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7 June 1994

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U.S. EPA Contract No.: 68-W8-0089

Work Assignment No.: 54-5NT2

Document Control No.: 4500-54-AJAZ

Subject: Remedial Design Work Plan Revision, Volume 1
Stoughton City Landfill, Stoughton, Wisconsin

Dear Mr. Edelstein:

Roy F. Weston, Inc. (WESTON®) is pleased to enclose two (2) copies of Volume 1 of the Remedial Design Work Plan Revision, in accordance with the request of Ms. Mary Tierney.

If you should have any questions regarding the Work Plan or the project, please contact me at (708) 918-4042.

Very truly yours,

ROY F. WESTON, INC.

William F. Karlovitz, P.E.
Site Manager

WFK:ktc

cc: Mary Tierney - RPM, U.S. EPA, HSRW-6J
P. Vogtman - Project Officer, U.S. EPA, HSM-5J

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4500-54-AJAZ




PERFORMANCE OF REMEDIAL
PLANNING ACTIVITIES AT
UNCONTROLLED SUBSTANCE
DISPOSAL SITES (ARCS REGION V)

U.S. EPA CONTRACT NO. 68-W8-0089

REMEDIAL DESIGN WORK PLAN
FOR
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

Work Assignment No. 54-5NT2
Document Control No. 4500-54-AGVI

Approved By:

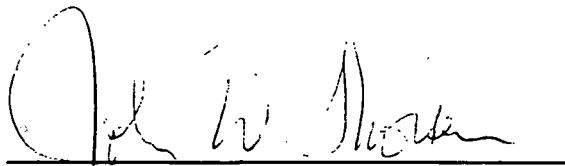


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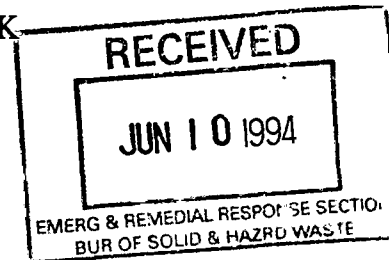
Date:

15 March 1993

**REMEDIAL DESIGN WORK PLAN REVISION
FOR
STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN**

**VOLUME 1
TECHNICAL SCOPE OF WORK**

19 April 1994



Prepared For:

U.S. Environmental Protection Agency
Emergency and Remedial Response Branch
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

This document was prepared in accordance with U.S. EPA Contract No. 68-W8-0089, WESTON Region V Alternative Remedial Contracting Strategy (ARCS).

Work Assignment No. 54-5NT2

Document Control No. 4500-54-AISX

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SECTION 1 INTRODUCTION

On ~~25 March 1994, 24 November 1992~~, the United States Environmental Protection Agency (U.S. EPA) issued a ~~approved Work Assignment Form, Revision Revision No. 0106, dated 20 November 1992, and with a revised~~ Statement of Work (SOW) Revision No. 0103, for the remedial design at the Stoughton City Landfill. ~~A kick-off meeting was held on 16 October 1992 to discuss the SOW.~~ This Work Plan ~~Revision~~ was prepared based on the SOW Revision No. 0103 ~~and the kick-off meeting held on 16 October 1992.~~

The Work Plan ~~Revision~~ consists of two volumes. The technical scope of work is discussed in Volume 1. The estimated costs for the scope of work are provided in Volume 2.

Volume 1 of the Work Plan consists of the following:

- Section 2 - Background Information.
- Section 3 - Remedial Design Scope of Work.
- Section 4 - Project Organization.
- Section 5 - Project Schedule.

~~The Work Plan Revision is necessary to incorporate technical requirements for performing additional tasks to collect data for completion of the design. In addition to the Work Plan Revision, the following additional tasks are necessary, as indicated in the SOW:~~

- ~~Preparation of HASP Addendum (Task C).~~
- ~~Hydrogeological investigation and QAPP Amendment (Task K3).~~
- ~~Exploratory borings and additional sampling (Task K7).~~
- ~~Methane monitoring (Task K8).~~
- ~~Control of water levels in northern portion of the site (Task K9).~~

SECTION 2

BACKGROUND INFORMATION

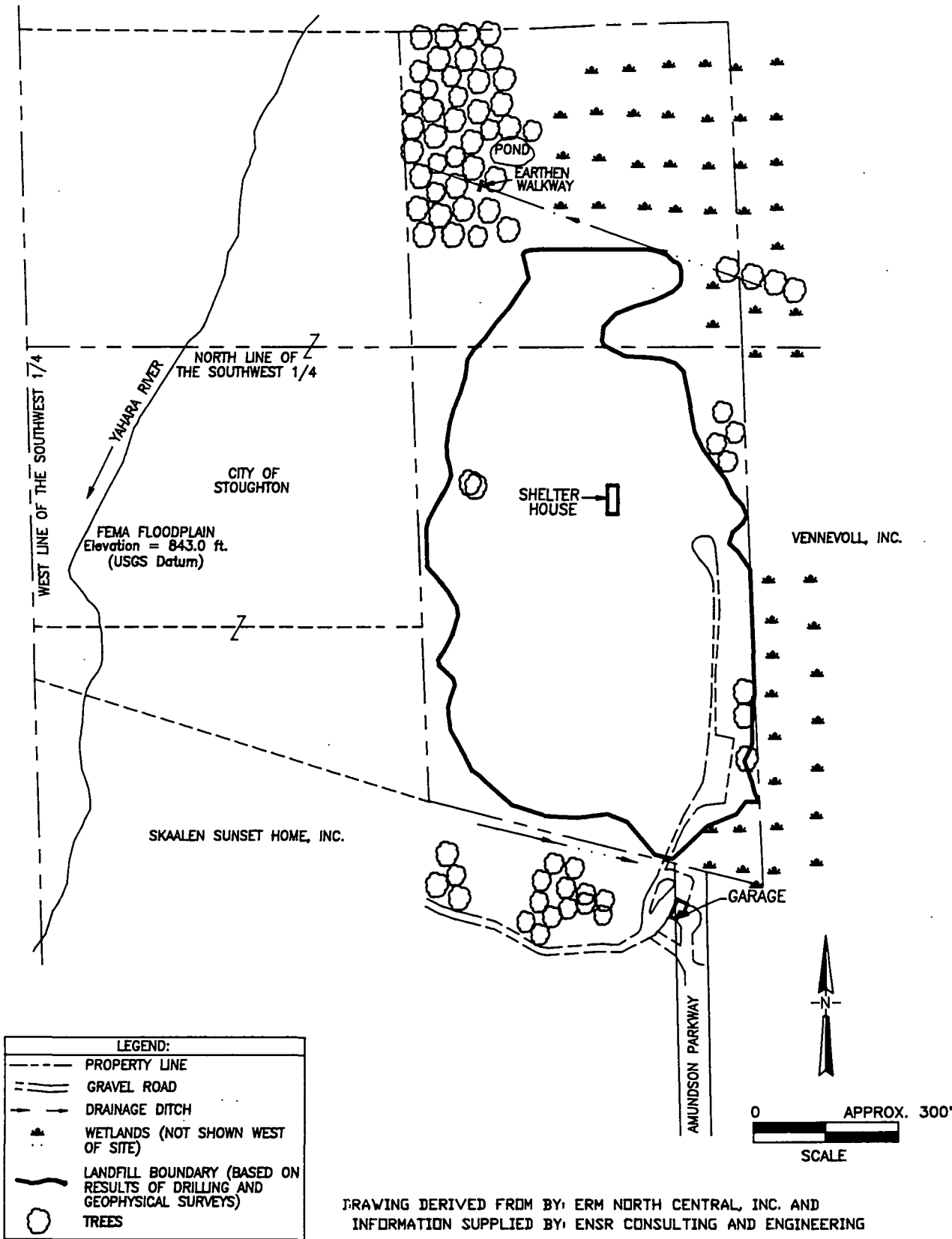
2.1 SITE LOCATION AND DESCRIPTION

The Stoughton City Landfill site is located in the northeast portion of the City of Stoughton, approximately 13 miles southeast of Madison, in Dane County, Wisconsin. The property containing the site encompasses approximately 27 acres and occupies portions of the W 1/2 of the SW 1/4 and the SW 1/4 of the NW 1/4 of Section 4, T. 5N., R. 11E.

A wetland area, located along the southeast portion of the present property boundary, was the initial area of waste disposal. Wetlands are also located in the north portion of the site, and west of the site along the Yahara River. The Yahara River is located west of the site and is within approximately 400 feet of the site at its closest distance. The nearest developed land, where residential homes have been built, is located to the south along Amundson Parkway, which serves as the site access road. A more extensive residential area is located approximately 1/4 mile south of the site. At this time, there is no developed land in the vicinity of the site to the west, north, or east. Approximately 1/8 of the site, the northeast portion which consists of wetlands, is located within the 100-year floodplain of the Yahara River. Existing site conditions are depicted in Figure 2-1.

2.2 SUMMARY OF PREVIOUS ACTIVITIES

The original 40-acre parcel of land was purchased by the City of Stoughton in 1952. Fifteen acres of the original site were used for landfilling purposes. Due to land exchanges transfers that occurred after closure of the landfill in 1982, only 27 of the original 40 acres are still owned by the City. None of the 13 acres of land transferred during the land exchanges were used for landfilling.



DRAWING DERIVED FROM BY: ERM NORTH CENTRAL, INC. AND
 INFORMATION SUPPLIED BY: ENSR CONSULTING AND ENGINEERING

FIGURE 2-1

ALTERNATIVE REMEDIAL CONTRACTING STRATEGY
 U.S. EPA CONTRACT No. 68-W8-0089
 WORK ASSIGNMENT No. 54-5NT2
 DOCUMENT CONTROL No. 4500-54-AISX

EXISTING SITE CONDITIONS
 STOUGHTON CITY LANDFILL
 Stoughton, Wisconsin

The landfill operated from 1952 until it was officially closed in 1982. Between 1952 and 1969, the site was operated as an uncontrolled dump site. During this time, refuse was usually burned or covered by dirt. The site began operation as a state-licensed landfill in 1969. In 1977, the Wisconsin Department of Natural Resources (WDNR) required that the site be closed according to state regulations. Closure activities included construction of a trash transfer station, placement of cover material borrowed from agricultural areas, application of topsoil, and seeding. From 1978 to 1982, closure work was performed according to WDNR regulations. Only brick, rubble, and similar construction materials were accepted at the site during this period.

Common municipal waste and solid and liquid industrial wastes were disposed of at the site during its years of operation. Industrial sludge containing acetone, tetrahydrofuran, toluene, xylene, and other organic substances was disposed of at the site from 1954 until 1962. During this period, the liquid wastes were commonly poured over garbage and burned. It was also reported that some liquid wastes were poured down boreholes in the west-central portion of the landfill. (These boreholes had been drilled as part of field testing of drilling equipment.)

The site was placed on the National Priorities List (NPL) in June 1986. In March 1988, the two Potentially Responsible Parties (PRPs), Uniroyal Plastics, Inc., and the City of Stoughton, entered into an Administrative Order on Consent (AOC) with U.S. EPA and WDNR. This AOC required the completion of a remedial investigation and feasibility study (RI/FS). RI field activities began at the site in March 1989. The majority of the RI was completed by September 1991. U.S. EPA is currently conducting additional groundwater monitoring work, and the results are expected by spring 1993. Based on work conducted to date, it has been determined that as a result of hazardous waste disposal at the landfill, various chemical contaminants have been leaching into the groundwater beneath the site and flowing towards the Yahara River. The ROD, which was signed in September 1991, identified the remedial action for the SCL site. This remedial action includes:

- Site security measures including placement of a fence around the site perimeter.
- Land use restrictions to prevent the installation of a well within 1,200 feet of the property boundary and to prevent residential development of the site.
- Excavation, relocation, and consolidation of wastes currently in contact with groundwater.
- Placement of a solid waste disposal facility cap over the existing fill area and consolidated wastes.
- Extraction and treatment of contaminated groundwater and subsequent discharge of the treated groundwater to the Yahara River, unless additional monitoring indicates that groundwater extraction is not required..
- Long-term groundwater monitoring to confirm the effectiveness of the other components of the selected remedial action.

2.3 PROPOSED REMEDIAL ACTION

Due to the complexity of the environmental setting and the potential for the primary contaminant, tetrahydrofuran (THF) to move throughout the aquifer, the remedial action will focus on controlling the source of contamination (i.e., the landfill contents), extracting and treating the contaminated groundwater, and protecting the adjacent wetlands by reducing the amount of leachate, which contains iron and other metals, into the wetlands.

The remedial action will meet the following site-specific cleanup goals:

- Minimize direct contact with the wastes.
- Minimize the further movement of contaminants to groundwater by reducing the amount of precipitation that infiltrates the landfill.
- Contain the movement of contaminants in the groundwater in order to prevent contaminants from leaving the site boundary.

- Extract and treat groundwater to meet WDNR water quality discharge limits, ~~unless additional monitoring indicates that extraction is not required to achieve compliance with WDNR groundwater quality standards.~~

The proposed remedial action has been identified as the preferred remedy by U.S. EPA and the WDNR. It includes a landfill remedial action plan and a groundwater remedial action plan to meet the above mentioned site-specific goals. These remedial actions are described in the following subsections.

2.3.1 Landfill Remedial Action

The landfill remedial action identified in the ROD includes fencing, land use restrictions, construction of an access road, waste consolidation by removing wastes from the wetlands, and placing a new multilayer clay cap with a passive gas collection system over the relocated wastes and the landfill.

Fencing will be installed around the landfill boundary to restrict access and thus reduce the potential for exposure to soils and solid wastes in the landfill. Cyclone fencing, with a locking gate at the landfill entrance, will be used. During remedial design, the need for restricting site access during remedial construction activities will be evaluated, and a temporary fence may be required.

Land use restrictions will be used to prevent the installation of wells within 1,200 feet of the property boundary and prohibit construction over the new multilayer landfill cap.

~~A The temporary site access road will be built identified in the ROD, to provide access to the site during waste consolidation and capping activities. The access road will be constructed in a location selected to minimize disruption of the residential area located south of the site and impact on the wetlands. will not be constructed due to the costs~~

associated with construction and impact on the wetlands. The City of Stoughton indicated that Amundson Parkway can be utilized to access the site. Temporary access to the site during construction activities shall be obtained by the U.S. EPA if the temporary road cannot be constructed on the landfill property.

Upon completion of the predesign investigation, waste consolidation of the landfill wastes will be evaluated. Concern has been raised that by uncovering and relocating the waste material, additional environmental impacts will be created. These impacts include odors, degradation of the surrounding wetlands and contaminant release to air and groundwater during excavation activities.

Waste consolidation will consist of excavating wastes in contact with groundwater along the landfill's northeastern and southeastern boundaries, and consolidating the wastes on top of the landfill along the site's western boundary. This will eliminate the direct contact of wastes with groundwater and will result in reduced impact to the wetlands adjacent to site's eastern border. Prior to excavation, facilities and equipment will be constructed to dewater the saturated wastes. The facilities will consist of temporary impermeable basins into which the excavated wastes will be placed. The wastes will be allowed to drain to a lower portion of the basin, and the water will be collected for treatment. As an alternative to constructing the impermeable basins, the saturated wastes may be placed on the top of the landfill to allow dewatering. This option may be utilized if the results of the laboratory analysis indicate that the liquid from the saturated wastes will not cause further contamination. The dewatered wastes will then be relocated to the top of the landfill. In addition, a field sampling investigation will be conducted to confirm that all waste and contaminated soils and sediments from the saturated areas have been relocated.

A landfill cap will be placed over the original fill area and the waste relocated from the wetlands. Areas from which relocated waste was removed will not be capped. The cap will meet the requirements of the Wisconsin NR 504.07 regulations concerning cover systems for

solid waste disposal facilities. The cap will consist of a 0.5-foot grading layer, a 2-foot clay barrier layer, a minimum 1.5-foot cover layer, and a vegetated 0.5-foot topsoil layer. The grading layer will be constructed from the existing cap materials. The clay barrier layer will have a compacted permeability of 1×10^{-7} cm/sec or less. A composite landfill cap, consisting of a geosynthetic liner and a 2 foot clay cap at a minimum 2% slope, will be evaluated as an alternate to the cap described above which is designed with a minimum 5% slope, if waste consolidation is not done.

A passive gas extraction system will be installed to collect gas from beneath the cap. If the results of the predesign tasks indicate an active gas collection system is more beneficial in containing gas migration, WESTON will inform U.S. EPA of the need to consider active gas collection in lieu of the passive gas system. Concurrence from the U.S. EPA will be obtained prior to the design of an active gas system. The need for treatment of air emissions from this system will be determined based on actual site data when the system is installed. A program for maintenance of the landfill cap will also be developed.

2.3.2 Groundwater Remedial Action

The groundwater remedial action will consist of groundwater extraction, treatment, and discharge of the treated groundwater to the Yahara River or to nearby wetlands. Groundwater treatability studies will be performed to collect the necessary data to establish design criteria for the groundwater treatment system. Contaminated groundwater will be pumped from the extraction wells to the surface for treatment to comply with Wisconsin Pollutant Discharge Elimination System (WPDES) and Best Available Treatment (BAT) requirements. The design of the extraction system and the treatment system will depend on results of the treatability studies. In addition, a groundwater monitoring program will be implemented following the cessation of treatment. The point at which groundwater treatment ceases will be determined by U.S. EPA and will be based on compliance with federal and state ARARs.

SECTION 3 REMEDIAL DESIGN SCOPE OF WORK

This section describes the technical scope of work to provide a design package for the implementation of the proposed remedial action for the site. The scope of work is based on the SOW provided by the U.S. EPA under Work Assignment 54-5NT2, Revision No. 4, the kick-off meeting, and subsequent discussions with the U.S. EPA's Remedial Project Manager (RPM). ~~Additional pre-design activities may be needed to supplement the current state of knowledge regarding the site conditions to the extent necessary for remedial design.~~

The SOW, Revision #3, identified ten (10) tasks to be performed by WESTON as part of the remedial design. These tasks are identified as follows:

- A. Work Plan and Revised Work Plan
- B. Initial Review of Documents
- C. Health and Safety Plan and Addendum
- D. Project Management
- E. Design of Fencing
- F. Waste Consolidation Plan/Landfill Cap/Access Road Design
- G. Groundwater Remediation System Design
- H. Review of Non-Specific Deliverables
- I. Meeting Participation
- J. Restoration of On-Site Wetlands
- K. Pre-design Work

For ease of financial tracking of these tasks, WESTON has combined the tasks into the following phases:

- **PHASE 1 -- PROJECT PLANNING.** This phase includes Work Plan and Work Plan Revision preparation, kick-off meeting, initial review of documents, and Health and Safety Plan (HASP) preparation and Quality Assurance Project Plan (QAPP) revisions.
- **PHASE 2 -- PREDESIGN ACTIVITIES.** This phase includes the delineation and characterization of the wetlands areas; locating borrow material for the landfill cap; delineating the landfill outline; hydrogeologic investigation, if required, to determine the extent of contamination and the location, number, and pumping capacity of the extraction wells; exploratory boring; methane monitoring; water level control; surveying; and preload settlement tests. The need for the hydrogeological investigation will depend on the results of the additional groundwater monitoring that is expected to be completed in spring 1993.
- **PHASE 3 -- TREATABILITY TESTING.** This phase includes the treatability study plan, treatability studies, and report.
- **PHASE 4 -- DESIGN ACTIVITIES.** This phase includes the design of fencing, waste consolidation plan/landfill cap design/access road design, restoration of on-site wetlands, groundwater remediation system design, and the preparation of the following design documents: performance standard verification plan, construction quality assurance plan, quality assurance project plan, HASP, field sampling plan, draft operation and maintenance plan, contingency plan, and cost estimates. This phase also includes design-related activities, including the review of non-specific deliverables and participation in meetings.
- **PHASE 5 -- PROJECT MANAGEMENT.** This phase includes the monthly status reports, project management, and the project closeout.

3.1 PHASE 1 - PROJECT PLANNING

The project planning activities include the following:

- Work Plan preparation.
- Kick-off meeting.
- Background information review.

- Health and safety plan preparation.
- Initial site visit.
- **Work Plan Revisions**

The activities associated with each of these phases of work are presented in the following subsections.

3.1.1 Work Plan Preparation

The SOW defines the objectives of the remedial design activities for the site. This Work Plan is based on the SOW, the results of the kick-off meeting, and information received from the RPM. The Work Plan serves as a planning document which outlines the project scope of work, a schedule for implementing the project, and estimated costs and manhours.

This document was completed.

3.1.2 Kick-Off Meeting

A kick-off meeting was held at the U.S. EPA's office on 16 October 1992 to discuss the SOW. The following people participated in the meeting:

Brigitte Manzke, Contracting Officer, U.S. EPA
Don Anderson, Contracting Specialist, U.S. EPA
Steve Nathan, Project Officer, U.S. EPA
Mary Tierney, Remedial Project Manager, U.S. EPA
P. Krishnan, Ph.D., P.E., Technical Operations Manager, WESTON
William Karlovitz, P.E., Site Manager, WESTON

The primary outcomes of the kick-off meeting included:

- Additional monitoring is being conducted at the site by a U.S. EPA contractor to confirm the requirement for groundwater treatment; however, this remedial design will proceed under the assumption that groundwater treatment will be required.
- The extent of work required with regard to the wetlands must be further defined by the U.S. EPA.
- Additional hydrogeologic data may be required to perform the remedial design. If existing data is insufficient, WESTON will notify U.S. EPA.
- The alternative selected for treating the groundwater has not been identified, and therefore WESTON will include a "zero" cost and LOE in the Work Plan at this time.

WESTON also received from the U.S. EPA copies of the Remedial Investigation (RI) Report, Draft Feasibility Study (FS) Report, Health and Safety Plan, ROD, and the Administrative Order on Consent.

Subsequent to the kick-off meeting, a final Work Plan was submitted to U.S. EPA on 15 March 1993, and additional monitoring has been completed by the U.S. EPA Contractor.

3.1.3 Background Information Review

WESTON has reviewed the existing documents to become familiar with previous work at the site and to prepare for remedial design tasks. The following documents were reviewed:

- Record of Decision, 30 September 1991.
- Remedial Investigation Report.
 - Volume 1 - 17 January 1991 (Revision No. 3).
 - Volume 2 - 23 October 1989.

Volume 3 - 23 October 1989.
Volume 4 - 23 October 1989.
Volume 5 - 10 August 1990 (Revision No. 2).

- Draft Feasibility Study Report, 18 January 1991.
- Statement of Work, 19 November 1992 (Revision No. 1).
- Administrative Order on Consent, 10 March 1988.

WESTON received copies of the these documents at the kick-off meeting. The following documents were received at a later date and reviewed:

- Preliminary Ecological Assessment.
- Site Analysis of Aerial Photography.
- Sampling and Analysis Plan for RI and FS.
- Monitoring Well Construction Report, 17 December 1993.

3.1.4 Health and Safety Plan Preparation

The Health and Safety Plan is designed to define the requirements and designate protocol at the site during implementation of the remedial design. The plan is intended to ensure that design activities are performed safely and in accordance with applicable regulatory requirements, and that all personnel on site are protected from any physical, chemical, and other hazards. The plan will be prepared in accordance with the Occupational Safety and Health Administration (OSHA) regulations to ensure that all operations and equipment will comply with 29 CFR 1910.120 and other applicable portions of 29 CFR 1910 and 29 CFR 1926.

An addendum to the HASP will be prepared to address the additional pre-design tasks outlined in the revised SOW (#3).

3.1.5 Work Plan Revisions

The following events necessitated revisions to the SOW:

- Based on the groundwater monitoring results reported by Jacobs Engineering Group (Jacobs) to U.S. EPA in December 1993 under the technical enforcement support contract, U.S. EPA has indicated that groundwater remediation will be necessary.
- Based on a review of the groundwater data, WESTON determined that additional predesign investigation will be required prior to initiating groundwater remedial design in order to identify the extent of the plume and to obtain background information on the groundwater.
- Based on concerns raised during the preliminary design of the landfill cap, additional borings, sampling and analysis will need to be performed before completion of the design.

Because of these changes, U.S. EPA issued a revised Statement of Work which defined additional predesign tasks that need to be completed. The revisions to the original Work Plan outlines the revised scope of work, and the schedule, estimated costs and manhours associated with the additional work.

3.2 PHASE 2 - PREDESIGN ACTIVITIES

Several predesign activities will be completed before starting actual design work. These include:

- Delineation of wetlands that will be impacted.
- Identification of borrow source material locations.
- Hydrogeological investigation.
- Preload settlement tests.
- Surveying.

- Delineation of extent of landfill cap.
- Exploratory borings and additional sampling.
- Landfill gas monitoring and pilot-scale extraction testing.
- Water level control.

3.2.1 Delineation of Wetlands

The existing wetland areas must be identified in order that the disturbed wetland areas can be returned to their existing conditions after the construction activities have been completed. A preliminary ecological assessment, prepared by the Region V Superfund Technical Support Unit on 11 June 1991, was reviewed to provide background information for the delineation of wetlands and identification of plant communities. Following this review, a physical assessment will be made to determine the plant communities and variety of species that exist today and to more precisely define wetland boundaries. A short report will be prepared to summarize the findings of the assessment. It is intended to utilize the U.S. EPA ecologist who prepared the assessment report, if available, to assist in delineation of the wetlands.

3.2.2 Identification of Borrow Source Material Locations

A source of borrow material is required to provide soils, clays, etc., to cap the landfill and to fill in the areas where the wastes will be removed from the wetlands. Geotechnical tests will be performed on these materials to determine the acceptability of these soils to meet the landfill cap design parameters. The soil for the backfill will be analyzed to determine compatibility with nearby wetland areas.

3.2.3 Hydrogeological Investigation

The portion of the preliminary design pertinent to the groundwater remedial action is comprised of three subtasks including: installation of extraction wells and performance of a pumping tests to determine aquifer characteristics, installation of reconnaissance borings and permanent monitoring wells to determine groundwater movement the extent of groundwater percent requiring remediation, and groundwater sample collection and analysis to determine the extent of groundwater contamination. U.S. EPA will determine the need to perform the hydrogeological investigation following the review of results from the additional monitoring scheduled for spring 1993. The groundwater preliminary design subtasks are described in the following subsections.

3.2.3.1 Installation of Extraction Wells and Performance of Pumping Tests

If required by U.S. EPA, a hydrogeologic analysis will be completed to characterize the hydraulic properties of the aquifer for use in the groundwater remediation design and to confirm the theoretical calculations for the purpose of design. Those parameters to be derived from this analysis include transmissivity and storage coefficient of the aquifer, and drawdown effects of the wells and pumping capacity of the wells. This analysis can be accomplished by the installation of one extraction wells and the performance of pumping tests. The pumping test well will be located where it can potentially be used as an extraction well during groundwater remediation. Four piezometers will be installed in the vicinity of this pumping well to monitor the aquifer response during the pumping test. Based on currently available information, two one aquifer pumping tests should be adequate. It is anticipated that at least one additional extraction well will be installed for the groundwater remediation system. The items scope included in the hydrogeological analysis are the procurement of a subcontractor, drilling and installation of extraction wells and piezometers, performing the pumping tests, and evaluation of data.

3.2.3.2 Installation of Monitoring Wells

The hydrogeological investigation will also include a subtask for characterizing the hydrogeologic conditions extent of groundwater contamination around the landfill. This characterization will be performed in two phases. The first phase will consist of seven reconnaissance borings, from which groundwater samples will be collected at approximately three discrete depths. The samples will be analyzed for THF, DCDFM, TCFM, and TCL volatiles to determine the extent of contamination. One monitoring well cluster will be installed upgradient (east of the site) to obtain background groundwater quality. The background well clusters will be analyzed for THF, DCDFM, TCFM, TCL/TAL parameters, and inorganic water quality parameters. In addition, it is anticipated that three monitoring well clusters will also be sampled for inorganic quality parameters. Following sample analysis and evaluation of the analytical data, the second phase will be performed. The second phase will consist of the installation of up to 65 additional monitoring wells clusters will be installed to supplement the existing well network. Piezometers will be installed in at least four locations to confirm groundwater flow directions away from the landfill.

Five sets of nested monitoring wells were installed during the remedial investigation. These wells will be inspected and redeveloped to determine whether they can be used for this investigation. It is assumed that they will be usable after redevelopment. In addition, six piezometers installed during the remedial investigation will be inspected to determine their condition and usability. If appropriate, sampling of individual piezometers may be substituted for reconnaissance borings on a one to one basis.

Following the installation of the new monitoring wells and redevelopment of the existing monitoring wells, two one rounds of groundwater level measurements sampling and water level measurements will be conducted to confirm the groundwater flow directions. In addition, all new and existing monitoring wells will be clearly labeled for easy identification.

3.2.3.3 Sample Collection and Analysis

In order to determine the physical properties of the aquifer, ~~at least one~~ soil samples will be collected and analyzed to determine the grain size distribution and the percent organic carbon at ~~each proposed~~ representative well screen locations.

~~Groundwater samples will be collected from all new and existing monitoring wells. The sample results will allow determination of the extent of groundwater requiring remediation.~~

~~The treatment scheme suggested in the feasibility study is a biological system. In order to properly design a biological treatment system,~~ In order to properly design a treatment system, additional analysis for conventional pollutants will be conducted. These parameters will include, at a minimum, biological oxygen demand (BOD₅), chemical oxygen demand (COD), total organic carbon (TOC), total suspended solids (TSS), ammonia-nitrogen, phosphorus, and pH.

In order to determine an appropriate method for disposal of the liquid from the saturated wastes, samples of the liquid will be collected and analyzed to determine if treatment is necessary, or if the liquid can be returned to the landfill.

3.2.4 Preload Settlement Testing

The additional load imposed by the new cap and the consolidated waste could cause settling of the existing landfill. Preload settlement testing ~~will be~~ was conducted to determine the amount of differential settlement for design purposes. The testing will involve calculating the expected loads, loading the test cell area to simulate the calculated loads, measuring settlement of test area with time, and extrapolating this data to determine the design parameters for the landfill cap.

Two test cells have been constructed, and monitoring of the settling will continue until the water level around the landfill is lowered.

3.2.5 Surveying

Topographic and boundary surveys ~~will be~~ ~~was~~ conducted to verify existing conditions and to develop up-to-date base maps for engineering design. Specific tasks include locating the property boundaries, setting baselines for a grid system that can be used in the field, and conducting courthouse research to determine deed restrictions.

Existing survey data ~~will be~~ ~~was~~ verified with regard to the extent of the existing landfill, location of wastes located in wetlands, and location of the floodplain in relation to the landfill topography.

Sufficient topographic data will be collected, and a location survey ~~will be~~ ~~was~~ performed to ~~delineate the temporary access road~~, the fence location, and the well locations; to obtain preload settlement test data; and to determine the plan and profile of the outlet sewer to the Yahara River.

In addition, the surveying will include determination of locations and elevations of the new monitoring wells.

3.2.6 Health and Safety Plan and Quality Assurance Project Plan

The HASP and QAPP previously submitted for design activities will be modified to address the additional predesign activities. The HASP will follow OSHA requirements as outlined in 29 CFR 1910. The revised HASP and QAPP will be submitted before predesign activities commence.

3.2.7 Delineation of Extent of Landfill Cap

The outline of the existing landfill was previously defined by geophysical methods. This outline ~~will be~~ was verified by collecting soil samples with a soil probe and has been completed.

3.2.8 Landfill Exploratory Borings

In order to investigate physical properties of the landfill unit, WESTON will conduct three exploratory borings into the southeast portion of the landfill to determine the depth of the waste, consistency, and degree of saturation. This is the area where waste excavation is proposed. Current information, presented in the remedial investigation report, is not adequate to determine the volume of waste requiring relocation or the size of the structure needed to dewater the saturated wastes prior to placement on the landfill. Additional borings may also be conducted in the northeast portion of the landfill, if required by U.S. EPA.

During exploratory borings, three subwaste soil samples will be collected and analyzed for THF, DCDFM, TCFM, and TCL/TAL parameters. These sample results will be used to determine extent of contamination in soils below the landfill and for evaluating soil cleanup objectives during waste consolidation activities.

3.2.9 Landfill Gas Monitoring Probes

Up to three landfill gas monitoring probes will be installed to monitor off-site migration of landfill gas from the site. Monitoring probes shall be constructed of PVC pipe approximately 10 feet in depth. Probes shall be positioned within 100 feet of the property boundary in a location that will not interfere with waste consolidation capping and temporary access road construction activities. Probes will be monitored periodically with

a combustible gas indicator (CGI), which measures concentrations of explosive gases based on percent of the lower explosive limit.

Results of this analysis will be used to determine if landfill gas is actively migrating away from the landfill boundary/waste limit. Following completion of the final cover system, and active gas extraction system (if necessary), additional gas monitoring probes may be required within the limits of the property boundary to conduct long-term monitoring of off-site landfill gas migration in accordance with WAC NR 504.05(7), Gas Control.

3.2.10 Pilot Scale Gas Extraction Wells

Two pilot scale gas extraction wells will be constructed to evaluate the feasibility of installing an active gas extraction system at the SCL site. Each well will be constructed after continuous visual profiling of the boring and identifying the bottom of the waste. Completed wells will be fitted with PVC wellheads which have the ability to control flow, measure gas temperature and obtain gas samples for determining gas quality and production rates. A vacuum will be applied to the wells at varying rates to determine the zone of influence the most efficient extraction rates, and the spacing of extraction wells. Pressure monitoring probes will be installed at specified distances from each well to determine the radius of influence with respect to each pumping rate and the ability of the vadose zone to propagate a vacuum. Data obtained during this pilot scale test will be used to design a full scale extraction system, if deemed necessary, to include wells, piping, blowers, and flare systems.

3.2.11 Water Level Control

A drainage swale located just north of the site property boundary has been dammed up by beavers living in the wetland areas around the site. As a result, drainage waters have

backed up against the landfill and are potentially resaturating the waste contained in the landfill.

Beaver dams located north of the site property shall be removed or otherwise breached to allow wetland area to the east of the site to drain. WESTON will maintain drainage structures or rebreach dams, as necessary, during the progress of design activities.

WESTON will periodically inspect the area for signs of dams or other structures impeding drainage from this area. If beaver activity continues to negatively impact site conditions (i.e., backing up water against landfill), WESTON will contract with a trapper to live trap and relocate the beaver to other area wetlands. As a last resort, lethal trapping will be utilized, on approval from U.S. EPA to remove beavers from these wetlands.

3.2.12 Sediment Sampling

WESTON will collect eight sediment samples. Four sediment samples will be collected from the wetland to the east of the site. Two sediment samples will be collected from the drainage ditch along the southern boundary of the landfill. Two sediment samples will be collected as background sediment samples from a wetland east of County Road N.

During the RI, sediment samples were collected from the wetlands east of the site and from the wetlands east of County Road N. These samples were analyzed for tetrahydrofuran (THF), dichlorodifluoromethane (DCDFM), trichlorofluoromethane (TCFM), and TCL and TAL parameters. According to the RI report, only some total metals were detected in concentrations significantly above those in background sediment samples. For this reason, sediment samples collected from the wetlands during this sampling effort will be analyzed only for total metals. During the RI, no sediment samples were collected from the drainage ditch along the southern boundary of the landfill. For this reason, sediment samples

collected from the drainage ditch along the southern boundary of the landfill will be analyzed for THF, DCDFM, TCFM, and TCL and TAL parameters.

3.2.13 Surface Water Sampling

WESTON will collect six surface water samples. Four surface water samples will be collected from the wetlands to the east of the site. Two surface water samples will be collected as background surface water samples from a wetland east of County Road N. The surface water sampling locations will be the same as sediment sampling locations in the wetlands. The surface water samples will be analyzed for water hardness and total metals. Results from the surface water sampling will be used to evaluate the impact of site on the wetlands and to better ascertain the source of any elevated levels of inorganic compounds.

3.3 PHASE 3 - TREATABILITY STUDIES

If the spring 1993 groundwater monitoring results indicate the need for groundwater treatment, treatability studies will be performed. The treatability studies would be necessary to aid in the selection of an appropriate treatment technology that would meet the cleanup goals and to aid in the implementation of the selected technology. The treatability studies would include the activities described in the following subsections.

3.3.1 Treatability Study Plan

The treatability study plan will detail the procedures required to perform bench-scale and/or pilot-scale treatability studies. The study will include the following:

- Literature survey to eliminate nonapplicable technologies and identify additional data needs for applicable technologies.

- Determination of the need for laboratory screening, bench-scale testing, or pilot-scale testing based on data needs of selected technologies.
- Submission of an outline and a schedule for the treatability studies for U.S. EPA approval.

3.3.2 Treatability Testing

The selection of the appropriate laboratory/bench-scale tests will be based on groundwater sampling results from the predesign hydrogeologic investigation. Two treatment technologies, biological and reverse osmosis, will be evaluated if the results of the groundwater sampling do not preclude their use. U.S. EPA will be consulted during the selection and final scoring process. Pilot-scale tests will use groundwater from the extraction well pump tests.

A subcontractor will be selected and used to perform the treatability study or studies.

3.3.3 Treatability Study Report

After completion of the treatability studies, a treatability study report will be submitted to U.S. EPA for approval. The treatability study report will include the following:

- Treatability study approach.
- Data analysis and interpretation.
- Conclusions and recommendation of a method of treatment.

3.4 PHASE 4 - DESIGN ACTIVITIES

The two major components of the remedial design involve activities associated with the landfill and groundwater treatment. These activities are detailed in the following subsections.

3.4.1 Landfill Remedial Design

3.4.1.1 Fencing

A permanent fence around the site will be designed in order to restrict access to the site. The fencing design will include locked gates at the existing entrance to the site and at the temporary access road entrance. Waste consolidation and capping activities could interfere with the installation of permanent fencing. In this case, a temporary fence may be required to restrict site access during remedial construction.

3.4.1.2 Temporary Site Access Road

A temporary site access road along the southern boundary of the landfill, if access can be obtained, will be designed to allow site access during waste consolidation and capping activities. The access road will be designed to minimize disruption of the residential area located south of the site and to minimize impact on wetlands. Activities associated with access road design are:

- Prepare plans and specifications for road construction.
- Determine acreage of off-site and on-site wetlands that will be affected.
- Determine factors regarding "natural value" of wetland area and overall impact of the damage to hydrology of the wetland complex.
- Obtain a permit, if required, for any off-site wetlands which will be affected.

- Design plans for closure of the road after remedial activities are complete and for restoration of any wetlands adversely impacted by the construction of the road.

3.4.1.3 Waste Consolidation Plan

The objective of this plan is to remove saturated wastes located in the northeast and southeast portions of the site and thus reduce their impact on the wetlands adjacent to the site's eastern border. If the liquid from the saturated wastes cannot be dewatered on top of the landfill, the waste consolidation plan will consist of following design activities.

- Design facilities and equipment to dewater the saturated wastes.
- Design a water collection and pumping system for the water resulting from the dewatering activities. This design will allow for pumping the water to an on-site holding tank(s) for treatment and, from there, to the wetlands or to an off-site disposal/treatment facility, or the Yahara River.
- Design a removal/backfill/consolidation construction sequence to minimize open exposure of wastes to atmosphere.
- Evaluate and specify methods to minimize dust generation during excavation, hauling, and consolidation.
- Prepare specifications to backfill the excavated area with appropriate hydric soil on the north and to fill and slope the excavation face in the southeast part of the site.

3.4.1.4 Landfill Cap

The landfill cap will be designed in accordance with the requirements contained in State of Wisconsin law NR 504.07, WAC, federal and State ARARs, and the ROD. Activities associated with the design of the landfill cap are:

- Prepare a grading design to provide optimum conditions for cap construction and for operation and maintenance.
- Design a surface drainage plan to control runoff from the site.
- Prepare details of gas vents and spacing on the cap for the passive gas collection system, ~~Depending on the results of the pilot-scale gas extraction wells; and, if directed by the U.S. EPA, prepare the details for an active gas system.~~
- Evaluate the need for any air emission controls required for treatment of air emissions after installation of the passive gas collection system.

3.4.1.5 Field Sampling Plan

The objective of this Field Sampling Plan (FSP) is to describe the rationale and procedures for collection and analysis of ~~samples for predesign tasks~~ and the surface and subsurface samples necessary to confirm that all waste and contaminated soils and sediments from the saturated areas have been relocated during waste consolidation activities. The FSP will include the following components:

- Sampling locations and rationale.
- Procedures for ~~soil/sediment~~ ~~soil, sediment, surface water, and groundwater~~ sampling.
- Protocols for decontaminating sampling equipment.
- Procedures for field screening of soils/sediments.
- Protocols for laboratory analysis.

3.4.1.6 Wetland Restoration

The wetlands will be restored after completion of the remedial construction activities. The data collected during the predesign assessment and surveying will be utilized as the basis for the following activities:

- Preparation of permit applications for on- and off-site wetland activities.
- Preparation of plans and specifications for restoration of wetlands, if necessary.

3.4.2 Groundwater Remedial Design

3.4.2.1 Extraction System Design

Supplemental data ~~may~~ **will** be collected as part of predesign activities to design an extraction system; ~~if U.S. EPA decides that groundwater treatment is required and that the supplemental data is necessary. This decision will be partially based on the additional monitoring being performed by the U.S. EPA contractor. This data may include areal and vertical extent of groundwater plume, off site hydraulic conductivity of aquifer material, porosity of aquifer material, fraction organic carbon of aquifer material, and water quality analysis.~~ This data will be utilized to develop a model of groundwater movement to ensure that hydraulic containment and capture can be theoretically predicated, and to develop pumping rates for the purpose of treatment process evaluations. The extraction system design will include following design activities:

- Design extraction well network (number of extraction wells, their location and depth).
- Prepare specifications for well construction according to standards outlined in WAC NR 112.

- Prepare specifications for pump installation according to standards outlined in WAC NR 112.
- Determine pumping rates and pumping schedule (continuous or pulse).
- Determine drawdown produced by the pumping system and assess the potential hydrogeological effect on the on-site and off-site wetlands.
- Prepare plans and specifications for the groundwater collection piping system.
- Determine estimated time for cleanup.
- Prepare a draft Operation and Maintenance (O&M) Manual.

3.4.2.2 Groundwater Treatment System Design

The groundwater treatment system will be designed to comply with WPDES and BAT requirements. The treatment technology and the design operating parameters for optimization of the selected treatment technology will be based on the results of the treatability studies. The treatment system will be designed following U.S. EPA approval of the treatment technology. The design will include a draft O&M Manual. This O&M Manual will require modification after the groundwater remediation system has been constructed. This modification will not be done as a part of the remedial design.

3.4.2.3 Discharge System Design

Treated groundwater will be discharged to the Yahara River, to area wetlands, or an off-site ~~treatment~~/disposal facility. This task will involve the following design activities:

- Prepare piping layout and design.
- Determine, if necessary, any pumping requirements.

- Prepare and obtain an effluent discharge permit under the WPDES, if necessary.

3.4.2.4 Groundwater Monitoring Program

A groundwater monitoring program will be designed to assess groundwater quality following the cessation of treatment. The program will be designed to ensure that desorption or dissolution of residuals does not cause an increase in the level of contamination after the cessation of treatment. The point at which the groundwater treatment ceases will be determined by U.S. EPA and will be based on compliance with federal and state ARARs. The groundwater program will involve the following design activities:

- Determine a method to detect changes in groundwater movement and the chemical concentrations of contaminants in the groundwater following remedial action.
- Determine the location of additional monitoring wells required for sampling.
- Prepare a plan and schedule for groundwater sampling.

3.4.3 Design Documents

The remedial design consists of three stages which will be submitted in four parts: 30% completion (preliminary); 60% completion (intermediate); 95% completion (prefinal); and 100% completion (final). Project documents necessary for implementation of the remedial action will also be submitted as part of the remedial design.

Scheduling of the remedial design phases for the landfill and groundwater components will differ due to the length of time required for the various predesign tasks. The landfill component will proceed before the groundwater component of design, and the groundwater extraction system will proceed in advance of the groundwater treatment system.

Each of these design phases (a deliverable) for the various components will involve a review by the U.S. EPA as part of the design process. The management and scope of these design stages for the basic remedial components are summarized in the following subsections.

3.4.3.1 Preliminary Design

The remedial design will be approximately 30% complete for the preliminary design phase. The preliminary design submittal will include or discuss, at a minimum, the following:

- Preliminary plans, drawings, and sketches, including design calculations.
- Results of treatability studies and additional field sampling.
- Design assumptions and parameters, including design restrictions, process performance criteria, appropriate unit processes for the treatment train, and expected removal or treatment efficiencies for both the process and waste (concentration and volume).
- Proposed cleanup verification methods, including compliance with ARARs.
- Outline of required specifications.
- Proposed siting, proposed locations of processes, and proposed construction activity.
- Expected long-term monitoring and operation requirements.
- Real estate, easement, and permit requirements.
- Preliminary construction schedule, including contracting strategy.

3.4.3.2 Intermediate Design

The remedial design will be approximately 60% complete for the intermediate design phase. The intermediate design will address all comments made to the preliminary design

submittal. At this stage, the specifications will be clearly outlined and conceptual design will be revised to reflect actual remedial action alternatives. The intermediate design submittal will include those elements listed for the preliminary design, as well as the following:

- Draft Performance Standard Verification Plan.
- Draft Construction Quality Assurance Plan (CQAP).
- Draft Quality Assurance Project Plan (QAPP), draft HASP, and draft FSP.

3.4.3.3 Prefinal Design

The remedial design will be approximately 95% complete at this stage of the design phase. The prefinal design will address all comments made to the preceding design submittal. The prefinal design will include those items listed for the preliminary design, as well as the following:

- Final Performance Standard Verification Plan.
- Final CQAP.
- Final QAPP, final HASP, and final FSP.
- Draft O&M Plan.
- Capital and O&M cost estimate.
- Final Project Schedule.

3.4.3.4 Final Design

After approval of the prefinal design documents, the required revisions will be incorporated and the final documents will be submitted 100% complete with reproducible drawings and specifications suitable for bid advertisement. The prefinal design will serve as the final design if U.S. EPA has no further comments and issues the notice to proceed.

3.4.3.5 Project Documents

Certain project documents will be prepared along with the design documents. These documents include Performance Standard Verification Plan, CQAP, QAPP, HASP, FSP, Draft O&M Plan, Capital and O&M Cost Estimate, and Project Schedule. Brief descriptions of the project documents are presented below:

Performance Standard Verification Plan

A Performance Standard Verification Plan will be developed so that the remedial action complies with the remedial design plans and specifications. The Performance Standard Verification Plan will be included in the intermediate, prefinal, and final design and will include, at a minimum, the following items:

- Description of sampling, rationale, and testing requirements for verification of remedial action performance.
- Scope and frequency of verification activities.
- Personnel qualifications of personnel involved in Performance Standard Verification.
- Description of documentation and reporting requirements for Performance Standard Verification activities.

Construction Quality Assurance Plan

A CQAP will be developed so that the construction effort complies with the remedial design plans and specifications. The CQAP will be included in the intermediate, prefinal, and final design and will include, at a minimum, the following items:

- Scope and frequency of construction observation activities.

- Sampling and testing requirements.
- Responsibility and authority of the organizations and personnel involved in the construction activities.
- Construction quality assurance personnel qualifications.
- Description of documentation and reporting requirements for CQA activities.

Quality Assurance Project Plan

The QAPP will identify the objectives and framework for the development of a quality assurance program for implementing all the tasks involved in the remedial design. The QAPP will be included in the intermediate, prefinal, and final design and will include:

- Quality assurance program for field sampling.
- Quality assurance program for treatability studies.
- Areas of responsibility and authority, and personnel qualifications of personnel involved in different tasks.
- Description of quality assurance procedures for different tasks.
- Description of documentation and reporting requirements for different tasks.

Health and Safety Plan

A HASP will be developed to protect on-site construction oversight and quality assurance personnel and area residents from physical, chemical, and other hazards during the implementation of the remedial action. The HASP developed during the remedial design will be modified to address the remedial action oversight and inspection activities. In addition, specifications will be developed requiring the contractor to prepare a site-specific Health and Safety Plan. The specification will detail the training requirements for site

workers, procedure for preparing the submittal and applicable state and federal regulations governing site health and safety. The contractor HASP will cover all site work necessary to implement the remedial action. Both The WESTON and contractor HASP will follow OSHA requirements as outlined in 29 CFR 1910. The contractor HASP requirements will be submitted as a part of intermediate, prefinal, and final design submittals. Before construction activities begin, ~~the construction contractor will need to sign off on the HASP.~~ the contractor HASP must be reviewed by the Engineer.

Field Sampling Plan

A FSP will be developed to confirm that all waste and contaminated soils and sediments from the saturated areas have been relocated during waste consolidation activities. The FSP has been described in Subsection 3.4.1.5. The FSP will be included as a part of intermediate, prefinal, and final design submittals.

Draft Operation and Maintenance Plan

A draft O&M plan will be developed for groundwater remediation system. As a point of information, this plan will need to be modified/updated once the groundwater remediation system has been constructed. The draft O&M Plan will be submitted with predesign and final design submittals and will include:

- Description of normal O&M tasks necessary for operation.
- Description of potential operating problems and a schedule of corrective actions to be implemented if discharge requirements are exceeded.
- Description of safety precautions, equipment descriptions, and documentation requirements.
- Description of system startup and shutdown procedures.

Contingency Plan

A contingency plan will be prepared to document the actions to be taken in the event that a municipal or residential well in the area of the site is contaminated due to a release from the site. The contingency plan will be included as a part of the prefinal and final design submittals.

Capital and O&M Cost Estimate

A cost estimate will be prepared for construction and implementation of the remedial action. The cost estimate will refine the feasibility study cost estimate to reflect the more detailed design plans and specifications. Capital and O&M cost estimates will be submitted with the prefinal and final design submittals.

Project Schedule for Remedial Action

A project schedule for remedial action will detail the implementation of the remedial action. At a minimum, it will include milestones for inspections, construction completion, and report submissions. This project schedule will be revised for each design phase to reflect U.S. EPA comments and the more detailed design plans and specifications being developed. The project schedule will be submitted with the preliminary, prefinal, and final design submittals.

3.4.4 Miscellaneous Remedial Design Activities

Additional design activities described in the SOW are described in the following subsections:

3.4.4.1 Review of Deliverables

The U.S. EPA may receive additional deliverables from the State or PRPs. As part of project management activities, these documents will be reviewed and commented on by WESTON according to U.S. EPA guidelines.

3.4.4.2 Meetings

WESTON will participate in site meetings, as directed by the U.S. EPA Work Assignment Manager (WAM). These meetings may be necessary for planning and consultation purposes or to discuss work plan revisions.

3.5 PHASE 5 - PROJECT MANAGEMENT

This section describes the scope of work for project management associated with remedial design. The scope includes day-to-day management, staffing and coordination of personnel, completion of monthly status reports, compliance with contract administration requirements, and coordination with U.S. EPA.

3.5.1 Monthly Status Reports

Monthly status reports will be prepared during the ongoing remedial design. The report consisting of technical and financial information will be prepared in accordance with the EPA Region V contract.

3.5.2 WACR Preparation

WESTON will prepare a Work Assignment Closeout Report (WACR) at the completion of the assignment to officially terminate the assignment. This is a requirement for all U.S. EPA-funded projects.

3.5.3 Technical and Financial Management

This task involves management activities associated with the administration of the project, including the review of financial reports each week for budgetary control and accuracy.

SECTION 4 PROJECT ORGANIZATION

WESTON has overall responsibility for all phases of the Remedial Design. Mr. William Karlovitz, P.E. will be the Site Manager and will provide day-to-day project management and technical guidance to project staff. He will be the primary contact with the U.S. EPA RPM.

Dr. P. Krishnan, P.E., in his capacity as the Technical Operations Manager, will provide quality control reviews for all deliverables submitted to the U.S. EPA to ensure compliance with the requirements of the SOW.

Mr. John W. Thorsen, P.E., as the Program Manager, will be responsible for ensuring appropriate personnel and resources are made available for timely completion of the design. He will also be utilized on as-needed basis for final deliverable reviews.

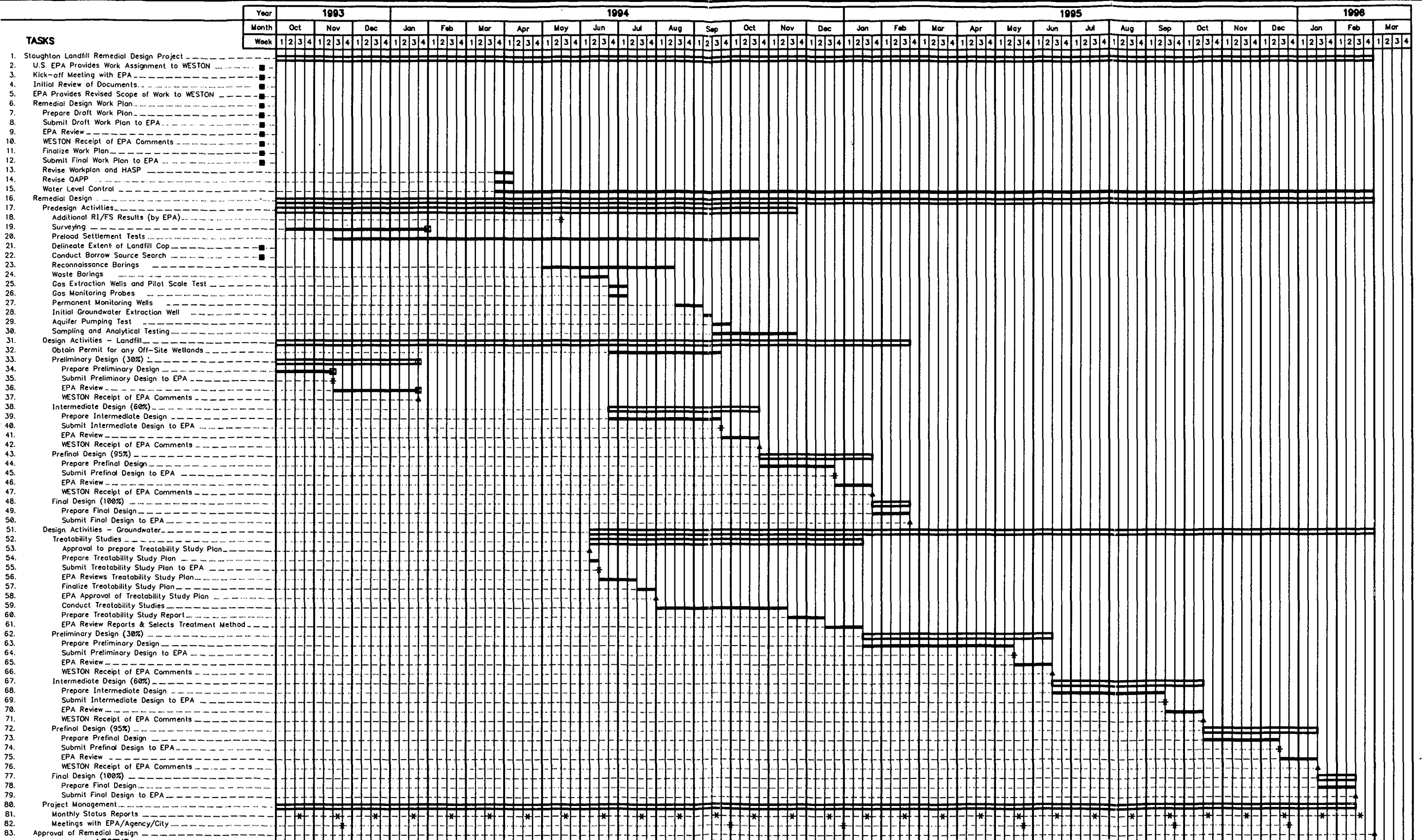
WESTON will provide personnel experienced in similar activities at other sites for this assignment. WESTON personnel from other offices will also be utilized as necessary.

SECTION 5

PROJECT SCHEDULE

Figure 5-1 presents the remedial design project schedule. The project schedule includes all the activities outlined in this Work Plan. Scheduling of field activities associated with predesign and treatability studies are subject to weather considerations and may need to be reevaluated and modified as the project progresses. Final document submittal dates are dependent upon receiving review comments and final approval from U.S. EPA of draft submittals. Also, schedule changes may be necessary depending upon the results of the treatability studies and selection of the groundwater treatment process. The project schedule will be updated and submitted with the monthly status reports, along with a discussion of any delays, actual or anticipated.

RWS-04/19/94-11: 44-CAD93\200\25594



LEGEND

- SUMMARY
- SCHEDULED ACTIVITY
- MILESTONE
- ONE TIME EVENT
- EVENT COMPLETED
- EVENT COMPLETED PRIOR TO OCT 1, 1993

FIGURE 5-1

ALTERNATIVE REMEDIAL CONTRACTING STRATEGY U.S. EPA CONTRACT No. 68-W8-0089 WORK ASSIGNMENT No. 54-5NT2 DOCUMENT CONTROL No. 4500-54-AISX	REVISED REMEDIAL DESIGN PROJECT SCHEDULE U.S. EPA - STOUGHTON LANDFILL Stoughton, Wisconsin
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