Remedial Design Work Plan Fadrowski Drum Disposal Site

City of Franklin, Wisconsin

Prepared For:
Menard, Incorporated
Eau Claire, Wisconsin

February, 1992

AYRES ASSOCIATES

REMEDIAL DESIGN WORK PLAN
FADROWSKI DRUM DISPOSAL SITE
CITY OF FRANKLIN, WISCONSIN
#3016.00

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This Work Plan is the first in a series of submittals toward achieving a Remedial Design (RD) plan for the Fadrowski Drum Disposal Site (FDDS). The RD will be a direct result of the Record of Decision (ROD) and negotiated Agreement of Consent (AOC), signed September 30, 1991; and the associated Scope of Work (SOW). Site specific information necessary to complete the Remedial Design Work Plan and it's appendices have been taken from the following:

1. FDDS Remedial Investigation/Feasibility Study Work Plan; Warzyn, Inc.; Madison, Wisconsin; June, 1988

2. FDDS Remedial Investigation/Feasibility Study Quality Assurance Project Plan; Warzyn, Inc.; Madison, Wisconsin; June, 1988

3. FDDS Final Remedial Investigation Report; Warzyn, Inc.; Madison, Wisconsin; January, 1991

4. FDDS Final Feasibility Study; Warzyn, Inc., Madison, Wisconsin; May, 1991

The work plan contains a brief discussion of the RD project organization and available information. It also provides the anticipated project approach for each of the tasks discussed in the SOW and a Health and Safety Plan and Quality Assurance Project Plan that will be followed during the RD period. A preliminary cost estimate has been updated from the "Final Feasibility Study" and a design schedule has been estimated, based on requirements of the SOW.

The Final Remedial Design will provide a detailed design of the Remedial Action (RA), along with an Operation and Maintenance Plan for the FDDS.

2.0 PROJECT ORGANIZATION

Menard, Inc., has signed an Administrative Order of Consent with the USEPA to take the lead in preparation of the RD for the FDDS. Ayres Associates of Eau Claire, Wisconsin, has been selected to work with

Menard's, USEPA, Wisconsin Department of Natural Resources (WDNR), and selected subcontractors in preparing the Remedial Design Plan. Figure 1 presents the organization and key personnel responsible for implementing the Remedial Design.

3.0 AVAILABLE INFORMATION

3.1 SITE LOCATION

The Fadrowski Drum Disposal Site is located on approximately 20 acres of semi-rural land in the southeast quarter of Section 1, Township 5 North, Range 21 East, Milwaukee County, Wisconsin. The site is situated immediately west of U.S. Highway 41 within the corporate limits of the City of Franklin.

3.2 TOPOGRAPHY AND SURFACE WATER DRAINAGE

The surface of the FDDS generally slopes to the west at slopes ranging from 1% to 5% with steeper slopes (up to 60%) at the edges of the fill areas. Site surface drainage is collected by a manmade drainage ditch along the western two-thirds of the north boundary and a one acre manmade pond near the center of the west half of the site. All site drainage, including that from the ditch and pond, appears to discharge to an unnamed stream along the west edge of the property. The unnamed stream discharges to the Root River approximately three miles southwest of the FDDS.

3.3 BRIEF HISTORY OF OPERATIONS

The history of the FDDS is detailed in the Administrative Order of Consent (AOC). The following is a brief summary of site history.

The site was owned and operated by Ed Fadrowski between 1970 and 1982, as an unlicensed disposal site. Wisconsin DNR disclosed the disposal of non exempt waste at the site in 1981.

Menard, Inc., of Eau Claire, Wisconsin, purchased the site in December, 1982. Attempts to borrow fill soil for grading adjacent properties uncovered one or more drums containing unknown liquids. Laboratory analyses of samples collected by WDNR indicated that the drum contents were hazardous. Subsequent events lead to placement of the site on the National Priority List of sites requiring remedial action.

Acme Printing Ink Company, Milwaukee, Wisconsin, agreed to lead the Remedial Investigation/Feasibility Study (RI/FS). Warzyn Engineering, Inc., performed these studies for Acme. Based on the RI/FS, EPA has issued a Record of Decision (ROD) for the FDDS. In September, 1991, Menard, Inc., agreed to prepare this Remedial Design Plan in accordance with the ROD and the negotiated Administrative Order of Consent (AOC) and the negotiated Scope of Work (SOW). Ayres Associates, a consulting engineering firm located in Eau Claire, Wisconsin, is contracted with Menard's to prepare the RD.

3.4 TECHNICAL INFORMATION

The Final Feasibility Study (FS) for the FDDS was completed by Warzyn Engineering in May, 1991. The FS presents RI information and studies, evaluates hazards and risks associated with the site, and evaluates remedial design alternatives. Previous RI work has also included a Health and Safety Plan for Remedial Investigations and a Quality Assurance Project Plan.

3.5 EPA DIRECTION

Upon review of the FS and other Warzyn documents, EPA with WDNR concurrence issued a Record of Decision (ROD) in June, 1991. The ROD outlined the Remedial Action (RA) to include:

- Excavation of previously identified drums and associated characteristically hazardous soils;

- Construction of trenches to find and excavate additional containerized waste and associated characteristically hazardous fills and soils;

- Off-site recycling or treatment and disposal of drummed wastes;

- Treatment and disposal of contaminated soil;

- Construction of a landfill cover (cap) in compliance with Chapter NR 504.07, Wisconsin Administrative Code (WAC) landfill closure requirements;

- Use of institutional controls on landfill property to limit land and ground water use; and

- Monitoring of ground water, surface water, leachate and sediments to audit effectiveness of the remedial action and evaluate the need for future ground water treatment.

The AOC and associated SOW were finalized on September 30, 1991.

The SOW details the work necessary to complete the RD, including:

- Fence Installation and Security

- Institutional Controls

- Access Permits

- Monitoring Program

- Excavation and Management of Containerized Waste

- Landfill Cover/Leachate Collection

- Fugitive Dust Considerations

In addition, Ayres Associates has been directed by Menard, Inc., to consider the removal of waste in the eastern third of the site and consolidation of this waste to other on-site areas containing waste. The disposition of the on-site pond is to also be considered.

The SOW also outlines four tasks within the RD:

Task I: RD Work Plan

Task II: RD Project Plan

Task III: Reports and Submissions

Task IV: Design Follow-Up

The schedule in Section 6.0 represents the expected timetable for RD task completion.

4.0 PROJECT APPROACH

The purpose of the Remedial Design (RD) is to implement the Record of Decision (ROD) for the Fadrowski Drum Disposal Site (FDDS). Generally, the design objective is to carry out the directions discussed in the negotiated Scope of Work in a safe, orderly and timely manner. The following paragraphs discuss specific items that will be considered during the RD work.

The revised preliminary cost estimate, design schedule, Health and Safety Plan, and the Quality Assurance Project Plan (QAPP) are not discussed with each item in the project approach. Instead, the reader is directed to Sections 5.0, 6.0, and Appendices A and B, respectively. Figure 2, "Existing Features Map", is included for reference in discussing the Design Work Plan. Figure 2 presents locations of existing test pits, wells and borings, existing topography, currently assumed waste limits, and the State Plane Coordinate System.

Field instrumentation to be used to complete the RD shall included, but not be limited to the following:

- Foxboro OVA 128 Century Flame Ionization Detector (FID) - Used to measure trace quantities of ionizable organic materials in the air.

- Photovac TIP 1 Photo Ionization Detector (PID) - Used to measure trace quantities of ionizable organic materials in the air.

- MicroGard Portable Alarm (Oxygen Meter and Combustible Gas Indicator) - Used to measure the oxygen content in the air and the concentration of explosive gases.

- MIE Miniram (Dust and Aerosol Monitor) - A real time instrument used to measure dust and aerosol concentration in air.

Equipment to be used in the field will be routinely calibrated and maintained to ensure to validity of any results obtained. Individuals on site conducting tests with equipment will follow manufacturer's specification and maintenance for each unit. All meters will be calibrated prior to each day of use and more frequently as conditions dictate. If equipment appears to be in disrepair, it will be repaired or replaced. Equipment log book(s) will be maintained for each unit showing dates of maintenance, repair, and calibration. Calibration methods for equipment are included in specific Standard Operating Procedures (SOP) in Attachment 2 of the Quality Assurance Project Plan.

4.1 FENCE AND SECURITY

The RD will include a design for a 6-foot high chain link fence, topped with three strands of barbed wire. The fence will be located as shown on Figure 8 of the FDDS Feasibility Study, May, 1991, and encompass the entire area containing waste. Access will be provided from the existing Menard's parking lot through locking gates. Additional gates may be required at

various locations for construction and environmental monitoring. Appropriate warning signs will be placed at 200 foot intervals around the fence perimeter. The fence will be monitored daily for damage and/or vandalism and properly repaired.

A guard will be present at the site 24 hours per day, or as directed by EPA project manager, during the construction period. The design will also show the relocation of the fence after the remedial action is complete.

4.2 INSTITUTIONAL CONTROLS

Institutional controls in the form of deed restrictions will be placed on the portion of the site containing waste after completion of the remedial action. These controls will prohibit any use of that area which may defeat or impair the effectiveness of the remedial activities. Maps showing the final waste limits and capped area will be available for the City of Franklin and Milwaukee County for potential zoning purposes.

4.3 ACCESS

It is not expected that remedial activities will be implemented outside of the area to be fenced, as discussed above. However, access to certain portions of the FDDS may, in some cases, be improved by crossing adjacent property. Waste location activities, design activities, and fence construction may require access across adjacent properties to the south.

To this extent, the respondent has obtained temporary limited access agreements from the following adjacent property owners:

[redacted]
Franklin, WI 53132

OK Investment Company
5221 W. Loomis Road
Greendale, WI 53129

These agreements are available for EPA and DNR review.

4.4 HORIZONTAL WASTE LIMITS VERIFICATION (TYPE 1 TEST PITS)

The horizontal limits of the existing waste cell will be defined as accurately as possible during the RD by excavating shallow test pits, which are hereafter referred to as Type 1 test pits. Material excavated during Type 1 test pit operations will be visually inspected and described. Each test pit will be screened for organic vapors. All waste descriptions and meter responses will be recorded. This information will aid in siting waste depth and soil sampling locations discussed in Section 4.6, designing a plan for waste consolidation, completing cap design, performing soil balances, siting additional monitoring wells, and estimating construction costs.

Type 1 test pits will be dug at approximate 100 foot intervals at the perimeter of the waste to document waste limits for designing the horizontal limits of the clay cap. It is expected that some design judgement may be necessary to determine potential waste consolidation and clay cap limits, therefore each test pit will begin in an area believed to be outside the waste limits and extend into the waste until waste depths of 2 feet or greater are encountered. Limits shown on the Fill Distribution Map (Figure 6 of the FDDS Feasibility Study, May, 1991) will be used as a guide during waste limits determination. Probable test pit locations are shown in Figure 3, "Proposed Test Pit Locations". Type 1 test pits are not numbered at this time, but will be numbered sequentially during the RD. Guidance for completing and documenting these Type 1 test pits is included in Figure 4 "Protocol For Completing And Documenting Type 1 Test Pits to Locate Horizontal Waste Limits".

It is expected that the entire body of waste at the FDDS, regardless of waste type, will be capped. The edge of waste as defined by Type 1 test pits, along with the designed waste consolidation limits, will provide a reasonable guide for designing the horizontal limits of the cap. The exception to this "defined edge of waste" will be along the south boundary where FDDS waste is contiguous with waste in the adjacent disposal site. It is expected that where the waste boundary is not definable within the FDDS property boundary the design capping limits will be the property boundary. Special consideration must be given this exception if it is discovered that hazardous wastes from the FDDS have encroached onto the adjacent disposal site. If such a discovery is made during the RD, the respondent, EPA and DNR will be notified. Resulting special design consideration must be approved by EPA.

Containerized waste is not expected to be encountered during the waste limits verification work, and this work plan does not specifically address the handling of hazardous waste encountered. The on-site contractor will, however, be trained in the extraction and management of such waste. If containerized waste, or a drum(s) is discovered, the procedure outlined in Section 4.5 of this work plan will be followed. Discovery locations will be documented and, along with waste analyses, will be used during the remedial design to determine additional investigation areas during remedial action.

Health and Safety requirements outlined in Appendix A, "Remedial Design Health and Safety Plan", will be followed during the waste limits verification work.

4.5 ON-SITE HAZARDOUS WASTE MANAGEMENT

Should buried drums be encountered, activities shall be halted and the Project Manager and Site Safety Officer will confer on the matter. Prior to taking any action, the USEPA Remedial Project Manager and the WDNR will be contacted to approve such

actions. If the respondent so chooses, buried drums will be removed in accordance with EPA and WDNR direction and managed in accordance with the Federal Land Disposal Restrictions, and Wisconsin waste management guidelines.

Handling, storage, sampling and final disposal would be addressed by addendum to this Work Plan, Health and Safety Plan and QAPP, and approved by EPA. In general, the addendum will follow the following guidelines.

Field screening and head space screening with field instruments would be performed to determine initial limits of excavation.

The waste would be representatively sampled and analyzed to determine hazardous characteristics and potential disposal options. Soil from beneath the waste location may also be collected and analyzed to help determine if additional investigation or cleanup is required during the remedial action.

Hazardous wastes would be stored on-site in a secure setting. Recovered drums would be overpacked in accordance with standard procedures. Soils will be stored in leak proof drums or lugger boxes. Wastes suspected to be hazardous will be labeled, given an ID number, and held in a locked area on the site. Entry to this area will be limited to only those individuals involved in the Remedial Design. In accordance with WDNR policy, hazardous waste will be stored on site for a maximum of 90 days.

Disposal options for wastes located at the FDDS will be in accordance with State of Wisconsin waste management guidelines, the "Interim Policy for Promoting the In-State and On-Site Management for Hazardous Wastes in the State of Wisconsin". Based on this guidance, reasonable efforts will be made to recycle drummed waste. (Recycling plans for drums will be submitted to the EPA and WDNR for their approval on a drum-by-drum basis).

Because of small quantities and high costs, on-site treatment and disposal of non-recyclable waste will probably not be warranted. Options of disposing the products within the State of Wisconsin will be investigated. Disposal of untreated waste at an out-of-state facility will be considered only as a final option. Empty drums, or drums found to not contain hazardous waste, will be properly disposed at a licensed landfill in Wisconsin.

4.6 DETERMINATION OF LIMITS OF WASTE TO BE RELOCATED (TYPE 2 TEST PITS)

The Remedial Design (RD) will include plans for relocation of the waste located on the eastern third of the site. The purpose of the relocation is to consolidate the fill, minimize the capped area, and release the eastern third of the site from institutional controls making it suitable for a productive use. The area under consideration for waste removal is east of State Plane Coordinate (SPC) Grid 2,548,500E.

Several soil borings and test pits were performed during the RI/FS to document waste depths and types and analyze soil from beneath the waste for hazardous constituents. During the RD, Type 2 test pits will be placed in the eastern third of the site and within the waste limits identified by Type 1 test pit investigations. They will be located such that the final sampling pattern, including existing RI/FS borings and test pits, will have approximate 100 foot grid spacings between borings and/or pits, as shown in Figure 3. It is noted that some new test pits will coincide with existing RI/FS sample locations which were found to contain elevated TAL and/or TCL concentrations. The purpose of sampling subsoil at these locations is to investigate contaminant migration limits at locations with known concentrations at the base of the waste. Type 2 test pits will be numbered beginning with TP-201 and incrementally from east to west to differentiate them from other test pits. Test pit locations and quantities may be

adjusted after horizontal waste limits are determined. Test pits may be added to delineate additional areas of concern or be eliminated if a decision is made to cap the area and not consider waste removal. Any adjustments to location, additions, or elimination of test pits during the RD must be approved by DNR and EPA.

The intent of the Type 2 test pits will be to determine waste/fill depths and estimate contaminant migration depth into subsoil. It is likely that test pits nearest the eastern edge of the site will be excavated first, and excavations will progress westerly from areas expected to contain the least waste toward areas likely to contain greater waste depths. Observations at each test pit will be documented in conformance with Figure 5, "Guidelines for Documenting Type 2 and Type 3 Test Pits". Soil samples will be collected from each test pit as described in Figure 6, "Flow Chart for Type 2 Test Pit Evaluation and Soil Analysis in Waste Relocation Area". It is, therefore, anticipated that soil samples will be collected from three (3) locations in each test pit. These samples will be used in qualitative field screening for organic vapors in accordance with Section 8 of the FSP; in potential fast turn-around (2-3 day) laboratory screening for semi-volatile organic compounds, in accordance with Data Quality Objective Level 3, to supplement field screening; and for potential analysis at the PRP lab for parameters outlined in the QAPP. The determination as to which samples are laboratory screened and/or analyzed at the PRP lab for QAPP outlined parameters will be based on information such as response by field screening with an FID or PID, location of the test pit, and depth of the sample. In general, however, the following will occur:

- If the samples collected in the native soil have continual field screen responses until the pit is terminated, the sample collected at the bottom of the

test pit may be analyzed at the PRP lab for TAL and TCL. The only instance in which this sample will not be analyzed is when the area is to be included under the cap.

- If the samples collected in the native soil have no responses during field screening, the shallowest sample is anticipated to be submitted to a lab for screening of semi-volatile compounds. If the results of lab screening indicate no detects, a sample from the same depth will be sent to the PRP lab for TAL and TCL analyses.

- If the shallowest sample has a response above background, or the lab screen reveals detects, the sample collected from two feet deeper, or second sample, will then be submitted for lab screening. If the results indicate no detects, a sample from the same depth will be sent to the PRP lab for TAL and TCL analyses.

- If the field screening or lab screening of the second sample reveals detects, the sample collected from two feet deeper, or third sample, will be analyzed by the PRP lab for TAL and TCL, unless, as mentioned above, the area is to be included under the final cap.

The purpose for the field screening and lab screening effort is to maximize the potential that the sample sent to the PRP lab will be deemed "clean". The laboratory screening provides a cost effective method to verify samples having "no response" during field screening, prior to analysis at the PRP lab.

Containerized waste is not expected to be encountered during the test pit excavation work, and this work plan does not specifically address the handling of hazardous waste encountered. The on-site contractor will, however, be trained in the extraction and management of such waste. If containerized waste, or a drum(s) is discovered, the procedure

outlined in Section 4.5 of this work plan will be followed. Discovery locations will be documented and, along with any waste analyses, will be used during the remedial design to determine additional investigation areas during remedial action.

Health and Safety requirements outlined in Appendix A, Remedial Design Health and Safety Plan", will be followed during the waste limits verification work.

4.7 ANOMALY INVESTIGATIONS - TYPE 3 TEST PITS

Several anomalies were identified during the RI/FS work and/or are apparent after review of RI/FS data.

Two Class 2B geophysical anomalies were identified within the potential waste/fill removal area which have not been resolved. These anomalies were located in the vicinity of STP grids 342, 240N; 549,000E and 342,400N; 548,870E and were identified as potential areas containing buried metal. A Type 3 test pit will be dug at each of these locations to determine the cause of each anomaly. Test pit documentation will be in accordance with Figure 5.

A second type of apparent anomaly occurs where a compound has been identified in the RI/FS lab analyses without the presence of other compounds normally associated with the waste; thus suggesting that the detected compound could potentially be attributed to laboratory contamination. One such sample is at SB-22, at a depth of 3.5 feet, where bis(2-ethylhexyl)phthalate was identified at a concentration of 1,800 ppb. This detect is above the EPA standard for PAH's and SB-22 is outside the proposed limits of the cap. Therefore, an additional test pit will be located at SB-22 to analyze soils at 3.5 feet. Three samples will be collected for field instrument screening, potential supplemental lab screening, and potential PRP lab analyses. If analyses confirm the presence of bis(2-

ethylhexyl)phthalate, additional testing or an extension of the cap into this area may be necessary. A "clean" report from the PRP lab may require another test pit and similar analysis near STP grid 548,000E between grid 342,300N and 342,500N to confirm "clean" soil at the edge of the proposed cap. The actual need and location of this extra test pit will be agreed to by DNR and EPA prior to installation. Test pit documentation for these test pits will be in accordance with Figure 5.

Handling of containerized waste, if encountered during the RD, is discussed in Section 4.5.

4.8 WASTE RELOCATION

The Remedial Design will include plans for relocation of the waste located on the eastern third of the site. The purpose of the relocation is to consolidate the fill, minimize the capped area, and release the eastern third of the site from institutional controls making it suitable for a productive use.

- Design of Consolidation Area

  Once the waste removal limits are determined and volume estimates are prepared the consolidation area can be designed. The following design protocol will be considered.

  a) Final design grades will promote positive surface slopes for control of runoff.

  b) Relocated waste will be compacted to minimize differential consolidation.

  c) Surface water control during construction activities will minimize erosion potential.

  d) Dust, due to construction activities, will be monitored and controlled.

e) Backfill soil types, placement, and compaction requirements will be described.

- Waste Excavation Protocol

The RD will establish sequencing and protocol for waste removal and consolidation efforts, including equipment requirements and response to identifying potentially hazardous waste during these efforts. The construction contractor during the RA will be trained in the extraction and management of such waste. If containerized waste, or a drum(s) is discovered during the RA, the USEPA Project Manager, WDNR, and the parties conducting the RA (parties) will be notified. Upon authorization from EPA and the parties, the contractor will be required to evaluate health and safety concerns, take proper precautions, and carefully remove and overpack the container.

The RD will further describe how soils surrounding the drum will be field screened to determine the extent of contamination. In addition, the RD will discuss how soil samples will be collected at regular grid intervals after the waste is removed and prior to backfill placement. Soils having an FID reading greater than 10 ppm above background are likely to be considered contaminated. All containers and contaminated soils will be handled, sampled, and analyzed in accordance with the Field Sampling Plan and the QAPP in the RD.

4.9 REMOVAL AND MANAGEMENT OF CONTAINERIZED WASTE

The RD will clearly outline strategy and design for locating previously identified containerized waste and excavation of a minimum of six (6) additional areas in an attempt to locate additional drums. The reported geophysical work will be used to help define some of these areas.

The RD and the associated Field Sampling Plan will identify the technique and policy for removal, staging, sampling, overpacking, and on-site storage of drums, containers, and/or soil suspected to contain hazardous waste.

The RD will detail how soil and debris immediately adjacent to any containers will be investigated for hazardous constituents. This soil and debris will be visually inspected for discoloration, unusual moisture or sheen, and other signs of contamination. Field instruments will be used to judge hazardous characteristics, as identified in the QAPP for the RA. Any soil or debris exhibiting signs of hazardous constituents will be excavated, placed in lugger boxes and staged for testing, and, if necessary, removed from the site and properly disposed.

Management of hazardous containerized wastes and hazardous soils will be conducted in compliance with the Federal Land Disposal Restrictions and Wisconsin waste management guidelines, including the "Interim Policy for Promoting the In-State and On-Site Management of Hazardous Wastes in the State of Wisconsin".

During the RD, several contractors, with capabilities to treat, recycle and/or dispose of the drums, hazardous waste and contaminated soils encountered, will be contacted to provide a practical list of alternative processes based on waste types. The priority for selection of a process will be first to reuse or recycle; secondly, to incinerate; and thirdly, to legally dispose of off site. It is not expected that treatment, such as chemical fixation and redisposal on-site, will be considered for this work, due to potential cost, and expected small numbers of drums and volumes of contaminated soil.

It is understood that USEPA, with recommendation from the parties conducting the remedial action and in consultation with WDNR, will make all final decisions concerning the recycling,

treatment, and/or disposal method used for management of excavated drums, soil, and debris.

In accordance with the SOW, it is also understood that the RD will require all drums found on site to be removed and properly disposed of off site, even if they are empty, and even if they do not contain hazardous waste.

4.10 SOIL BORROW INVESTIGATION

The remedial action will require large quantities of imported soil for grading layer, clay cap, protective cover, and topsoil. Most of the soils can be specified and purchased as part of the construction contract(s). However, the clay cap soil must be identified and tested prior to regulatory approval of the RD.

Potential clay soil borrow sites will be evaluated based on geotechnical parameters, associated environmental impacts, cost effectiveness, and practicality.

Geotechnical parameters will be obtained by retrieving representative soil samples from backhoe test pits performed at the borrow area, and testing for physical characteristics as outlined in Attachment 3 to the QAPP and the Field Sampling Plan.

The results of these tests will be evaluated for compliance with applicable sections of NR 504.07.

Potential environmental impacts to be evaluated during soil borrow site consideration will include, but not be limited to:

- Wetland and Habitat Disturbance
- Erosion Control
- Surface Water Pollution Due to Runoff

Cost effectiveness studies will include an analysis of land access, purchase price, mining techniques, haul distances, and reclamation costs for each potential borrow.

Practical aspects to be considered when evaluating each borrow area include parameters such as regulatory sentiments, permitting process, site location, and traffic and roadway conditions.

It is preferable that the clay borrow be located either on or near the site, or at a pre-existing clay borrow area. However, should these sites prove to be unfeasible, other potential clay borrows will be sited with the help of local soil maps and contractor knowledge.

4.11 LANDFILL CAP DESIGN

As part of the remedial design, a multi-layered soil cap will be designed to decrease the amount of water percolating into the waste, and prevent access to the waste area. The cover will be designed to meet or exceed those requirements established in the SOW and NR 504.07. From the bottom to the surface, this cover will consist of the following elements:

- Grading Layer
- Compacted Clay
- Protective Root Zone Soil
- Topsoil
- Vegetation

The following paragraphs elaborate on each of the elements of the cap.

The grading layer will be used to cover all refuse and remove most irregularities in the surface of the fill and provide

slope of at least 5%, whenever possible. The grading layer will have a minimum thickness of 6 inches.

The compacted clay layer will be constructed from the clay identified in the clay borrow study. This clay will meet or exceed the following geotechnical parameters:

- Clay content shall be 25% by weight or greater.
- A minimum of 50% by weight passing the #200 sieve.
- A saturated hydraulic conductivity of 1×10^{-7} cm/sec, or less when compacted, to 90% of the modified proctor density.
- A liquid limit of 30%, or greater.
- A plasticity index of 15%, or greater.

The clay layer will be designed to be a minimum of 2 feet thick at all locations. The Remedial Design report will present detailed plans regarding the "keying in" of the clay cap to the native soil surrounding the waste area and include clay cap installation and documentation requirements.

The protective layer will be designed to provide root zone for cover vegetation, and to protect the clay layer from freeze\thaw and desiccation. Thickness of the protective layer will be established, based on soil properties, frost conditions, and criteria established by WDNR for Rock County, Wisconsin.

The topsoil layer will be a minimum of 6 inches thick and provide conditions that promote vegetative cover. The topsoil shall be seeded with vegetation compatible to site conditions.

It is noted that the SOW requires a drainage layer be incorporated immediately above the clay layer in the FDDS design. Typically, the main reason for a drainage layer above

the barrier (clay or membrane) layer is to maintain minimal head of water on the barrier thereby minimizing infiltration and leachate generation. This would be beneficial where the protective cover soil is a granular soil which would allow a great deal of surface water to infiltrate to and pond on the barrier layer. The soils "native to the vicinity" and expected to be used as a protective layer at FDDS are a silt and clay classification. These soils will promote surface water runoff rather than infiltration. They also have an affinity for water which will hold moisture within the soil matrix making it available for root and plant growth. The use of a fine grained (silt and clay) protection cover soil defeats the need for a drainage layer, therefore it is proposed that the drainage layer be eliminated from the FDDS cap design.

4.12 LEACHATE COLLECTION TRENCH

As part of the RD, a leachate collection trench will be designed. The design will be a toe drain trench concept. The toe drain will be placed along the west edge of the area containing waste. Historical mapping indicates this to be the most probable low point of original soil/waste interface. The design intent will be to collect and remove the seepage traveling through waste and along the waste/base soil interface, creating the ability to monitor the quality and seasonally differential quantity collected. If, during RD, seepage is observed in other areas of the waste cell, additional leachate collection trenches may be considered.

Design of leachate monitoring system will consider the following features:

- Collection Trench

  The dimensions of the trench will be approximately 2 feet wide and, if possible, 2 feet deep. The base will be located above the elevation of the existing pond water

surface and the normal phreatic surface of the "clay aquifer" to avoid collection of ground water in the system. The top, or inlet, to the trench should be below the waste/base soil interface, if possible. Geotextile fabric and synthetic membrane materials will be considered for soil separation and trench liners.

- Collection Piping

  The leachate collection pipe will be 6 inch diameter Schedule 80 PVC. The pipe will be perforated in the area of the trench and will be surrounded by a minimum 6 inches of washed stone bedding. The minimum slope on all leachate collection pipes will be 0.5%.

- Manholes and Cleanouts

  The design will include provisions for manholes or cleanouts. The number and location of these manholes will be established, based on collection piping configuration and pipe cleaning capabilities.

- Storage

  The design will also consider storage of leachate, in addition to manhole capacity. If necessary, a shallow bury tank will be designed, in addition to or in lieu of a manhole. Tank design must consider corrosive resistant materials and floatation, if the tank is to be installed below the ground water surface.

  Provisions for vehicular access to this collection system, leachate testing, leachate removal and tank inspection will be covered in the RD Operation and Maintenance Plan.

4.13 SURFACE WATER MANAGEMENT

The Remedial Design will consider the control of surface water during construction and after completion of the Remedial Action construction. The purpose of these controls will be to minimize erosional problems, thereby protecting the existing unnamed stream, assisting in site surface stabilization and promoting the integrity of the waste area cover. Controls will be designed based on site and area hydrologic characteristics. Examples of such controls include, but are not limited to the following:

- Site Grading
- Mulching
- Vegetative Cover
- Riprapped Drainageways
- Stormwater Piping
- Settling Ponds
- Check Dams
- Temporary Silt Fence and/or Straw or Hay Bale Dams

It is expected that runoff would be directed to the unnamed stream at the rear of the site. Discussions with local officials indicate that local stormwater permits are not required, provided that no underground utilities are installed. Wisconsin stormwater regulations must be reviewed to determine criteria to be followed during construction activities.

4.14 LANDFILL GAS

Given the nature of the fill at the FDDS, it is unlikely that gas production rates warrant the installation of a venting system. However, if, during the remedial design, it becomes

apparent that the waste encountered may exhibit the capability to produce substantial amounts of gas, a venting system will be considered.

4.15 ENVIRONMENTAL MONITORING PROGRAM

The monitoring program will be designed to detect changes in the chemical concentrations in the ground water, leachate, surface water, sediment, and private well water at and near the site. The results will be utilized for the following purposes:

- To further characterize and monitor ground water and surface water conditions at and near the site;

- To provide a baseline ground water data and ongoing data during remediation in order to continually and systematically assess ground water conditions. During and within the first 2 years after the RA construction, this data will be incorporated into a Ground Water/Surface Water Assessment Plan which will help estimate the length of time until ground water clean-up standards will be met through natural attenuation. The baseline on up gradient wells may also be utilized to provide alternative concentration limits in lieu of limits listed in NR 140;

- To ascertain the effectiveness of the cap in reducing infiltration of water through the waste;

- To determine whether and when ground water and surface water clean-up standards have been met;

- To determine whether the Respondents will be required to evaluate additional remedial actions at the site;

- To assess ground water conditions at private wells; and

- To determine if treatment of liquids collected and removed from the leachate collection trench is necessary.

4.15.1 Ground Water Monitoring Wells

Site investigations, well logs, and literature indicate that there are potentially three geologic units beneath the FDDS in which monitoring should occur. The uppermost water bearing medium is a variable thickness clay unit, which appears to be about 65 feet thick in the vicinity of the FDDS, according to an adjacent private well log. A second unit is a sand, gravel, and mixed sandy clay "sand and gravel unit" which, as identified by the same private well, is about 75 feet thick. Literature, however, indicates that this layer varies considerably in thickness across the region and may be non existent in some areas. The third water bearing feature is identified as the dolomite aquifer. The dolomite bedrock unit appears to be the unit in which the majority of the private wells in this area are drawing water from.

It is the intent of the negotiated SOW for the Remedial Design to identify a minimum of six (6) monitoring wells screened in the clay unit, four (4) wells screened in the sand and gravel unit, and four (4) monitoring wells screened in the dolomite unit. The down gradient monitoring wells must be located as close as possible to the waste management boundary (WMB) which, in this case, is the edge of the final cap. The new monitoring wells will be installed after the remedial cap and final grades have been stabilized and in accordance with NR 141.

There are currently five water table wells and three piezometers located in the "clay aquifer". No monitoring wells are located in the other two units. Since final waste management boundaries are not known, it is not possible to locate proposed wells at this

time, however, the following narrative discusses general well placement criteria and locations.

- Clay Aquifer Wells

The slope of the water table in the clay aquifer has been identified as westerly, making MW-1 an up gradient well. MW-1 may, therefore, remain as an up gradient water table well. P-1 will probably be abandoned in accordance with NR 141.25. If MW-1 appears to be in the way of waste relocation efforts, it may also be abandoned according to NR 141.25 and reestablished near the east property line.

MW-3 and P-3 appear to be in an appropriate down gradient location near the southwest corner of the waste management boundary, however, it is reported that MW-3 may have been placed in an area containing waste. If this is the case, then MW-3 may be relocated, however, P-3 should remain as a sampling point deeper in the clay aquifer.

MW-4 and MW-5 are not expected to be adjacent to the WMB. They may also be in the way of borrow soil excavations or final surface water control features. If this is the case, they may be properly abandoned in accordance with NR 141.25. If not "in the way", MW-5 may remain, but likely not be a part of the monitoring program.

MW-2 and P-2 are located about 300 feet northwest of the presumed WMB and not in conformance with the SOW. It is likely that MW-2 and P-2 will be properly abandoned in accordance with NR 141.25.

Three (3) new water table wells will, therefore, be needed along the west edge of the WMB. The

following approximate State Plane Coordinate (SPC) grid locations will be considered during the RD.

SPC Grid	
North	East
342,000	2,547,800
342,250	2,548,000
342,400	2,547,900

It is understood that EPA and DNR will approve the locations of all monitoring wells prior to installation.

- Sand and Gravel and Aquifer Wells

Current literature indicates that the flow direction in the sand and gravel aquifer may be easterly toward Lake Michigan. A new up gradient well must then be installed west of the final WMB. It would be proper to install this well adjacent to one of the down gradient water table wells. However, the ability of these locations to provide true up gradient quality is in question, and this well may have to be located further west.

Three down gradient wells are required in the sand and gravel aquifer. These will probably be located along the east edge and near the northeast or southeast corner of the final WMB. A sequential drilling system will be followed to allow placement of these wells in down gradient positions as water elevations in this aquifer are identified. The east WMB is expected to be in the neighborhood of State Plane Coordinate grid 2,548,500E to 2,548,700E. EPA's project manager and hydrogeologist and WDNR's representative will be kept informed as consecutive well locations are

proposed and will approve the locations of all wells prior to installation.

- Dolomite Aquifer Wells

  According to literature, the flow direction in the dolomite aquifer is also expected to be easterly toward Lake Michigan. It is possible the piezometric surface documented in the dolomite wells may be parallel to that of the sand and gravel aquifer wells. Therefore, the up gradient dolomite aquifer well will probably be nested with the up gradient well for the sand and gravel aquifer. A sequenced approach will again be used to locate down gradient wells along the east waste management boundary in the most down gradient position based on water elevations in previously constructed wells. Again, EPA and DNR representatives will be kept informed as well locations are proposed and will approve the locations of the wells prior to installation.

Monitoring well design will also consider drilling techniques that may minimize the potential for transporting contamination down the drill hole. This consideration will include discussions of double casing and grouting wells penetrating to sand and gravel aquifer, and the dolomite aquifer. No permanent monitoring wells will be installed through waste.

The operation and maintenance O&M Plan will establish sampling and record keeping protocol and describe maintenance requirements for the monitoring wells.

4.15.2 Leachate Monitoring

The Remedial Design will include provisions for an operation maintenance program for the leachate

collection trench. This program will include provisions for sampling and analysis of leachate, as well as leachate disposal and collection trench maintenance.

4.15.3 Surface Water Monitoring

The approved Remedial Design will determine the fate of the existing pond. If the existing pond is to remain after site closure, two points will be chosen as surface water sample locations. In addition, two locations will be identified for surface water sample locations in the stream. Each sample location will be clearly marked in the field and include a reference elevation for gaging water elevation.

The Operation and Maintenance (O&M) Plan will establish protocol for sampling, record keeping, and maintenance of sample locations.

4.15.4 Sediment Monitoring

The Remedial Design will determine locations in the stream and the pond to collect sediment samples, if necessary.

4.15.5 Private Wells

The RD will identify private wells near the FDDS to be monitored, if required by EPA.

4.13.6 Monitoring Program Operation and Maintenance Plan

- Sampling and Analyses

The Operation and Maintenance (O&M) Plan within the RD will set forth the schedule for monitoring, the parameters to be analyzed, the sampling protocol and the sample location inspection/maintenance

requirements. The monitoring schedule and analyses will reflect those requirements negotiated in the SOW.

- Clean-Up Standards and Schedule

The O&M Plan will describe the monitoring points adjacent to the edge of the completed cap as the point of standards application or point of compliance. Preventative Action Limits (PAL's), as set forth in NR 140, will be used as the cleanup standards at these locations, unless alternate concentration limits are acceptable to EPA and WDNR. The RD will discuss the potential to estimate the length of time after the RA that may be expected in order to achieve the PAL cleanup standards by natural attenuation methods. The data used for this estimate may include soil and cap permeability expectations, ground water flow calculations, and existing concentrations of targeted parameters. An attempt to determine an estimated attainment schedule may not be possible until the monitoring system is complete and background analyses are documented.

- Assessment Outline

An outline will be established to assess ground water and surface water analytical data for the required two and five year assessment reports.

- Alternate Water Supply

In the event that a private well is shown to be contaminated, above cleanup standards, with chemicals found in the water or ground water during the RI or the monitoring program, the parties conducting the remedial action will be required to

supply an alternate drinking water supply. The RD will discuss potential alternate sources and availability.

4.16 POND MANAGEMENT

The Remedial Design will discuss alternatives for the final fate of the man-made pond located on the Fadrowski Drum Disposal Site. This pond area was excavated for fill material in approximately 1983. The result was an isolated pond that accumulates surface water and possibly ground water from what has been identified as the "clay aquifer". Since the pond has no active flow, it is very stagnant and has been described as "very low quality". The pond also acts as an attractive nuisance, especially to young people. Because of this, it can be considered a hazard to life and health.

There appear to be three alternatives when considering the final fate of the pond.

- The alternative described in the Final Feasibility Study shows a large portion of the pond to be filled to provide proper slopes over the western edge of the FDDS fill area. The clay cap would terminate at the existing edge of waste. It is expected that fill soil would extend nearly all the way across the south end of the pond and probably to a lesser extent across the north end. This alternative would probably leave a smaller pond with the same undesirable characteristics as the existing pond. The toe of the fill slope would likely be we and unstable. The actual area of pond remaining cannot be determined until horizontal waste limits are defined and cap design completed.

- The second alternative may be to relocate waste along the western edge of the fill limits to provide the proper slope prior to cap placement. The pond, in this case,

would probably remain very near the same configuration and maintain the existing undesirable features. This alternative creates additional concerns for the construction of the leachate collection trench in potentially inundated areas. Waste relocation with heavy equipment on this steep slopes may be hazardous.

- The third alternative, and currently the "preferred option", would be to continue beyond the first alternative by completely filling the pond, creating a positive surface slope to drain surface water from the capped landfill further west toward the creek. This alternative, if implemented, would help to increase soil strength at the base of the slope and minimize site safety concerns.

During the Remedial Design, wetland regulatory people will be invited to provide opinions as to the final fate of this pond. With the encouragement of EPA and Menard, Inc., and approval from WDNR, the third alternative will be chosen as the Remedial Action. Selection of this third is supported by the following:

1. The elimination of the pond would result in eliminating saturated soil at the base of the slope and increasing the angle of internal friction in the soil and improve slope stability;

2. The elimination of the pond would result in a drier, more stable area for placement of the leachate collection trench and manhole(s). This would also minimize the likelihood of inundation of the leachate collection trench by surface water;

3. The distance to the stream (400-500 feet) and the natural topography eliminates the need for the pond to act as a sedimentation basin;

4. According to the Fadrowski Drum Disposal NPL Site Wetlands Investigation, completed by the EPA, the area that is now the pond was not a wetland prior to its excavation in 1983;

5. Since it is isolated from any natural streams, the pond has no outlet, and therefor has poor water quality.

6. Elimination of the pond would reduce local residents' risk associated with physical hazards presented by the pond.

If the pond is to be filled, sediment sampling, as described in the Field Sampling Plan, will be implemented to determine the need to consolidate sediments into areas to be capped, or extend the cap accordingly.

4.17 FUGITIVE DUST CONTROL

Since RD field work will probably be completed during the early spring, particulate levels are expected to be negligible. This is due to the minimal amount of soil disturbance and the high cohesion of moist or frozen soils. However particulate sampling at test pit excavation sites will be performed in conformance with the RD Health and Safety Plan. The RD will contain a section discussing fugitive dust control for the Remedial Action. This section will consider control measures for activities such as:

- Waste relocation operations;
- Soil borrow operations;
- Cap construction;
- Long term site operations.

Measures under consideration for controlling fugitive dust will include, but not be limited to, phased construction and application of water to parched areas.

4.18 PERMITTING

In accordance with the National Contingency Plan (NCP), permits are not required for remedial activities taking place on the FDDS. However, the substantive requirements of applicable local, state, and federal permits will be met. Furthermore, required permits shall be obtained for any activities taking place off site. As such, it appears that only two permits are required to complete the RD. These can be summarized as follows:

City of Franklin Soil Disturbance Permit - Covers soil disturbing practices such as test trenching operations. This permit will be obtained prior to beginning any off site work. This permit may also be necessary to excavate test pits at proposed off site borrow sources.

US Environmental Protection Agency - Hazardous Waste Generator Permit - Covers the generation or reclamation of hazardous waste such as that which might be uncovered during test trenching operations. Since containerized waste is not expected to be recovered during the RD, a Hazardous Waste Generator Permit would be obtained only if needed.

During the Remedial Design, local governments and regulatory agencies will be contacted to determine the need and establish the process to obtain permits to carry out the Remedial Action. The parties to be contacted will include the City of Franklin, Milwaukee County, Milwaukee Metropolitan Sewerage District, U.S. Corp of Engineers, USEPA, and WDNR. Permits to be sought may include Soil Disturbance Permits, Conditional Use Permits for borrow sources, Stormwater Management Permits, Wetland Disturbance Permits, Hazardous Waste generator Permits, and

Permits to Discharge or Dispose of Contaminated Soil and/or Liquids.

5.0 REVISED PRELIMINARY COST ESTIMATE

The estimate for capital cost has been updated to reflect the additional work required by the SOW. The ROD chose Alternate 5A from the Feasibility Study as the Remedial Action. Alternate 5A included an NR 504 cap with container removal. The negotiated SOW added 12 monitoring wells and the potential to consolidate waste from the eastern third of the site onto the remaining area containing waste. The capital cost estimate for Alternate 5A, as presented in Appendix A of the "Final Feasibility Study, Fadrowski Drum Disposal Site, Franklin, Wisconsin, May, 1991", has been updated to reflect these changes and is included herein as Figure 7.

The changes reflected in the updated cost estimate include:

- Waste relocation;
- Soil backfill for the eastern third of the site;
- Test pits and soil sampling in the eastern third of the site;
- Reduction in clay cap and cover soil due to this consolidation;
- Additional fill to completely fill the man-made pond;
- Twelve additional monitoring wells;
- Fence and security.

The updated estimate uses the same unit costs as the original estimate whenever possible, however, it is assumed that the soil to backfill the eastern third of the site will be taken from land owned by Menard's immediately west of the FDDS. The estimate will be updated again during the RD, at which time the design quantities for the cap and waste relocation will be defined. An initial RD cost

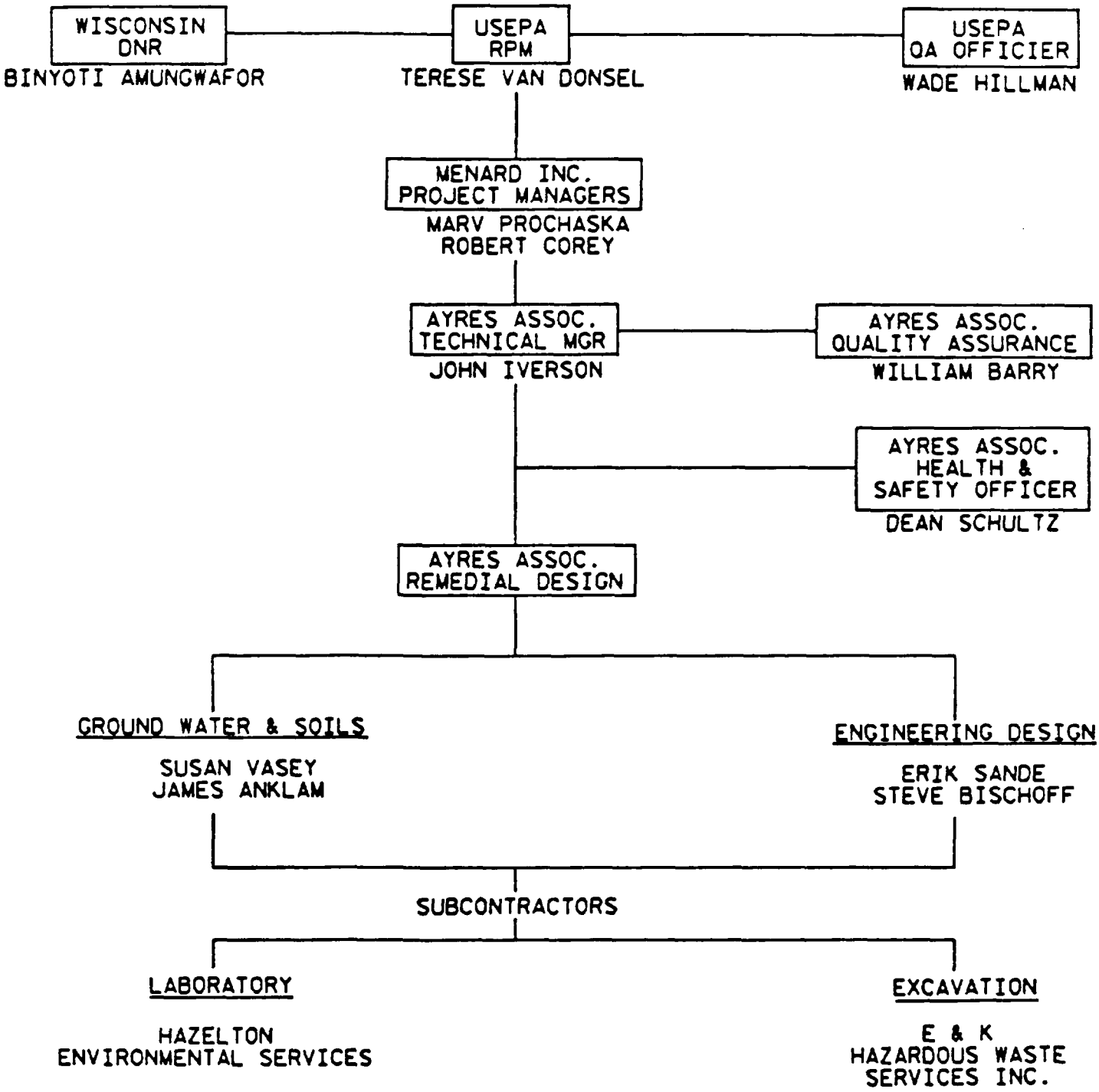
estimate will be submitted with the Prefinal Design and the final cost estimate will be included with the Final Design documents.

6.0 DESIGN SCHEDULE

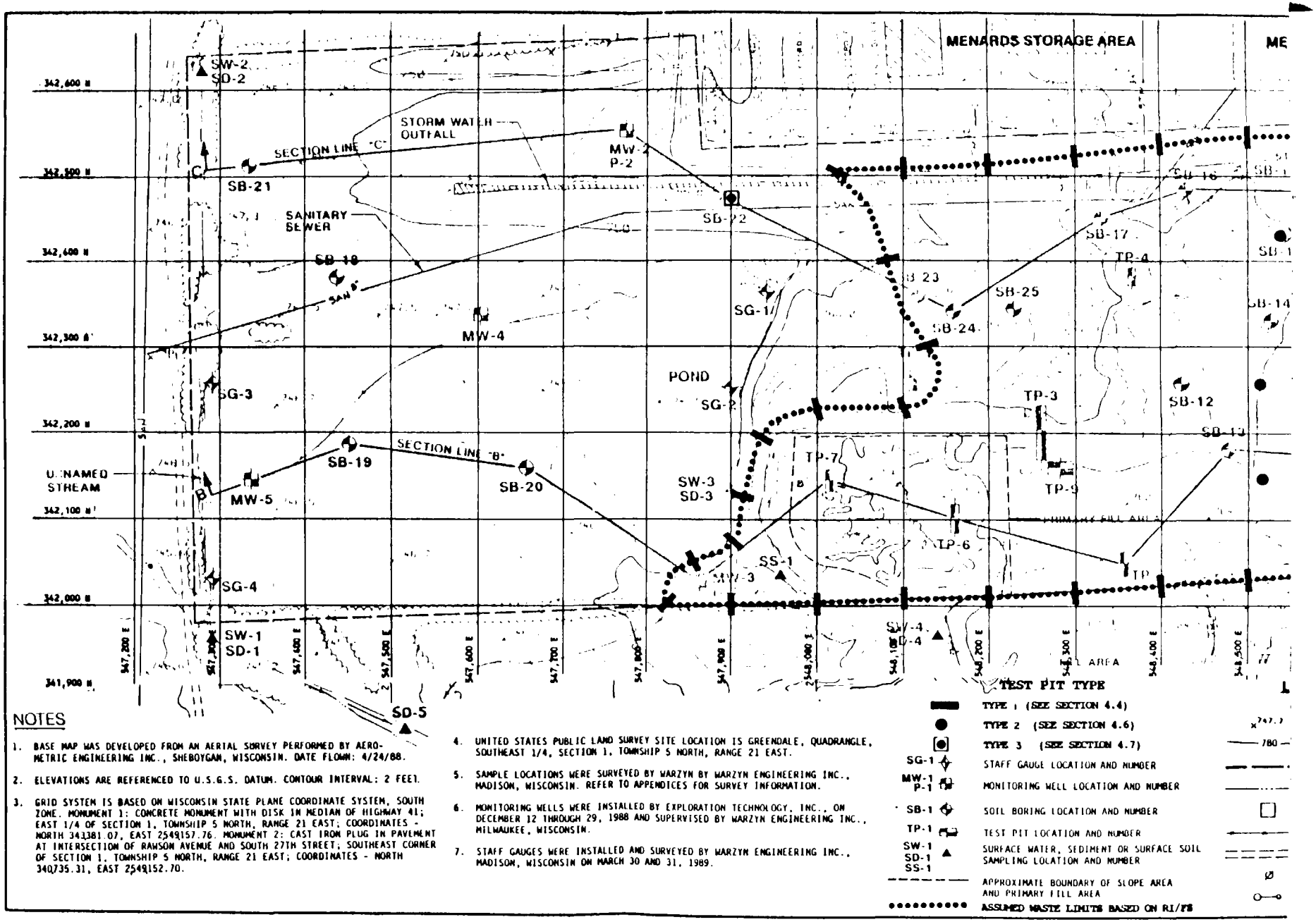
A compliance schedule is presented in the SOW. Because of additional testing and lab analyses during the preliminary design phase it is requested that this Phase be lengthened to 90 days. The following approximate design schedule is suggested:

Sept. 30, 1991	Signature of AOC
Sept. 30 to Nov. 30, 1991	Preparation and Submittal of RD Work Plan
Dec. 1, 1991 to Jan. 20, 1992	EPA Review of Work Plan
Jan. 20 to Feb. 20, 1992	Revisions to RD Work Plan
Feb. 21 to Mar. 13, 1992	EPA Second Review of Work Plan
Mar. 13 to Jun. 11, 1992	RD Field Work and Preliminary Design
Jun. 11 to Jul. 11, 1992	EPA Review Preliminary Design
Jul. 11 to Aug. 26, 1992	RD Prefinal Design
Aug. 26 to Sept. 26, 1992	EPA Review Prefinal Design
Sept. 26 to Oct. 11, 1992	Final Design

PROJECT ORGANIZATION CHART
FADROWSKI DRUM DISPOSAL SITE
REMEDIAL DESIGN

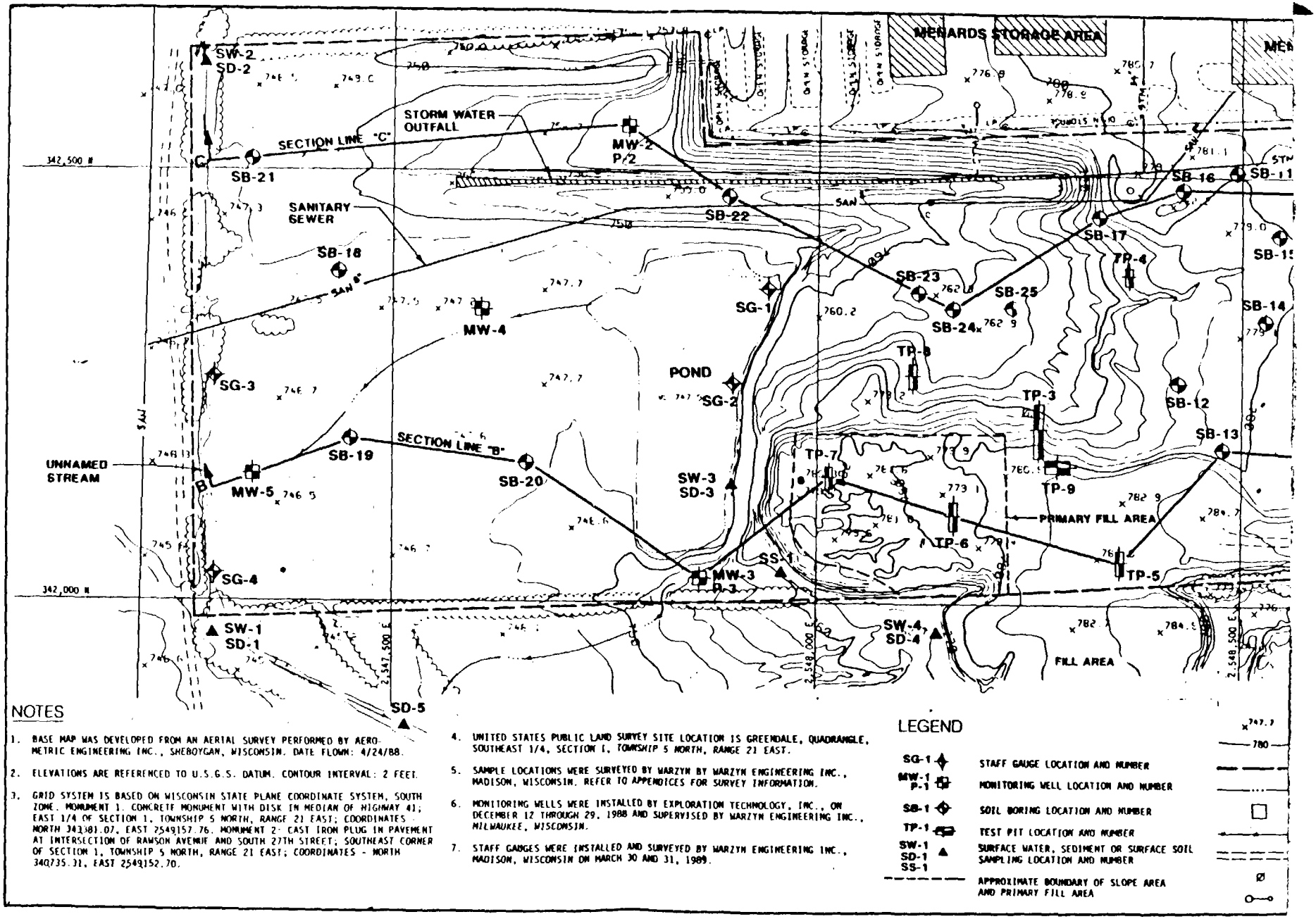


FIGURE



NOTES

1. BASE MAP WAS DEVELOPED FROM AN AERIAL SURVEY PERFORMED BY AERO-METRIC ENGINEERING INC., SHEBOYGAN, WISCONSIN. DATE FLOWN: 4/24/88.
2. ELEVATIONS ARE REFERENCED TO U.S.G.S. DATUM. CONTOUR INTERVAL: 2 FEET.
3. GRID SYSTEM IS BASED ON WISCONSIN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE. MONUMENT 1: CONCRETE MONUMENT WITH DISK IN MEDIAN OF HIGHWAY 41; EAST 1/4 OF SECTION 1, TOWNSHIP 5 NORTH, RANGE 21 EAST; COORDINATES - NORTH 341381.07, EAST 2549157.76. MONUMENT 2: CAST IRON PLUG IN PAVEMENT AT INTERSECTION OF RAWSON AVENUE AND SOUTH 27TH STREET, SOUTHEAST CORNER OF SECTION 1, TOWNSHIP 5 NORTH, RANGE 21 EAST; COORDINATES - NORTH 340735.31, EAST 2549152.70.
4. UNITED STATES PUBLIC LAND SURVEY SITE LOCATION IS GREENDALE, QUADRANGLE, SOUTHEAST 1/4, SECTION 1, TOWNSHIP 5 NORTH, RANGE 21 EAST.
5. SAMPLE LOCATIONS WERE SURVEYED BY WARZYN BY WARZYN ENGINEERING INC., MADISON, WISCONSIN. REFER TO APPENDICES FOR SURVEY INFORMATION.
6. MONITORING WELLS WERE INSTALLED BY EXPLORATION TECHNOLOGY, INC., ON DECEMBER 12 THROUGH 29, 1988 AND SUPERVISED BY WARZYN ENGINEERING INC., MILWAUKEE, WISCONSIN.
7. STAFF GAUGES WERE INSTALLED AND SURVEYED BY WARZYN ENGINEERING INC., MADISON, WISCONSIN ON MARCH 30 AND 31, 1989.



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LEGEND

- SG-1 — STAFF GAUGE LOCATION AND NUMBER
- MW-1 / P-1 — MONITORING WELL LOCATION AND NUMBER
- SB-1 — SOIL BORING LOCATION AND NUMBER
- TP-1 — TEST PIT LOCATION AND NUMBER
- SW-1 / SD-1 / SS-1 — SURFACE WATER, SEDIMENT OR SURFACE SOIL SAMPLING LOCATION AND NUMBER
- APPROXIMATE BOUNDARY OF SLOPE AREA AND PRIMARY FILL AREA

FIGURE 4

PROTOCOL FOR COMPLETING TYPE 1 TEST PITS TO LOCATE HORIZONTAL WASTE LIMITS

1. Survey and mark approximate test pit locations based on Figure 3 locations.

2. Excavate test pit at surveyed location.

3. Probe soil with backhoe at 10 foot intervals toward and/or away from center of waste to find approximate edge of waste.

4. Extend a test pit, having minimum depth of 2 feet) from 5 feet outside of horizontal waste limits to waste.

5. Locate and dimension test pit; record:

   - Grid station
   - Elevation at surface
   - Length
   - Width
   - Depth

6. Define waste location within pit; record:

   - Depth of cover soil
   - Depth of waste
   - Waste profile through and across test pit (may require a sketch)
   - Determine "edge of waste"

7. Meter readings; perform and record:

   - Head space meter reading of soil immediately beneath waste at documented edge of waste.
   - If first reading is above background, collect soil sample and at same depth 5 feet outside of defined waste limits and screen.

8 Describe waste and soil encountered, and provide an opinion as to whether waste or soil requires capping or consolidation.

   a). Waste Requiring Capping or Consolidation

- Demolition and rubble; i.e., soil, concrete, blacktop, steel, unpainted wood, painted wood, glass, roofing materials, plaster, siding, insulation, small paint or solvent cans, adhesive containers, or other waste that may be derived from construction or demolition of buildings.

- Foundry sand, sludges, or other soils appearing contaminated: describe texture, any discoloration, color or sheen, or obvious odor if evident, etc.

- Containers such as drums, paint cans, solvent cans, etc.: look for labels and describe contents, if evident.

- Native soil or fill beneath and intermingled with waste include visual USCS classification, apparent moisture, discoloration or sheen, obvious odors, presence of oil or sludge, etc.

8. Photograph test pit side walls and waste observed; 35 mm photos; log all photographs.

FIGURE 5

GUIDELINES FOR DOCUMENTING TYPE 2 AND TYPE 3 TEST PITS

1. Survey and mark test pit location in field based on Figure 3 locations.

2. Record location and dimension test pit; record:

   - Grid station
   - Elevation at surface
   - Length, width, depth

3. Define waste location within pit

   - Depth of cover soil
   - Total depth of waste
   - Variations to profile across test pit

4. Record meter readings

   - See Figure 6

5. Describe waste and soil encountered

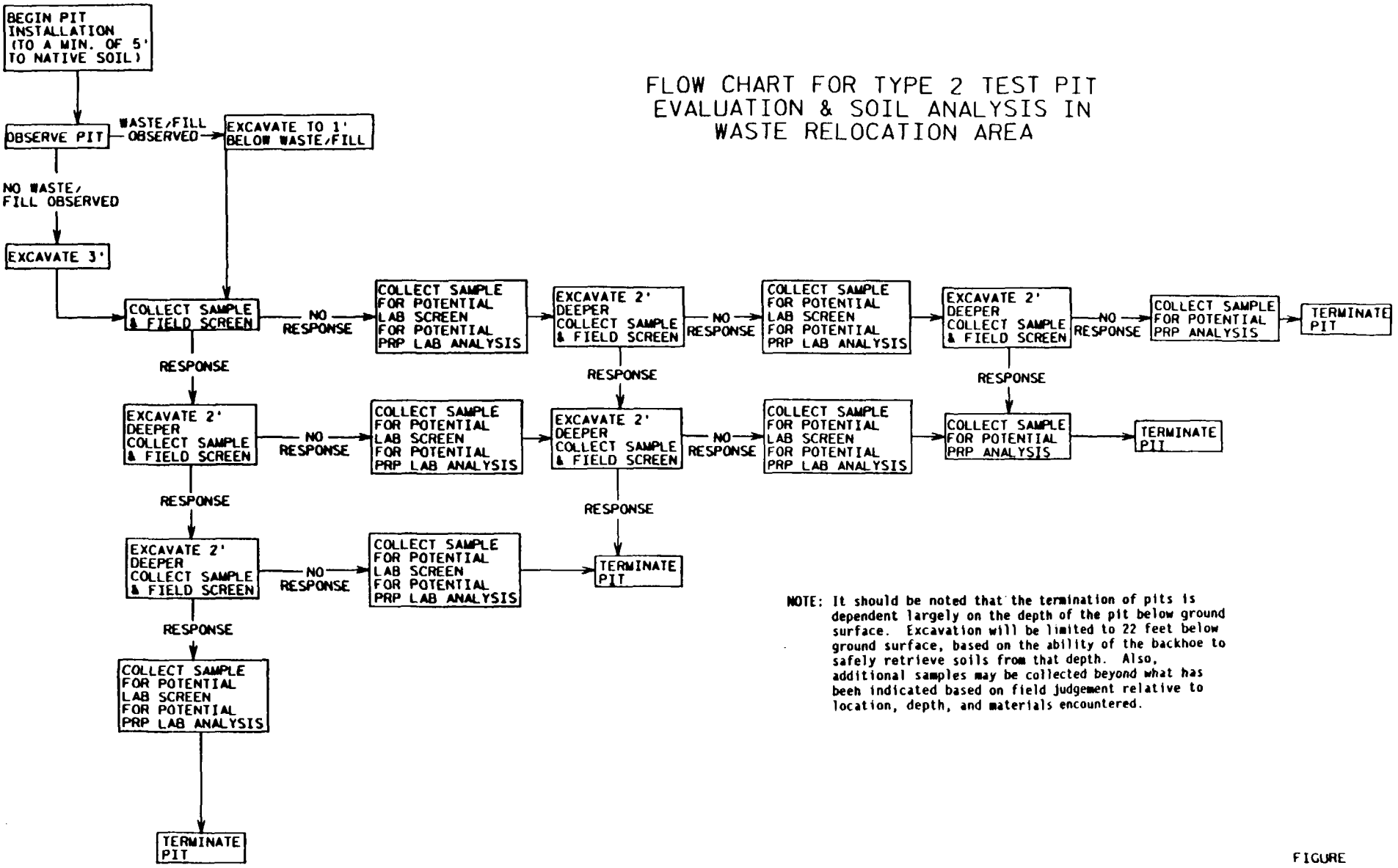
   - Demolition and rubble: soil, concrete, blacktop, steel, unpainted wood, painted wood, glass, roofing materials, plaster, siding, insulation, small paint or solvent cans, adhesive containers, or other waste that may be derived from construction or demolition of buildings.
   - Foundry sand, sludges, or other soils appearing contaminated: describe texture, any discoloration, color or sheen, or obvious odor if evident, etc.
   - Containers such as drums, paint cans, solvent cans: look for and record label descriptions and describe contents, if evident.
   - Soil beneath and intermingled waste: include visual USCS classification, apparent moisture, discoloration or sheen, obvious odors, presence of oil or sludge, etc.
   - Provide an opinion as to whether waste encountered appears to be hazardous or non-hazardous.

6. Record location of samples collected

- Depth from surface

- Depth below observed waste/fill

FLOW CHART FOR TYPE 2 TEST PIT EVALUATION & SOIL ANALYSIS IN WASTE RELOCATION AREA



NOTE: It should be noted that the termination of pits is dependent largely on the depth of the pit below ground surface. Excavation will be limited to 22 feet below ground surface, based on the ability of the backhoe to safely retrieve soils from that depth. Also, additional samples may be collected beyond what has been indicated based on field judgement relative to location, depth, and materials encountered.

FIGURE

6

FIGURE 7
REVISED PRE-DESIGN CAPITAL COST ESTIMATE
FADROWSKI DRUM DISPOSAL SITE - 02/07/92

CAPITAL COSTS	QUANTITY	UNIT	UNIT COST	COST SOURCE(1)	COST
Security					
a. Chain Link Fence	4000	LF	$13.25	a	$53,000
b. Guard	2400(2)	Hr	$11.00	a	$26,400
c. Shelter	1	ea	$7,000.00	b	$7,000
Container Removal Program					
a. Excavation and Backfill	1000	cy	$12.00	b	$12,000
b. Container Staging Area	1	@	$1,200.00	b	$1,200
c. Overpack Container	50	@	$120.00	c	$6,000
d. Sampling Cost for Disposal	50	@	$720.00	c	$36,000
e. Transport Containers to Incinerator	1	LS	$2,400.00	b	$2,400
f. Container Incineration	50	@	$528.00	b	$26,400
g. Management of Hazardous Soils	12	cy	$750.00	b	$9,000
h. Supervision and Container Handling (2)	1	LS	$33,000.00	b	$33,000
i. Additional Fill Sampling (3)	10	@	$2,000.00	b	$20,000
Waste Consolidation					
a. Additional test pits	10	ea	$440.00	c	$4,400
b. Soil sampling beneath waste	10	ea	$2,000.00	b	$20,000
c. Waste relocation	72000	cy	$3.00	b	$216,000
d. Soil Backfill (4)	72000	cy	$2.87	a	$206,640
Cap (per NR 504.07)					
a. Grade site (3%<site slope<25%)	11900	cy	$3.00	a	$35,700
b. Import soil from borrow site					
- 6" topsoil	9060	cy	$9.25	c	$83,805
-18" soil	19000	cy	$8.00	c	$152,000
-24" clay	25000	cy	$9.25	c	$231,250
-Soil fill to meet minimum slope	30000	cy	$8.00	c	$240,000
c. Place soil for cap construction					
- 6" topsoil	9060	cy	$2.00	a	$18,120
-18" topsoil	19000	cy	$2.87	a	$54,530
-24" clay	25000	cy	$3.00	b	$75,000
-vegetate cover	54440	sy	$0.25	b	$13,610
-soil fill to meet minimum slope	30000	cy	$2.87	a	$86,100
d. Construction Leachate Collection Trench					
-excavation	324	cy	$3.03	a	$982
-pipe placement	250	ft	$8.00	a	$2,000
-manhole construction	1	ea	$1,800.00	a	$1,800
-1/2" to 2" stone	85	cy	$12.50	c	$1,063
-backfill trench	239	cy	$2.00	b	$478
e. Construct Floodplain Protection					
-filter fabric	400	sy	$2.00	b	$800
-rip rap	130	cy	$15.00	c	$1,950
Monitoring Wells					
a. Clay aquifer	250	VF	$63.10	c	$15,775
b. Sand and gravel aquifer	410	VF	$77.05	c	$31,590
c. Dolomite aquifer	650	VF	$81.00	c	$52,650
Subtotal					$1,778,643
Construction Management (20%)					$355,728
Design Engineering (15%)					$266,796
Construction Documentation (10%)					$177,864
Total Capital Cost					$2,579,031(5)

Note: (1) a-Cost based on Means Site Work Cost Data-1991. b - Cost based on costs from similar projects. c-Cost based on vendor estimates.
(2) Cost based on a site supervision for a 100 day period.
(3) Verification soil samples after drum removal.
(4) Soil available adjacent to site.
(5) Total does not include O&M costs.

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