

Agreement will be made between U.S. EPA and the Respondents on the items listed above, with any subsequent modifications to the Work Plan made as a result of the agreements.

If it is determined Pagel's Pit Landfill is responsible for contamination west of Killbuck Creek, or if the extent (areal and/or vertical) of contamination originating from Pagel's Pit Landfill has not been determined, then the Phase 2 Well installations (or a modification thereof) and sampling/analysis in Rounds 3 and 4 will be implemented.

If Pagel's Pit Landfill is not found to be responsible for impacts west of the Creek, then the Phase 2 wells will not be installed by the Respondents, and rounds 3 and 4 of groundwater quality monitoring and leachate monitoring will not be performed by Respondents. At that point, the Facility Investigation Analysis Report, Endangerment Assessment and Feasibility Study will be initiated by Respondents, and any necessary modifications to the Work Plan prepared.

In the event that Pagel's Pit Landfill and Acme Solvents are both required to further investigate the areal and vertical extent of contamination originating from their respective facilities, an attempt will be made to coordinate the investigations.

The sampling program assumes that the wells referenced as part of the Acme Solvents investigation will be installed, and further, they will be accessible for sampling. Changes in the Acme Solvents well installation program or inability to gain access wells to under Acme Solvents control will necessitate changes in the program.

Five copies of the interim groundwater quality report will be submitted to U.S. EPA and the PRPs as a draft document for review and comment. The recommendations made on likely sources of contaminants and additional monitoring and/or well installation will serve as an addendum to this Work Plan, with the defined changes in scope of work having been agreed upon by the Pagel's Pit Landfill PRPs and U.S. EPA. Five copies of the final report will be issued to U.S. EPA and to PRPs.

Subtask 3C - Sediment Sample Collection

Five sediment samples (SS-1 through SS-5) will be collected from Killbuck Creek from the eastern half of the stream profile (see Drawing C 12660-B4). Four of the sample locations will be located downgradient from Pagel's Pit Landfill. One sample will be collected upstream of the landfill.

Appropriate locations will be determined during the site inspection (Subtask 1B).

The samples will be taken at representative points on the eastern half of the stream profile. Samples will be collected using a stainless steel hand coring device.

The stream sediment samples will be analyzed for the EPA HSL organics and inorganics (see Attachment 2) by CLP protocols. The sediment samples will be collected concurrent with Phase I drilling operations.

In estimating costs for this activity, it was assumed:

- Two people would be required for one day to collect the samples.
- Level D safety protection would be adequate.
- One field duplicate sample will be collected and analyzed for quality control.

Subtask 3D - Surface Water Investigation

Five surface water samples (SW-1 through SW-5) will be collected from Killbuck Creek on two occasions. The surface water samples will be collected from the same locations where sediment samples were collected (see Subtask 3C and Drawing C 12660-B4). The surface water samples will be collected concurrent with the collection of Round 1 and 3 groundwater samples (see Activity 3B.4).

Surface water samples will be collected from the lower portion of the stream channel using a Kemmemer sampler or by taking grab samples. The stream will be sampled in such a way as to minimize disturbance of sediments which could affect surface water results. Surface water sampling will proceed from the furthest downstream location to the furthest upstream location, to further limit the impacts of any sediment which may be stirred up while sampling. Surface water samples will not be filtered before analysis.

The surface water samples will be analyzed for the following:

- Hazleton's method for Volatile Organics analysis by Gas Chromatography (GC); 10% confirmation by Gas Chromatography/ Mass Spectroscopy (GC/MS).
- Total Phenolics
- Field pH

- Field specific conductance
- Total alkalinity
- Chlorides
- Arsenic (Total)
- Barium (Total)
- Cadmium (Total)

If the analyses for HSL compounds on sediment (see Subtask 3C) during Round 1 indicate significant amounts of potentially hazardous compounds are present, additional analyses may be required for surface water samples collected during Round 3. The additional parameters for analyses would be by mutual agreement between U.S. EPA, Warzyn and the Pagel's Pit Landfill PRPs.

In developing the costs for this activity, it is assumed:

- All travel expenses are included in the costs for Round 1 and Round 3 (see Activity 3B.4) groundwater sampling.
- Level D health and safety equipment is adequate.
- Two people will be required for 1/2 day to collect each set of samples.
- One field duplicate, one field blank and two matrix spike samples will be collected and analyzed each round for quality control.
- Additional parameters are assumed not to be necessary after review of HSL analyses of sediment samples.

Subtask 3E - Air Monitoring

Ambient air monitoring will be conducted at the property boundaries of the landfill site to determine concentrations of volatile organic compounds in the air. The results will be used to evaluate the potential for health impacts to downwind receptors.

If the evaluation indicates downward receptors are potentially impacted by migrating toxic gases, a plan to routinely monitor gases at site boundaries

will be prepared. The plan will include at least one upwind and three downwind sampling stations. The air monitoring data will be evaluated in the Endangerment Assessment.

The evaluation of the need for a long-term air monitoring program will be made as part of the interim groundwater quality evaluation (see Activity 3B.5). Costs were developed for this activity assuming:

- The property boundary monitoring program will consist of the collection of four samples on Tenax/Tenax-charcoal sorbing media over a 12-hour period on one occasion. It is assumed that these samples will be collected during August or September when a higher probability for "worst case" conditions exists.
- The collection of the landfill margin air samples will require one individual for thirty hours. Level D safety protection will be adequate.
- The development or implementation of a long-term air monitoring plan is not included in the costs.
- Three field duplicates, one field blank and one laboratory blank will be analyzed for quality control.

Subtask 3F - Biological Investigation

A sampling of the biota and animal life in Killbuck Creek is not currently included as part of the RI. The Biological Investigation will only be made if significant contamination is identified in sediment or surface water samples.

The need for this investigation shall be determined by U.S. EPA after consultation with the PRPs and Warzyn. An evaluation of the need for a Biological Investigation will be made as part of the Interim Groundwater Investigation (Activity 3B.5). No costs have been budgeted at this time.

Subtask 3G - QA/QC Data Review

Hazleton and Radian will provide Warzyn with all deliverables in accordance with the specifications in methods descriptions or those of the CLP for HSL analyses performed, including volatile organic analyses, base neutral and acid extractables, pesticides/PCBs and metals. These data will be validated by Warzyn using applicable U.S. EPA guidance documents. These documents include:

- Laboratory Data Validation, Functional Guidelines for Evaluating Organics Analyses, Technical Directive Document No. HQ-8410-01, May, 1985.
- Laboratory Data Validation, Functional Guidelines for Evaluating Inorganics Analyses, November, 1985.

Warzyn will also review data from non-CLP RAS analyses using quality control specified in methods descriptions. These will be provided in the QAPP.

All analytical data generated by Hazleton's, Radian's and Warzyn's laboratories will be reviewed by a project chemist for accuracy and completeness based on performance criteria detailed in the QAPP. The RI report will contain a section summarizing the review.

TASK 4 - FACILITY INVESTIGATION ANALYSIS

A Remedial Investigation (RI) Report will be prepared to summarize and evaluate the data collected during the site investigation (Task 3) and as part of the initial investigation activities (Task 1). The primary emphasis of the RI Report will be to delineate sources and extent of released hazardous constituents and to separate the impacts from the Pagel's Pit Landfill and Acme Solvents Facility. The report will address site conditions based upon environmental media investigated. It is anticipated the identifiable environmental media will be:

- Leachate
- Subsoils
- Surface Water
- Sediment
- Groundwater
- Air

The environmental medium concept will be used to identify the pathways of release of materials from Pagel's Pit Landfill (if any), and a summary will be developed regarding the type and extent of contamination at or from the facility.

The nature and extent of the releases in each environmental medium will be determined and discussed in the report. The character of the releases with respect to known or potential threats to the public health, welfare or the environment will be identified. An assessment as to the significance of any observed or potential releases will be made. The evaluation will include a description of nearby populations which may be impacted by releases from the site.

As part of the RI Report, a review of QA/QC procedures followed for the sampling, analysis and data handling aspects of the RI as required by the approved QAPP (Activity 2C.1) will be prepared. An evaluation will be made on the extent to which the QAPP was adhered to by the EPA oversite contractor(s). Any limitations on data usage bsaed on deviations from the QAPP, or from available analytical QA/QC information will be identified.

The RI Report will consider all applicable U.S. EPA guidance documents. The report will be issued as a draft within two weeks of receipt of the last quarter of groundwater monitoring data (Subtask 3.B.4). The Work Plan assumes U.S. EPA review comments will be available within one month of receipt of the draft report. The final report will be issued within one month of receipt of agency comments of the draft report.

The probable cost for this task was developed based upon the following assumptions:

- Copies of the raw lab analysis data will not be included with the report, only data summaries.
- Five copies of the draft report will be issued to U.S. EPA and PRPs. The report is assumed to be 150 pages long with five full size drawings.
- Five copies of the final report will be submitted to U.S. EPA and PRPs. The report is expected to of similar size and composition to the draft report.
- One meeting between representatives of Warzyn, U.S. EPA and the PRPs will be held at U.S. EPA Region V headquarters in Chicago to discuss review comments.

TASK 5 - LABORATORY AND BENCH SCALE STUDIES

If determined necessary by U.S. EPA, after consultation with Warzyn and the PRPs, a laboratory and/or bench scale study will be conducted. The laboratory and/or bench scale studies will be directed toward addressing specific site conditions, and will include the following:

- A laboratory and/or bench scale study to determine the applicability of remedial technologies to site conditions and problems determined to be of concern based upon the criteria set forth in the NCP.
- Analysis of the technologies, based on NCP criteria, vendor contacts and past experienced to determine what, if any, testing should be undertaken. The scope of any such testing will be limited to technologies and/or processes which will be effective in mitigating conditions that are a known or potentially significant threat to public health, welfare and the environment, and are attributable to releases from the Pagel's Pit Landfill.
- If testing is determined to be necessary, a testing plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed, and data management and interpretation guidelines will be developed for submission to U.S. EPA for review and approval, as appropriate.
- Upon completion of the testing, evaluation of the testing results to assess the technologies with respect to site specific questions identified in the testing plan, will occur. The scale of those technologies selected is based upon testing results.
- Preparation of a report summarizing the testing program and its results, both positive and negative.

The approach, implementation and evaluation of the test results, will be directed toward evaluation of remedial action alternatives in a manner consistent with the NCP and SARA requirements. The selection of remedial technologies and remedial action alternatives to be evaluated will be based upon observed site conditions and the endangerment assessment (Task 7), the preliminary remedial technology screening (Task 8), and the development of alternatives (Task 9).

No proposed schedules or costs have been prepared for this task, as the level of effort needed will be dependent upon the technologies selected for evaluation and the extent of the testing program.

FEASIBILITY STUDY (FS)

The purpose of a FS at the Pagel's Pit Landfill will be to:

- Perform an endangerment assessment (EA) to evaluate the effects of any known or potential releases from Winnebago Reclamation Landfill on public health, welfare and the environment.
- Development and screening of technologies for general response actions which will eliminate or mitigate the known or potential exposures determined in the EA.
- Define and develop remedial action alternatives.
- Perform initial screening of remedial action alternatives.
- Perform detailed analysis of remedial action alternatives.
- Select the most cost-effective remedial alternative(s) that will mitigate or minimize damage to and provide adequate protection of, the public health, welfare and/or the environment.
- Prepare a draft and final FS Report.
- Prepare a pre-design report.

The feasibility study consists of seven tasks plus the Community Relations Support:

Task 6 - Work Plan Development
Task 7 - Endangerment Assessment
Task 8 - Screening of Preliminary Remedial Technologies
Task 9 - Development of Alternatives
Task 10 - Initial Screening of Alternatives
Task 11 - Evaluation of the Alternatives
Task 12 - Final Report

TASK 6 - WORK PLAN DEVELOPMENT

The Work Plan will be updated at the completion of the Remedial Investigation Report (Task 4), to reflect the number, complexity and types of remedial actions to be initially screened and any consequent changes in budget,

scheduling and/or personnel. Any adjustments to the Work Plan will be by mutual consent of U.S. EPA and the PRPs. A draft of the revised Work Plan and scope of work will be prepared for submittal concurrent with the RI Report. It is expected any Work Plan revisions will be discussed at the meeting conducted at U.S. EPA offices to discuss the draft RI Report (Task 4).

TASK 7 - ENDANGERMENT ASSESSMENT

Based upon the data contained in the RI Report (Task 4), and other available relevant data, an Endangerment Assessment (EA) shall be performed. The EA will assess the potential dangers to the public health, welfare and the environment. The EA will be based on the assumption that no remedial actions will or are being taken at the site. Further, if temporary remedial actions are being taken (e.g., leachate and gas withdrawal), the EA asssumes they will not continue over the long term.

Existing standards shall be reviewed to evaluate potential exposures. Where no current standards exist, site specific criteria shall be developed based upon current research on health concerns and acceptable daily intake of compounds of concern or other applicable criteria. Based upon the existing or formulated standards, endangerment to exposed population shall be determined. The EA will include:

- Identification of contaminant sources and exposure pathways.
- A discussion of monitored or estimated present and future concentrations of the compounds of concern.
- Identification of potential receptors.
- Integrated exposure analysis.
- Assessment of endangerment due to exposure to compounds of concern.

Five copies of each EA submittal will be made to U.S. EPA and the PRP's. The EA will be formulated such that the operable units discussed in the remedial investigation are evaluated as separate migration routes. The separation of exposure pathways will help clarify remedial alternatives to be considered in the remainder of the FS (Task 9), to reduce or eliminate potential exposures.

The following items shall be included as part of the Endangerment Assessment:

Item 1. Outline of the Endangerment Assessment;

Item 2. Identify the constituents detected at the Pagel's Pit Landfill, their concentration and estimated total mass, and target the more important constituents for consideration in the Endangerment Assessment;

Item 3. Review the toxicity of and identify any available standards or criteria for the targeted constituents;

Item 4. Discuss the fate and transport of the targeted constituents;

Item 5. Identify the exposure pathways and the populations at risk; and an estimate of exposure concentrations to the populations at risk;

Item 6. Characterize the risks to the various populations; and

Item 7. Prepare a Final Endangerment Assessment Report.

An outline of the proposed Endangerment Assessment (Item 1) will be submitted to the agencies for review. This will be submitted after Round 2 groundwater monitoring results are evaluated.

A second submittal will identify the information required in Item 2. The focus of this submittal will be to obtain agreement with the agencies on the targeted contaminants.

A draft Endangerment Assessment report will be prepared for agency review, encompassing the requirements of Items 1 through 6. The agencies will prepare written review comments, Responses to agency review comments will be incorporated into the first draft and resubmitted to the agencies in the form of a second draft report.

A final Endangerment Assessment (Item 7) will be submitted after agency review comments are received on the second draft report.

TASK 8 - SCREENING OF PRELIMINARY REMEDIAL TECHNOLOGIES

Based upon observed site specific problems, an evaluation of the developed feasible technologies (Subtask 1D) will occur. The technology screening will consider both source control and off-site remediation as dictated by observed problems. The determination of feasible potential remedial technologies will be based upon observed site conditions, waste characteristics and technical requirements. Technologies may be eliminated if they are not feasible due to difficult implementation, reliance on unproven technology, do not adequately alleviate problems associated with the site, or require unreasonably long periods of time for implementation and/or operation. A brief explanation of why specific technologies were rejected will be provided to U.S. EPA in the form of a technical memorandum. The memorandum will also identify any additional information needed to evaluate any technology considered.

TASK 9 - DEVELOPMENT OF ALTERNATIVES

Based upon the results contained in the RI Report (Task 4) and consideration of screening of preliminary remedial technologies (Task 8) and the EA Report (Task 7), a limited number of alternatives for source control and/or off-site

remedial actions, or both, shall be developed, to address actual or potential threat to public health, welfare or the environment.

Subtask 9A - Establishment of Remedial Response Objectives

Site specific objectives for response to conditions documented at and around the Pagel's Pit Landfill Facility will be developed. The objective of any remedial response will be based upon the following:

- Observed or potential impacts on the public health, welfare or the environment.
- Current site conditions.
- Results of the remedial investigation.
- Requirements of the NCP.
- U.S. EPA interim guidance documents.
- Compliance with U.S. EPA or other Federal and State of Illinois environmental standards, laws or regulations under U.S. EPA CERCLA Compliance policy.

Objectives of source control measures will be developed to prevent or significantly minimize migration of contaminants from the site. Objectives for management of migration measures, if and to the extent appropriate, should prevent or minimize impacts of contamination that has migrated from the site. The remedial response objectives will be developed in close consultation with U.S. EPA.

Subtask 9B - Development of Response Action Levels

The EA (Task 7) will be used to develop site specific response action levels. Existing state and/or federal standards shall be used where ever relevant and appropriate.

Subtask 9C - Identification of Remedial Alternatives

The remedial technologies identified in Task 8 will be assembled into remedial action alternatives. At a minimum, alternatives will be developed for each of the following:

- No Action.
- Alternatives that meet the CERCLA goals of preventing or minimizing present or future migration of hazardous substances and protect human health, welfare and the environment, but do not attain the applicable or relevant standards (as defined in Subtask 9B).
- Alternatives that attain applicable and/or relevant federal or state public health or environmental standards, and established response action levels.
- Alternatives that exceed applicable and/or relevant state or federal public health or environmental standards, and established response action levels.
- Offsite treatment or disposal of the waste at an offsite facility approved by U.S. EPA.

There may be overlap among alternatives developed. Additional alternatives outside of the categories outlined above may also be developed, such as non-cleanup alternatives (e.g., alternative water supply, monitoring program, or institutional controls). A discussion presenting the rationale for excluding any technologies identified in Task 8, but not used in the development of alternatives, will be prepared. The alternatives will be developed in close consultation with U.S. EPA. A review meeting between Warzyn, representatives of the PRPs and the U.S. EPA will be held in U.S. EPA Region V headquarters in Chicago. The meeting will be used to reach a consensus on potentially feasible remedial actions to be evaluated in the initial screening of alternatives (Task 10).

TASK 10 - INITIAL SCREENING OF ALTERNATIVES

Screen criteria will be prepared to assess the potentially feasible remedial action alternatives (Task 9). The screening is intended to eliminate those alternatives which are clearly unfeasible or inappropriate, prior to undertaking detailed evaluations of the remaining alternatives. Factors to be addressed in developing the screening criteria include:

- Environmental Protection - Endangerment to human health via exposure through air, water, groundwater or soil pathways will be considered. Weighting will be given to the proposed alternatives, satisfaction of the response objectives and the alternative's ability to contribute substantially to the protection of human health, welfare or the environment. Source control alternatives will have to achieve adequate control of source materials. Management of migration alternatives will minimize or mitigate the threat of harm to public health, welfare or the environment.

- Environmental Effects - The impacts from implementation of various alternatives will be considered. The degree of potential adverse environmental affects for implementation of the alternatives will be evaluated.

- Technical Feasibility Evaluation - Evaluation of performance (effectiveness of meeting effluent criteria or other objectives), useful life, reliability, (operation and maintenance requirements and demonstrated reliability), implementability (constructability and time to implement) and safety (operator and nearby residents safety from fire, explosion, etc.).

- Institutional Issues - Compliance with federal, state and local standards specifically including NPDES, POTW, and Clean Air Act permitting. Also compliance with criteria guidance found in the EPA Water Protection Strategy, recommended maximum contaminant levels (RMCLs), health advisories and EPA water quality criteria. Other issues to be evaluated include public involvement, community affects and historic and archeological sites.

- Costs - Capital, operation and maintenance (O&M), and present worth costs will be considered, to compare costs of potential alternatives.

The potentially feasible remedial action alternatives will be screened according to the developed criteria which incorporate the above factors. Ability to meet reponse action levels will be the overriding concern.

TASK 11 - EVALUATION OF ALTERNATIVES

Those alternatives remaining after the initial screening of alternatives (Task 10) will be subjected to detailed analysis to determine which of the actions or combinations of actions represent the cost effective remedy for site problems. Additional engineering studies may be required to fully evaluate the cost, constructability, applicability or reliability or each remaining alternative.

If treatment of contaminated materials is included in the list of potential remedial alternatives, a technical assessment of this alternative will be conducted to identify applicable processes. It is assumed that the majority of the technical assessment will have been performed in any laboratory and/or bench scale studies required as part of Task 5.

Subtask 11A - Development of Alternatives and Technical Analysis

Using data collected in the previous tasks, a written description of each of the alternatives under consideration will be prepared to a level of detail sufficient to allow comparison of alternatives. The following information will be included in the written description of each considered alternative:

- Basic component diagrams for each alternative to be considered, including design criteria, quantities of materials to be handled, efficiency of contaminant removal and other basic information.
- Major equipment needs and utility requirements.
- Conceptual site layout drawings.
- Preliminary implementation schedule including procurement, construction and length of O&M period required to achieve objectives.

following the preparation of detailed alternative descriptions, each alternative will be subjected to a analysis of technical factors which affect its suitability. The following will be included as appropriate to each alternative:

- Description of appropriate treatment, storage and disposal technologies.
- Discussion of how the alternative does (or does not) comply with specific requirements of other environmental programs. When an alternative does not achieve compliance, discussion of how the alternative prevents or minimizes the migration of releases and mitigates potential or real public health or environmental impacts, will be presented. The discussion will include a description of special design changes that could be implemented to achieve the required compliance.
- An outline of operation, maintenance and monitoring requirements for the remedy will be prepared.
- Identification and review of potential off-site facilities to achieve compliance with applicable RCRA and other U.S. EPA environmental program requirements will be provided. Potential disposal facilities will be evaluated to determine if off-site management of recovered materials would result in a potential for future releases from the selected disposal facility.
- Identification of temporary storage requirements, off-site disposal needs and transportation plans will be performed.
- A description of whether the alternative results in permanent treatment or destruction of wastes and/or recovered materials, and if not, the potential for future releases to the environment will be evaluated.
- A summary of safety requirements for the implementation of remedial measures will be prepared.
- A description of how the proposed alternative could be phased into individual operable units will be prepared. The description will include a discussion of how various operable units of the complete remedy could be implemented individually or in groups, resulting in significant improvements to the environment or substantial savings in cost.
- A description of how the alternative could be segmented into smaller units, to allow implementation of phasing will be prepared.
- Special engineering requirements of the applicable alternative or site preparation considerations will be described.

Subtask 11B - Environmental Analysis

An environmental analysis will be performed for each alternative. The environmental analysis will focus on the problems at the site which have been determined to be of concern, and the pathways of released compounds of concern, which are actually addressed by each alternative. The environmental analysis of each alternative will include, at a minimum, an evaluation of beneficial affects of the response, adverse affects of the response, and an analysis of measures to mitigate adverse affects. The "NO ACTION" alternative will be fully evaluated to describe the current site situation and anticipated environmental conditions if no actions are taken. The "NO ACTION" alternative will serve as the baseline for the environmental analysis of other considered alternatives.

Subtask 11C - Public Health Analysis

Each alternative will be assessed in terms of the extent to which it provides mitigation of long-term exposure to any residual contamination and protects public health both during and after completion of the proposed remedial action. The assessment will describe the levels and provide characterization of contaminants on-site, potential exposure routes, and potentially affected populations.

The effects of the "NO ACTION" alternative will be described in terms of short-term effects, long-term exposures to the compounds determined to be of concern, and resulting public health impacts. Each remedial alternative will be evaluated to determine the level of exposure to substances of concern and the reduction of the exposure over time. The relative reduction in public health impacts for each alternative will be compared to the "NO ACTION" level.

For management of migration measures, the relative reduction in impacts will be determined by comparing residual containment levels of each alternative, with existing applicable, relevant and appropriate criteria to meet the intent of the NCP. For source control measures or when criteria, standards or guidelines are not available, the comparison shall be based on the relative effectiveness of the technologies. The "NO ACTION" alternative and the Endangerment Assessment will serve as the baseline for the analysis.

Subtask 11D - Institutional Analysis

Each alternative shall be evaluated based on relevant institutional needs. Specifically, regulatory requirements, permits, community relation concerns, and participating agency coordination needs will be assessed for each alternative.

Subtask 11E - Cost Analysis

An opinion on the cost of each feasible remedial action alternative (and for each phase or segment of the alternative) will be presented. Costs will be presented as a present worth cost and will include the total cost of implementation of the alternative and the annual anticipated O&M costs. Both monetary costs and associated non-monetary costs will be included. A distribution of costs over time will also be provided. The cost analyses will be for comparison purposes only, consistent with the level of detail in the FS and will not represent final construction budgets.

Subtask 11F - Evaluation of Cost-Effective Alternatives

The applicable remedial alternatives shall be compared against each other using technical, environmental, and economic criteria. Preference shall be

given to those alternatives that permanently treat or destroy the hazardous substances present. The following should be used to compare alternatives, unless U.S. EPA agree that certain items need not be considered:

- Present worth of total cost - The net present value of capital and operation and maintenance costs must be considered.

- Health information - For the "NO ACTION" alternative, U.S. EPA prefers a quantitative statement including a range estimate of maximum individual risks. Where quantification is not possible, a qualitative analysis may suffice. For source control options, a quantitative risk assessment is not required. For management of migration measures, a quantitative risk assessment including a range estimate for individual risks will be considered when evaluating alternatives.

- Environmental effects - Only the most important or noteworthy affects or impacts shall be summarized. Reference can be made to supplemental information in a separate table as necessary.

- Technical aspects of the remedial alternatives - The technical aspects of each remedial alternative relative to the others shall be clearly delineated. Such information generally will be based on the site conditions and the technologies comprising the remedial alternative.

- Information on the extent which remedial alternatives meet the technical requirements and environmental standards of applicable environmental regulations - This information shall be displayed so that differences in how remedial alternatives satisfy such standards are readily apparent. The general type of standards that may be applicable at the site include but are not limited to:

  - RCRA -- Design and operating standards
  - Drinking Water Standards and Criteria

- Information on Community Effects - The type of information that will be provided includes the extent to which the implementation of a remedial alternative disrupts the community (e.g., traffic, temporary health risks and relocation).

- Other factors - This category of information would include such things as institutional factors that may inhibit implementation of a remedial alternative and any other site-specific factors identified in the detailed analyses performed in Subtasks 11A through 11E that may influence which alternative is eventually selected.

TASK 12 - FEASIBILITY STUDY (FS) REPORT

A draft FS report will be prepared for submission to U.S. EPA and IEPA, which will include the results of Tasks 8 through 11. Data considered when performing the analyses of information in Tasks 8 through 11 will be included in the appendices of the report. In the draft FS report, one alternative or a combination of alternatives will be recommended to U.S. EPA for implementation at the site.

The draft FS report will be submitted to U.S. EPA and other interested parties (as directed) for comment. The draft FS Report, revised to reflect agency comments, will be adequate to support U.S. EPA needs during the public comment period before U.S. EPA's development of a record of decision (ROD).

The probable cost for this task was developed based upon the following assumptions:

- Five copies of the draft report will be issued to U.S. EPA and PRPs. The report is assumed to be 150 pages long with five full size drawings.
- Five copies of the final report will be submitted to both U.S. EPA and PRPs. The report is assumed to be of similar size and composition to the draft report.

A meeting between representatives of Warzyn, U.S. EPA and the PRPs will be held at U.S. EPA Region V headquarters in Chicago to discuss review comments.

ON-GOING ACTIVITIES

Community relations support, monthly progress reporting and meetings will be on-going activities throughout the course of the RI/FS.

TASK 14 - COMMUNITY RELATIONS SUPPORT

U.S. EPA will provide the lead for community relations activities associated with the RI/FS at the Winnebago Reclamation Service Landfill. Support of U.S. EPA activities will be provided whenever possible. The overall objective of the community relations activities associated with the RI/FS at Pagel's Pit Landfill is for the community to achieve an understanding of the actions being taken and to keep the community aware of the progress and direction of on-going activities.

Community relations support will be consistent with Superfund community relation policy, as stated in the U.S. EPA guidance document, "Community Relations in Superfund: A Handbook" (September 1983, or as revised) and in accordance with the U.S. EPA approved Community Relations Plan for the site.

TASK 15 - MONTHLY PROGRESS REPORTS

Monthly written progress reports will be provided to U.S. EPA. The progress reports will contain a description of the technical and financial progress of all of the work performed to date, as well as specific identification of work that was performed during the reporting period. The progress report will also contain a description of anticipated activities to be performed during the current reporting period. The progress reports will be submitted to U.S. EPA by the 10th of every month, following the effective date of the Consent Order, until termination of the RI/FS.

At a minimum, the progress reports will:

- Identify the site and tasks.
- Describe the status of the work at the site and progress to date, specifically identifying work that was performed during the previous month.
- List by task and/or subtask, the estimated percent completion, with comparison to actual or proposed completion dates and explanations of deviations from the proposed milestones. It is assumed this will be a computerized output updated monthly.
- Describe difficulties encountered during the reporting period and actions taken to rectify problems.
- Describe activities anticipated to be performed for the upcoming month.
- Identify any changes in site investigation personnel.
- Provide photodocumentation, when pertinent and available, of major actions or features performed at and around the site. Photodocumentation will not be performed as a routine aspect of monthly reporting.
- Provide technical data that has gone through internal quality control review and is in a format suitable for submittal. The data such as analytical results, boring logs, well construction details and groundwater elevations, will be submitted periodically and will not necessarily be submitted within a month of collection.

MEETINGS

Meetings have been scheduled at key points throughout the RI/FS process to facilitate communication between the agencies, PRPs and consultants. The intent of the meetings is to discuss project progress and problems, review agency comments on draft reports, and to evaluate any necessary changes to the Work Plan and/or project schedule.

JAH/DWH/sss/BAW
[ndj-39a-1]

SDMS ADMINISTRATIVE RECORD IMAGERY INSERT FORM

SITE NAME	PAGELS PIT		
DOC ID #	70624 / Page 69		
DESCRIPTION OF ITEM(S)	SITE LOCATION MAP		
REASON WHY UNSCANNABLE	____ ILLEGIBLE	or	__X__ FORMAT OVERSIZED
DATE OF ITEM(S)	11-21-1986		
NO. OF ITEMS			
PHASE	__X__ Remedial ____ Removal ____ Deletion Docket Volume __4__ of __9__ __X__ Original ____ Update # ____		
O.U.	01/LAGOON		
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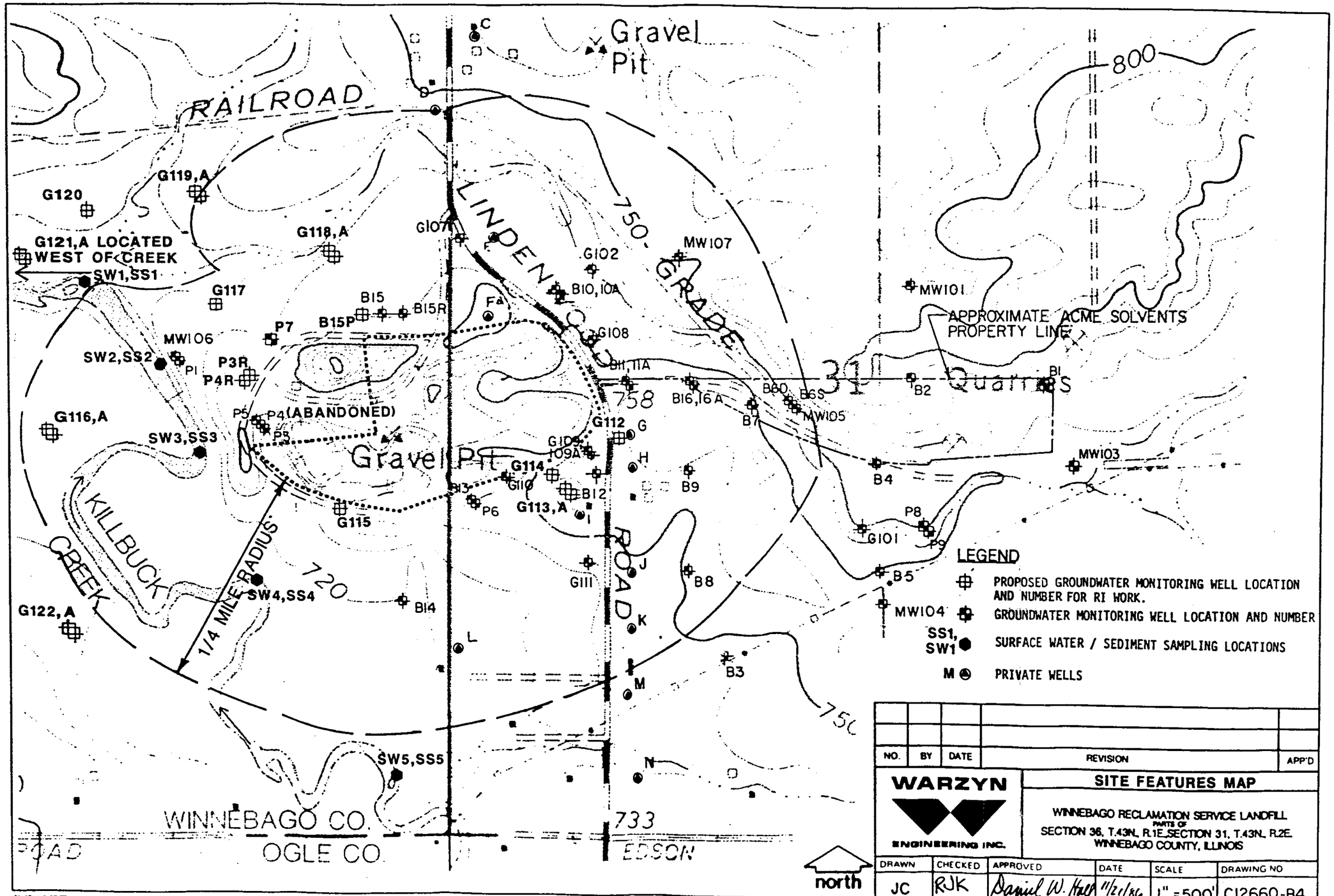
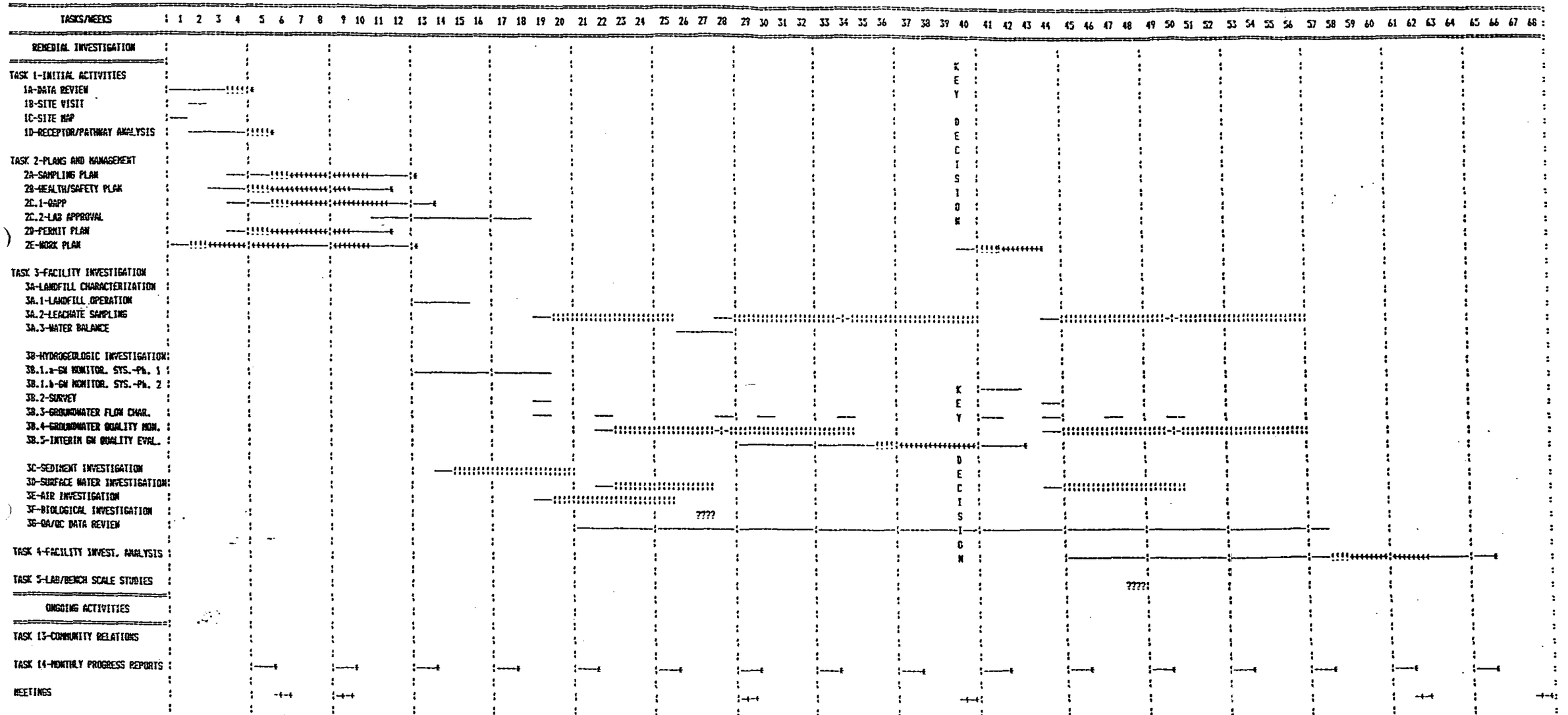
COMMENTS			

ATTACHMENT 1A AND 1B

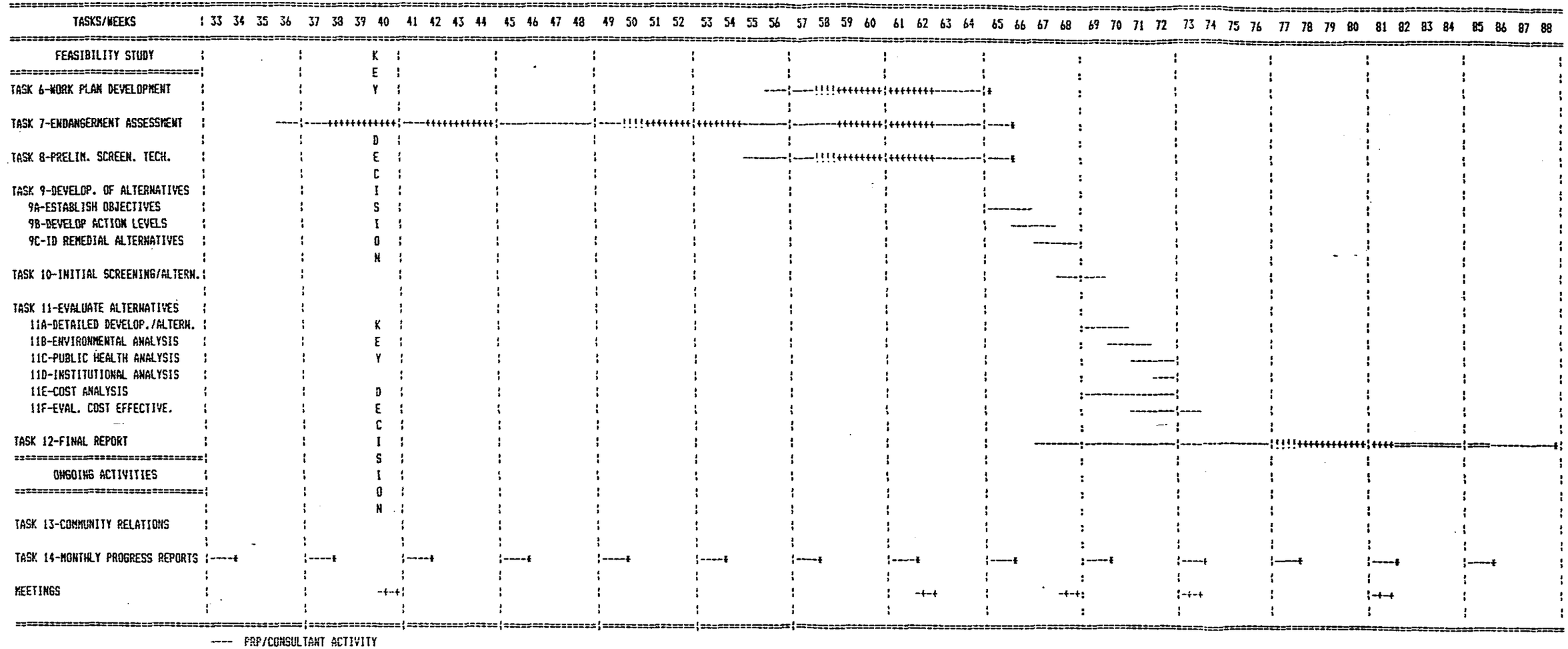
RI/FS SCHEDULES


RAILROAD
Gravel Pit
800
G120
G119,A
G118,A
G121,A LOCATED WEST OF CREEK
SW1,SS1
G117
G107
LINDEN ROAD
750
GRADE
G102
MW107
B10,10A
MW101
APPROXIMATE ACME SOLVENTS PROPERTY LINE
B15
B15R
B15P
P7
MW106
SW2,SS2
P1
P3R
P4R
G108
B11,11A
758
B16,16A
B6D
B6S
MW105
B7
B2
B1
Quarry
G116,A
P5
P4 (ABANDONED)
P3
SW3,SS3
G112
G
G109
109A
H
Gravel Pit
G114
G110
B13
P6
B12
B9
B4
MW103
G113,A
I
G115
P8
G101
P9
KILLBUCK CREEK
1/4 MILE RADIUS
720
SW4,SS4
G122,A
B14
G111
J
B8
B5
MW104
K
L
B3
M
SW5,SS5
N
WINNEBAGO CO.
OGLE CO.
733
ROAD
EDSON
north
LEGEND
PROPOSED GROUNDWATER MONITORING WELL LOCATION AND NUMBER FOR RI WORK.
GROUNDWATER MONITORING WELL LOCATION AND NUMBER
SS1, SW1 SURFACE WATER / SEDIMENT SAMPLING LOCATIONS
M PRIVATE WELLS
NO. BY DATE REVISION APP'D
WARZYN ENGINEERING INC.
SITE FEATURES MAP
WINNEBAGO RECLAMATION SERVICE LANDFILL
PARTS OF
SECTION 36, T.43N., R.1E., SECTION 31, T.43N., R.2E.
WINNEBAGO COUNTY, ILLINOIS
DRAWN JC
CHECKED RJK
APPROVED Daniel W. Hall
DATE 11/21/86
SCALE 1" = 500'
DRAWING NO C12660-B4
TELEDYNE POST

ATTACHMENT 1-A
PAGEL LANDFILL REMEDIAL INVESTIGATION SCHEDULE



ATTACHMENT 1-B
PAGEL LANDFILL FEASIBILITY STUDY SCHEDULE



---- PRP/CONSULTANT ACTIVITY
++++ AGENCY REVIEW TIME
!!!! LABORATORY TURNAROUND TIME
* REPORT/DOCUMENT DUE
???? DATE/ACTIVITY UNDETERMINED
-+-+ CONSULTANT/AGENCY MEETING
==== PUBLIC COMMENT PERIOD
: RI/FS SCHEDULES MATCHLINE
!!!! PRP REVIEW TIME

ATTACHMENT 2

HSL PARAMETER LIST

CLP TARGET COMPOUND LIST
AND DETECTION LIMITS*

Volatiles	CAS Number	Detection Limits(1) Low Water(2) ug/l	Detection Limits(1) Low Soil Sediment(3) ug/kg
1. Chloromethane	74-87-3	10	10
2. Bromomethane	74-83-9	10	10
3. Vinyl Chloride	75-01-4	10	10
4. Chloroethane	75-00-3	10	10
5. Methylene Chloride	75-09-2	5	5
6. Acetone	67-64-1	10	10
7. Carbon Disulfide	75-15-0	5	5
8. 1,1-Dichloroethene	75-35-4	5	5
9. 1,1-Dichloroethane	75-35-3	5	5
10. trans-1,2-Dichloroethene	156-60-5	5	5
11. Chloroform	67-66-3	5	5
12. 1,2-Dichloroethane	107-06-2	5	5
13. 2-Butanone	78-93-3	10	10
14. 1,1,1-Trichloroethane	71-55-6	5	5
15. Carbon Tetrachloride	56-23-5	5	5
16. Vinyl Acetate	108-05-4	10	10
17. Bromodichloromethane	75-27-4	5	5
18. 1,1,2,2-Tetrachloroethane	79-34-5	5	5
19. 1,2-Dichloropropane	78-87-5	5	5
20. trans-1,3-Dichloropropene	10061-02-6	5	5
21. Trichloroethene	79-01-6	5	5
22. Dibromocloromethane	124-48-1	5	5
23. 1,1,2-Trichloroethane	79-00-5	5	5
24. Benzene	71-43-2	5	5
25. cis-1,3-Dichloropropene	10061-01-5	5	5
26. 2-Chloroethyl Vinyl Ether	110-75-8	10	10
27. Bromoform	75-25-2	5	5
28. 2-Hexanone	591-78-6	10	10
29. 4-Methyl-2-pentanone	108-10-1	10	10
30. Tetrachloroethene	127-18-4	5	5
31. Toluene	108-88-3	5	5
32. Chlorobenzene	108-90-7	5	5
33. Ethyl Benzene	100-41-4	5	5
34. Styrene	100-42-5	5	5
35. Total Xylenes		5	5

Semi-Volatiles	CAS Number	Detection Limits(1) Low Water(4) ug/l	Low Soil Sediment(5) ug/kg
36. Phenol	108-95-2	10	330
37. bis(2-Chloroethyl)ether	111-44-4	10	300
38. 2-Chlorophenol	95-57-8	10	330
39. 1,3-Dichlorobenzene	541-73-1	10	330
40. 1,4-Dichlorobenzene	106-46-7	10	330
41. Benzyl Alcohol	100-51-6	10	330
42. 1,2-Dichlorobenzene	95-50-1	10	330
43. 2-Methylphenol	95-48-7	10	330
44. bis(2-Chloroisopropyl)ether	39638-32-9	10	330
45. 4-Methylphenol	106-44-5	10	330
46. N-Nitroso-Dipropylamine	621-64-7	10	330
47. Hexachloroethane	67-72-1	10	330
48. Nitrobenzene	98-95-3	10	330
49. Isophorone	78-59-1	10	330
50. 2-Nitrophenol	88-75-5	10	330
51. 2,4-Dimethylphenol	105-67-9	10	330
52. Benzoic Acid	65-85-0	50	1600
53. bis(2-Chloroethoxy)methane	111-91-1	10	330
54. 2,4-Dichlorophenol	120-83-2	10	330
55. 1,2,4-Trichlorobenzene	120-82-1	10	330
56. Naphthalene	91-20-3	10	330
57. 4-Chloroaniline	106-47-8	10	330
58. Hexachlorobutadiene	87-68-3	10	330
59. 4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	330
60. 2-Methylnaphthalene	91-57-6	10	330
61. Hexachlorocyclopentadiene	77-47-4	10	330
62. 2,4,6-Trichlorophenol	88-06-2	10	330
63. 2,4,5-Trichlorophenol	95-95-4	50	1600
64. 2-Chloronaphthalene	91-58-7	10	330
65. 2-Nitroaniline	88-74-4	50	1600
66. Dimethyl Phthalate	131-11-3	10	330
67. Acenaphthylene	208-96-8	10	330
68. 3-Nitroaniline	99-09-2	50	1600
69. Acenaphthene	83-32-9	10	330
70. 2,4-Dinitrophenol	51-28-5	50	1600
71. 4-Nitrophenol	100-02-7	50	1600
72. Dibenzofuran	132-64-9	10	330
73. 2,4-Dinitrotoluene	121-14-2	10	330
74. 2,6-Dinitrotoluene	606-20-2	10	330
75. Diethylphthalate	84-66-2	10	330

Semi-Volatiles		CAS Number	Detection Limits(1) Low Water(4) ug/l	Low Soil Sediment(5) ug/kg
76.	4-Chlorophenyl Phenyl ether	7005-72-3	10	330
77.	Fluorene	86-73-7	10	330
78.	4-Nitroaniline	100-01-6	50	1600
79.	4,6-Dinitro-2-methylphenol	534-52-1	50	1600
80.	N-nitrosodiphenylamine	86-30-6	10	330
81.	4-Bromophenyl Phenyl ether	101-55-3	10	330
82.	Hexachlorobenzene	118-74-1	10	330
83.	Pentachlorophenol	87-86-5	50	1600
84.	Phenanthrene	85-01-8	10	330
85.	Anthracene	120-12-7	10	330
86.	Di-n-Butylphthalate	84-74-2	10	330
87.	Fluoranthene	206-44-0	10	330
88.	Pyrene	129-00-0	10	330
89.	Butyl Benzyl Phthalate	85-68-7	10	330
90.	3,3'-Dichlorobenzidine	91-94-1	20	660
91.	Benzo(a)anthracene	56-55-3	10	330
92.	bis(2-ethylhexyl)phthalate	117-81-7	10	330
93.	Chrysene	218-01-9	10	330
94.	Di-n-octyl Phthalate	117-84-0	10	330
95.	Benzo(b)fluoranthene	205-99-2	10	330
96.	Benzo(k)fluoranthene	207-08-9	10	330
97.	Benzo(a)pyrene	50-32-8	10	330
98.	Indeno(1,2,3-cd)pyrene	193-39-5	10	330
99.	Dibenz(a,h)anthracene	53-70-3	10	330
100.	Benzo(g,h,i)perylene	191-24-2	10	330

Notes:

(1) Detection limits listed for soil/sediment are based on wet weight. The detection limits calculated by the laboratory for soil/sediment will be on dry weight basis and will be higher.

(2) Medium Water Detection Limits (DL) for Volatile CLP Target Compounds are 100 times the individual Low Water RDL.

(3) Medium Soil/Sediment DL for Volatile CLP Target Compounds are 100 times the individual Low Water DL.

(4) Medium Water DL for Semi-Volatile CLP Target Compounds are 100 times the individual Low Water DL.

(5) Medium Soil/Sediment DL for Semi-Volatile CLP Target Compounds are 60 times the individual Low Soil/Sediment DL.

(6) Medium Water DL for Pesticide CLP Target Compounds are 100 times the individual Low Water DL.

(7) Medium Soil/Sediment DL for Pesticide CLP Target Compounds are 15 times the individual Low Soil/Sediment DL.

* Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable.

[cac-79-13]

ELEMENTS DETERMINED BY INDUCTIVELY COUPLED PLASMA EMISSION
OR ATOMIC ABSORPTION (AA) SPECTROSCOPY

Metal:	Required Detection Level (ug/l)
Alumium	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	5
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20

[cac-79-14]

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