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WORK PLAN

PERIMETER SURVEY AND LONG TERM MONITORING PROGRAM IMPLEMENTATION

PHASE I

LOVE CANAL REMEDIAL PROJECT MONITORING PROGRAM (TASK VC) NIAGARA FALLS, NEW YORK

PREPARED FOR

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Henry G. Williams, *Commissioner*

Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., *Director*

E.C. JORDAN CO.

SEPTEMBER 1985

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NIAGARA FALLS, NEW YORK

PREPARED FOR:

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DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

PREPARED BY:

E.C. JORDAN CO.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 PHASE I

WORK PLAN SUMMARY

1.1 INTRODUCTION

Task V of the remedial action plans for the Love Canal site in Niagara Falls, New York, included a borehole investigation program along the perimeter of a proposed cutoff wall (Task VA), the design of a long term monitoring program (Task VB) and an option for the installation of the monitoring program with additional explorations as necessary to close data gaps (Task VC). Tasks VA and VB have been completed, and the State of New York has decided to exercise its option to perform Task VC. In preparing the scope of work for Task VC, three phases of activity were identified. Phase I includes the completion of a perimeter survey about the Canal (begun during the Task VA borehole program) to identify the outermost extents of contaminant migration, the installation of wells and piezometers identified in the Task VB long term monitoring program design report, and collection of water and soil samples for chemical analyses. Phase II is to install additional perimeter survey explorations as necessary, collection of water and soil samples for chemical analyses, and preparation of a report on the findings of the perimeter survey. Phase III consists mainly of the collection and analysis of groundwater and surface water samples at stations identified in Task VB for the first year of the monitoring program.

This work plan describes the activities to be conducted under Phase I only. Work plans for Phases II and III will be prepared prior to the execution of each successive phase.

1.2 OBJECTIVES

The New York State Department of Environmental Conservation (NYSDEC) has identified four objectives for the Task VC Perimeter Survey and Long Term Monitoring Program Implementation. These four objectives are:

Objective A. Provide information for evaluation of the present and continuing effectiveness of remedial actions including: 1) the existing barrier drain; 2) the synthetic membrane and extended clay cap; and 3) the utility cutoff walls.

Objective B. To provide information for NYSDEC to facilitate implementation of system(s) to assess the present and long term environmental quality of the Love Canal area.

Objective C. Facilitate assessment of the extent of contamination outside the Canal as a result of chemical migration through the ground and groundwater.

Objective D. Provide data for NYSDEC to make an evaluation of remedial alternatives, including the no action alternative, to remediate any contamination identified outside the Canal.

Phase I activities, through the perimeter survey and from information gathered during the installation of the planned monitoring stations, will provide a large body of information toward the achievement of these objectives.

1.3 PHASE I SCOPE OF WORK

The phased approach to the planned work provides a cost-effective method for systematically developing additional information and allows evaluation of that information at the conclusion of each phase of work. This approach will provide a basis for reassessing scopes of work and methodologies for successive phases at key decision points. It also increases the opportunity for participation by the public and other entities that NYSDEC identifies in the implementation of the long term monitoring program at the Love Canal site.

During Phase I, Project Operations Plans will be prepared that will include this work plan, a health and safety plan (HASP) and a quality assurance/quality control (QA/QC) plan for the Task VC activities. Requests for proposal on the drilling portion of the work plan will be prepared concurrently with the Project Operations Plans. Upon approval of the plans a subcontractor(s) will be selected for the drilling and exploration program. The field exploration programs have been designed to:

- further assess the extent of contamination beyond the limits of the Canal;

- evaluate the influence of the barrier drain on the groundwater levels within the Canal;

- further evaluate the zone of influence of the barrier drain on each of the geologic units adjacent to the drain;

- assess the influence of the fractures present in the weathered clay stratum on permeability within that unit;

- evaluate the hydrogeologic characteristics of the bedrock at selected locations both near the soil-rock interface and throughout the dolomite bedrock unit; and

- install a series of wells located beyond the areas of signficant contamination for the purposes of the long term monitoring program.

The exploration program will include hollow stem auger borings, cased borings, and the installation of wells and test pits. The exploration for Phase I will include:

Phase I

- borings and wells in contaminated areas;
- perimeter survey monitoring wells;
- nested wells for monitoring the barrier drain;
- test pits;
- bedrock wells; and
- monitoring wells on the 93rd Street School site.

L.F. wells Phase I - 2

The nested wells are primarily designed to provide piezometric and water level data to monitor and evaluate the action of the barrier drain and the extended cap. The borings and wells in contaminated areas and the perimeter survey wells are to define the extent of contaminant migration and establish an early warning perimeter of wells should migration continue laterally away from the Canal. The test pits are to more closely observe and evaluate the fractures in the clay and to assess in more detail the potential for lateral migration through this potential pathway. The bedrock wells and wells in the Canal will provide a basis for assessing the potential migration of Canal contaminants into the underlying dolomite aquifer and to provide monitoring data for this stratum. Finally, the monitoring wells at the 93rd Street School site are to assess the potential impact of wastes at the school, believed to originate from the Canal, on Bergholtz Creek. Phase II will include the installation of wells in the Canal and if required, supplemental perimeter wells.

The basis for the number and approximate locations for each type of exploration has been detailed in the Task VB report, "Love Canal Long-Term Monitoring Program Design." The general rationale for selection rested on interpretations of the existing data concerning the geology and hydrogeology of the site, existing contaminant distribution data and the identification of data gaps in the available information. Decisions for general areas for placement and spacing were based on experience as supported by computer modeling which was performed to better understand the potentials and probable pathways for ground-water movement. Exact locations for placement in the field may depend somewhat on physical features such as terrain or possible underground obstacles such as buried house foundations or utilities. The possible use of existing

installations in the proposed long-term monitoring program will be determined based on proximity to proposed locations, suitability of design and installation and a survey of the well's present operating condition.

A detailed description of the tasks associated with the completion of the Phase I program appears in Section 2.

1.4 SCHEDULE

It is estimated that the Phase I activities will take from 6 to 8 months. The critical elements in meeting this schedule are the weather and the time frame in which the exploration program occurs. Thus delays in approval of plans and/or winter weather could necessitate carryover of some Phase I installations to the spring.

2.0 TASK VC PHASE I

SCOPE OF WORK

2.1 PHASE I IMPLEMENTATION

The following sections describe specific tasks to be accomplished during Phase I. Six major tasks have been identified with the exploration program and have been further divided according to type of installation or purpose.

2.1.1 Task 1: Prepare Project Operations Plans. The project will require the preparation and approval of three documents. These documents are this work plan, a health and safety plan (HASP) and a quality assurance and quality control (QA/QC) plan. The latter two documents are described below.

Health and Saftey Plan. The HASP describes in detail the protocols to be followed during the conduct of the study to minimize potential health and safety risks encountered during the operations. Procedures and equipment are described which provide protection to site personnel, the environment and health and safety of area residents. Levels of protection for workers are designated by letters. Levels D, C and B are anticipated for various work tasks and are described in the HASP. The level of protection increases from D to C to B. Contingency and emergency provisions of the plan are to be coordinated with area officials and residents in the event a signficant release of contaminants were to occur at the Canal. Monitoring of ambient air quality is

prescribed with a set of criteria which dictates personnel response in the immediate area of exploration and for a wider area, if necessary.

Quality Assurance/Quality Control Plan. The QA/QC Plan provides descriptions and specifications of protocols to be employed in the sampling, tracking and analysis of samples to afford the greatest degree of accuracy and reliability of data that can be obtained for the methodology and parameters specified for analysis. Two levels of protocol are anticipated for the project. Normal EPA and NYSDEC protocol will be observed in the collection and analysis of samples in suspected contaminated areas. Most of these samples will receive field screening in order to aid in the decision of where to place a final well in the perimeter survey program. Field screening will consist of a combination of visual observation, scanning with a photoionization (PI) meter for volatile organics and/or more rigorous analysis by a gas chromatograph (GC) unit set up at the field office. This will save time and costs over analysis performed by the Contract Laboratory Program (CLP). CLP level protocols will be observed in sampling and analysis during the perimeter survey of areas which are screened as clean and thus are tentative locations of monitoring wells for early warning of continued contaminant migration if it were to occur. The CLP procedures are required for Superfund site support data and provides an increased level of documentation and confidence in the determination of clean areas.

2.1.2 Task 2: Drilling Subcontractor Bid Package Preparation. Concurrent to preparation of the QA/QC plan, HASP and work plan to NYSDEC for approval, a bid package(s) for the required exploration and monitoring well installation program associated with the Phase I Task VC work will be prepared. This bid

package will be sent to a minimum of three drilling firms to solicit bids for drilling and installation of monitoring wells. The subcontractor recommended for selection will be approved by NYSDEC prior to entering into a subcontractor agreement. The bid package will contain specifications for well installations and for procedures to prevent cross contamination between wells or within a given borehole for a well. Specified procedures to minimize exposure of Love Canal related wastes will be provided while providing installations adequate to achieve stated project objectives. Subcontractors will be subject to all provisions of the work plan, HASP and QA/QC plan that apply to their work.

In the selection process for the drilling subcontractor and other subcontractors and/or services and materials for this project, Jordan will make every good faith effort possible to meet New York State guidelines for minority and women owned business enterprise (MBE and WBE) quotas. Jordan has identified procedures it will employ to achieve these guidelines in the contact amendment support documentation. Efforts to meet these guidelines and actual identified MBE and WBE expenditures will be documented throughout the project for New York State review.

2.1.3 Task 3: Phase I Exploration Program. Jordan and the approved drilling subcontractor(s) will mobilize on the Love Canal site to perform the test borings, install monitoring wells and excavate test pits which are part of Phase I. During the drilling and test pitting operations, an area about each exploration will be cordoned off, as necessary, to prevent incidental contact of unprotected persons with the drilling operation. The Phase I field explora-

tion and monitoring well installation program is anticipated to include the following six subtasks.

Phase I

Subtask 1 - Borings and Wells in Contaminated Areas

The Task VA report of this project identified areas where contaminants were encountered during the borehole program. The general locations of these "hot spots" appear as shaded areas on Figure 2-1. The purpose of this subtask for the Task VC work is to further assess the extent of the contamination through the installation of hollow stem auger borings with continuous sampling of soils using a 2-foot-long split spoon sampler. Soil specimens will be screened in the field for volatile organics as an indicator of contaminant migration using a photoionization meter and a gas chromatograph (GC). Sampling and analytical procedures will be specified in the QA/QC plan developed for this project and as approved by NYSDEC. On the basis of the field GC data, successive borings would be moved away from the areas of contamination until non-detectable levels from the analysis of soil specimens occur. A 2-inch diameter, stainless steel monitoring well would then be installed in those borings identified as being "clean" (as defined by NYSDEC).

A typical installation detail for a monitoring well is shown on Figure 2-2. A monitoring well shall consist of a 1-foot or 5-foot (as required by Jordan) slotted screen 2 inches in diameter constructed of stainless steel pipe, with openings 0.010 inches wide and sufficient 2-inch diameter, thread flush stainless steel riser pipe to reach 3 feet above the

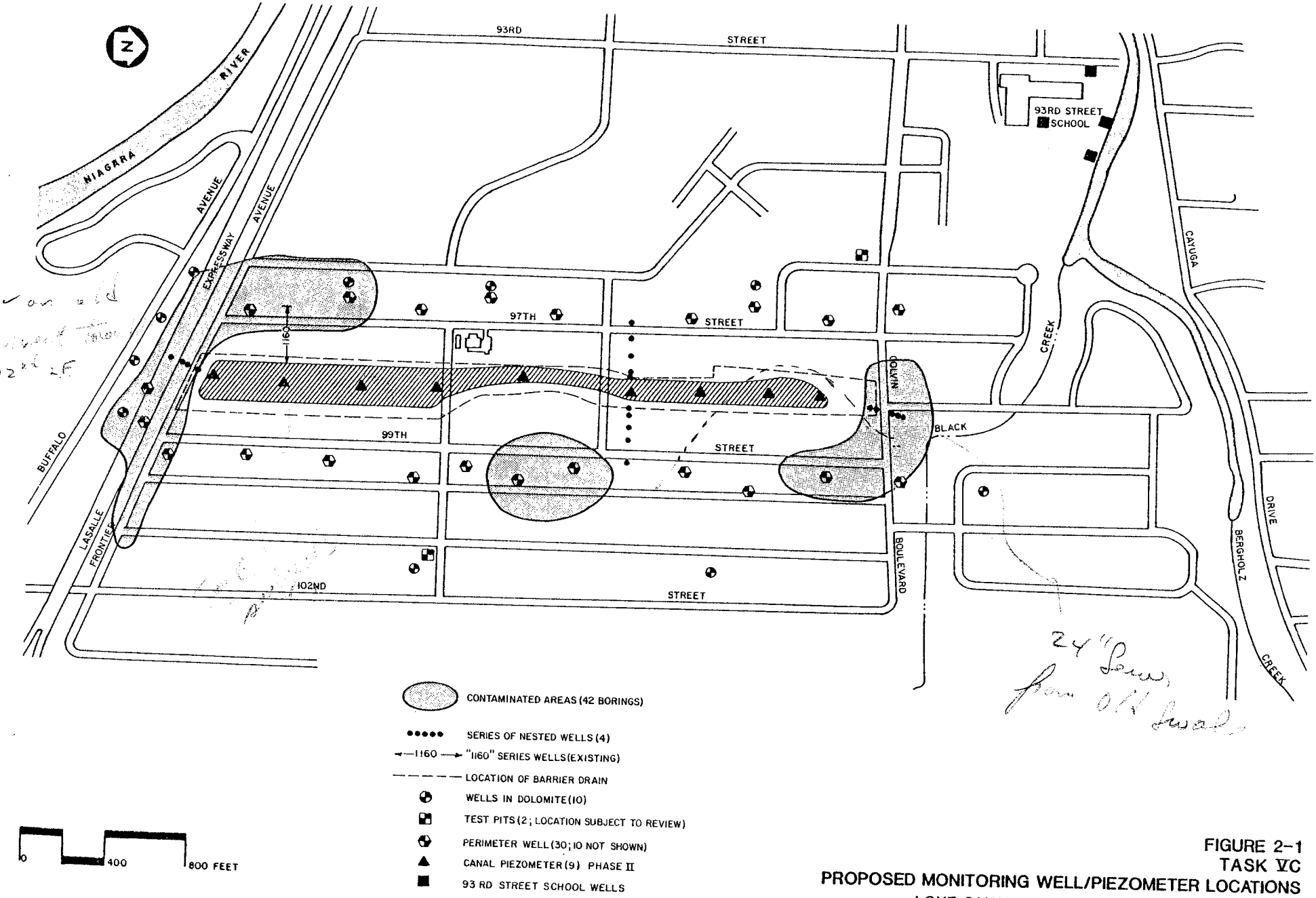

FIGURE 2-1
TASK VC
PROPOSED MONITORING WELL/PIEZOMETER LOCATIONS
LOVE CANAL LONG TERM MONITORING PROGRAM

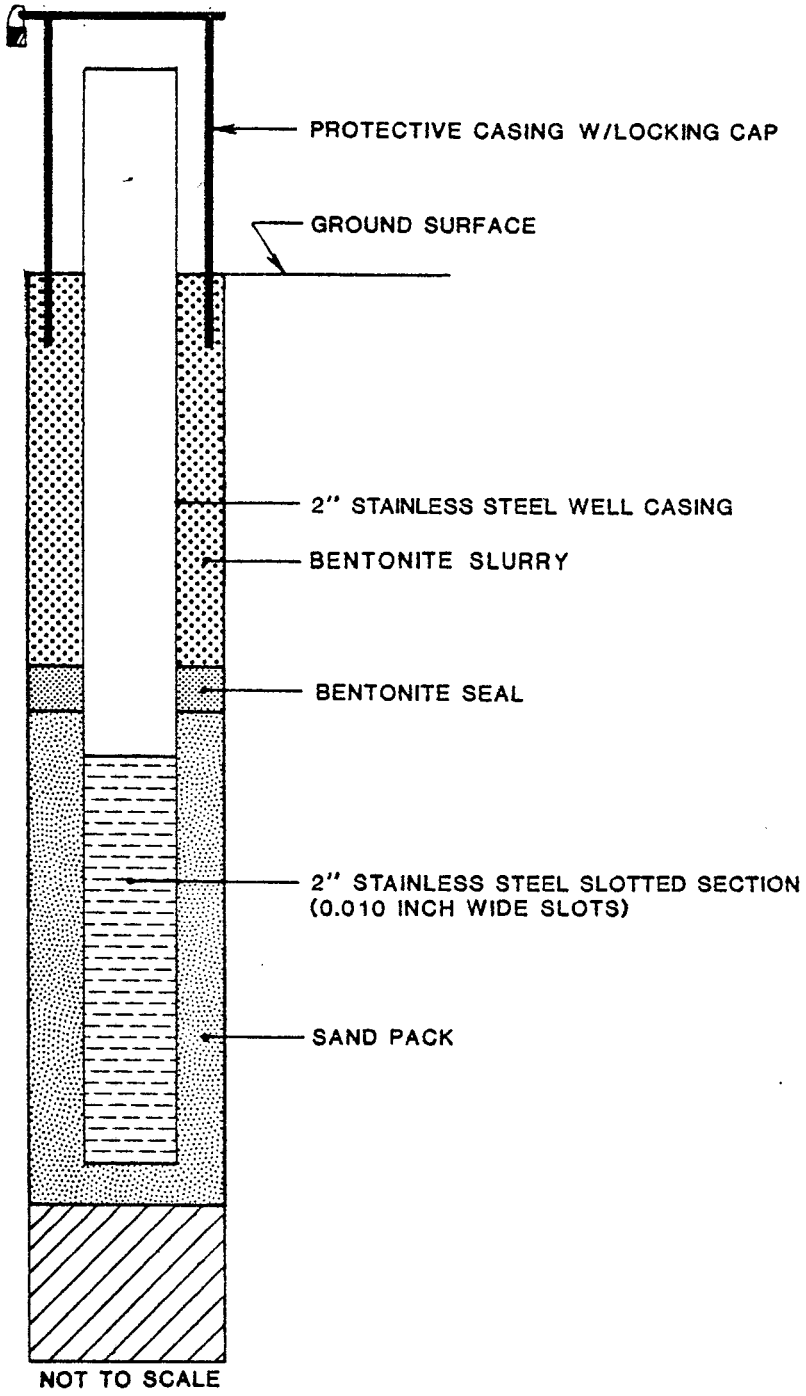

FIGURE 2-2
MONITORING WELL INSTALLATION DETAIL
LOVE CANAL PROJECT
NIAGRA FALLS, NEW YORK

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ground surface. Monitoring wells shall be placed thru casings at least 4 inches in diameter.

The hole will be prepared, backfilled to the well elevation with sand and/or bentonite and the well inserted. The casing will be withdrawn as the sand pack and seal are placed at depths specified by Jordan. At no time shall the borehole be unsupported by either the casing or backfill. The depths to the top of the sand backfill lifts and bentonite seals shall be measured by the driller and recorded. All monitoring wells shall have a surface protective casing constructed and labeled as specified for piezometers.

Monitoring wells and piezometers shall be developed by flushing with potable water. Water shall be alternately introduced into the well casing and removed by pumping until the well produces sediment-free water when pumped.

Representative soil specimens from each location where a well is installed and a water sample from the well will be collected for analysis using CLP. If the analytical results confirm the well is in a "clean" area, the well then becomes a part of the long-term monitoring program. Subsequent sampling and analysis of water samples collected from the well will also be done in accordance with CLP protocols. If the area is shown to be not clean, then successive explorations will be scheduled for Phase II to define the extent of contaminant migration in this area.

The work associated with this subtask will be conducted using one drill rig and a minimum of two Jordan personnel with Level C protection.

The quantities of exploration for this subtask are presented in Table 2-1. The analytical program is summarized in Table 2.2.

Subtask 2 - Perimeter Survey Monitoring Wells

NYSDEC has determined that a series of wells must be installed around the perimeter of the Canal in "clean" areas or areas with no significant levels of contamination. Further, the wells are to be spaced at a minimum of 300 feet on center and extend to a depth of about 25 feet below the ground surface. The 2-inch stainless steel wells are to be installed ~~in~~ through hollow stem auger borings in which soil samples were obtained on a continuous basis using a 2-foot-long split spoon sampler. A total of 20 wells have been budgeted for this subtask during this Phase. Should CLP data from analyses of samples from these wells indicate that the area of contamination has not yet been satisfactorily defined, further perimeter survey wells are planned in Phase II.

For the most part, the wells shown on Figure 2-1 that are located beyond the shaded areas are assumed to be situated in "clean" areas. One well, however, will be located at the southern end of the Canal between Lots 771 and 775 where a sand lens, encountered during construction of the barrier drain, showed evidences of contamination. It is believed that much of the water in these sand lenses was quickly released to the barrier drain

system. The purpose of this well is to investigate if residual contamination persists.

In an effort to reduce some of the cost associated with this subtask, boring and installation logs for existing wells will be reviewed to identify suitable installations which might serve the purposes of providing water samples for the perimeter survey. Wells identified as potentially useful will be inspected to verify their condition and suitability.

To confirm that an area is "clean", a soil specimen from the ground surface and one from the upper 10 feet (the zone of highest permeability) shall be collected and, with a water sample from the well, will be analyzed through the CLP for the parameters shown in Table 2.2.

In addition, this item will include the installation of four (4) monitoring wells near the 93rd Street School (see Figure 2-1). Two wells are to be installed near the top of the bank between the area of fill and Bergholtz Creek. A third well will be placed in an old filled drainage swale on the west side of the school property. The fourth will be installed and screened in the principal area of the fill. These wells will be installed using the same procedures and materials as for the Perimeter Survey Wells.

The work associated with this task will be conducted at Level C using one drill rig and a minimum of two Jordan personnel. The quantities associated with the drilling for this subtask are shown in Table 2.1.

TABLE 2.1

TASK VC - LOVE CANAL LONG-TERM MONITORING PROGRAM
SUMMARY OF EXPLORATION PROGRAMS

Location	Number Installations	Drilling Soil	Footage Rock	Soil Sampling	Well/Piez. Riser	Footage[1] Screen	Level Protection
Canal Wells	9	270	--	No	135	135	B
Perimeter Survey	30	750	--	continuous	725	30	C
Test Pits	2	--	--	as needed	--	--	D
Contaminated Areas	42[2]	630	--	continuous	210	12	C
Well Nests	60[3]	1400	--	50% continuous	1700	60	C/B
Bedrock Wells	7	280	105	every 5'	385	15	C
	3	120	600	every 5'	135	([4])	C

[1] Riser and screen are made of stainless steel.
[2] 12 of the 42 borings will include installation of a monitoring well.
[3] 4 nested series of wells are planned, each nested series including 15 wells distributed at 5 locations.
[4] Multiple point PVC piezometer to be installed.

TABLE 2.2

TASK VC - LOVE CANAL LONG-TERM MONITORING PROGRAM
SUMMARY OF ANALYTICAL PROGRAM - PHASE I

Media	Type of Analysis	Contract Laboratory	Sampling Location: Perimeter Wells	Contaminated Areas	Test Pits	Well Nests	Bedrock	Total[1]
Water	Volatile Organics	Yes	24	12	-	-	25	67
	Semi-Volatile Org.	Yes	24	12	-	-	25	67
	PCB/Pesticides	Yes	24	12	-	-	25	67
	Dioxin	Yes	-	-	-	-	-	-
Soil	Volatile Organics	Yes	48	24	-	-	-	79
	Semi-Volatile Org.	Yes	48	24	-	-	-	79
	PCB/Pesticides	Yes	48	24	-	-	-	79
	Dioxin	Yes	48	24	-	-	-	79

[1] Total includes 10% for field duplicates and sample blanks.

Subtask 3 - Nested Wells for Monitoring the Barrier Drain

A series of nested wells are to be installed at each of the four locations shown on Figure 2-1. Each series is similar in design and purpose to the existing "1160" series of wells installed in 1982 by NYSDEC in the south-western sector of the Canal area. Each series of wells will consist of five nests of wells; four nests installed exterior to the barrier drain and one set interior. The following depths have been assumed; however, actual depths and locations will be determined in the field. The two nests of wells adjacent to the drain will include two wells; one well at a depth of 35 feet and the second well at a depth of 20 feet. The next well nest away from the set adjacent to the drain will include three (3) wells; 35 feet, 20 feet and 15 feet deep. The two nests furthest from the drain will have four (4) wells each; 35 feet, 20 feet, 15 feet and 10 feet in depth. Thus each series of wells is anticipated to consist of 15 individual wells. Due to the anticipated problems of access, utility clearance and optimal placement of the nests in the series at the south end of the Canal, it may not be possible to install all of the proposed nests in that series. This decision will be made in the field by Jordan and NYSDEC.

Wells will be carefully located to avoid interference by buried house foundations. The 2-inch stainless steel wells will be installed ~~in~~ thru cased borings made using 4-inch diameter casing or hollow stem augers. Soil samples will be obtained continuously at the deepest well in a set; however, all remaining borings for that set will be advanced without

sampling. Repair of the liner will be required except for the furthest nest of wells which will not penetrate the liner.

Installation of the nested wells will be conducted using one drill rig with a minimum of two Jordan personnel. Level B protection has been assumed for the two nests of wells adjacent to the barrier drain whereas Level C protection is anticipated for the remaining wells.

Because the nested wells are being used mainly to assess piezometric conditions existing within the geologic units adjacent to the drain, analytical testing has not been provided. As soon as conditions permit, e.g., the piezometers achieve equilibrium, they will become part of the network of wells routinely monitored by NYSDEC for water level determinations.

If cost savings are achieved in this or other items of work, NYSDEC and Jordan shall determine if sufficient funds are available for the installation of up to 3 additional series or partial series of nested wells. Locations will be selected by Jordan and NYSDEC to provide, primarily, additional water level data with which to assess the influence of the barrier drain system and extended cap.

Subtask 4 - Test Pits

Two test pits are to be made in "clean" areas as indicated by the Task VA borehole program beyond the perimeter of the extended clay and synthetic

cap for the purpose of observing the structure of the weathered clay strata underlying the site. These observations should enable Jordan to assess the influence of the observed soil structure, be it stratification and/or fracture patterns, on the permeability of the geologic unit and possibly contaminant transport. In addition, the results of the test pits should allow further assessment of the need and feasibility of the trench wells which were designed as part of Task VB.

The test pit program includes a budget for 2 10-foot-deep test pits. In situ sampling and testing of the weathered clay stratum will be attempted if such efforts are deemed practical and safe. This work will be conducted using Level D protection.

Subtask 5 - Bedrock Monitoring Wells

Monitoring wells will be installed in the bedrock underlying the site at the ten (10) locations shown on Figure 2-1. The borings will be advanced to the bedrock surface using 4-inch flush-jointed casing and the soils will be sampled using a 2-foot-long split spoon sampler at intervals of five feet. Seven (7) of the borings will be advanced into the dolomite bedrock an anticipated average depth of 15 feet using an Nx-size core barrel. A monitoring well will then be installed and sealed to monitor the groundwater quality and piezometric levels in the near-surface zone of the dolomite. The three (3) other bedrock borings will be advanced to the top of the Rochester Shale formation underlying the site using wire line and an NQ-size core barrel. The Rochester Shale is expected to occur at a

depth of approximately 200 feet below the surface of the bedrock. Water samples will be collected from the rock in 50-foot intervals as the borehole is advanced through the dolomite.

Water samples will be collected using a packer system. Multiple point (level) piezometers will be installed in the deep wells to monitor groundwater piezometric levels.

Installation of these wells and piezometers will require one drill rig, one person from Jordan's staff during drilling and two during well installation, and Level C and D protection. (Wells in clean areas will be begun in Level D but upgraded if contaminant levels are encountered which exceed criteria established in the health and safety program.) The estimated drilling quantities are shown in Table 2.1. Further, a survey of existing wells installed in the rock may result in the substitution of some existing wells for proposed wells.

Subtask 6 - Location Survey

In order to locate the additional explorations on a site map Jordan or its subcontractor will conduct a survey to determine the location and elevation of all additional explorations done during the Phase I (and II) field activities. The elevations will be referenced to USGS datum. Jordan understands that a USGS datum bench mark is located at the Love Canal Treatment Plant and assumes this will be sufficient. In connection with this locational and elevation survey, but prior to any new well

installations, Jordan will conduct a visual survey to observe the physical conditions of existing wells that are in close proximity to proposed monitoring well locations for the long-term monitoring program. An evaluation of their physical condition and functional usefulness as part of the long-term monitoring program will be made in an effort to achieve cost savings to the overall program.

2.1.4 Task 4 - Phase I Sampling. Collection of soil specimens for chemical analysis will be ongoing throughout the course of the field exploration program. Soil samples, chemical analytical parameters, and requirements for CLP protocols are summarized in Table 2.2.

At the conclusion of the Phase I exploration program, Jordan will commence sampling of the perimeter wells and the twelve (12) wells installed in "clean" areas adjacent to the contaminated zones. The number of groundwater samples, chemical analytical parameters, and necessary protocols are also summarized in Table 2.2.

2.1.5 Task 5 - Phase I Chemical Analyses. Soil and water samples to be submitted to the CLP for laboratory chemical analyses in Phase I are summarized in Table 2.2. Jordan expects that data generated by a subcontracted CLP laboratory will be validated in accordance with the QA/QC plan by Jordan.

2.1.6 Task 6 - Phase I Evaluation. Under this task Jordan will compile both geologic/hydrogeologic and analytical data gathered during the Phase I program. The data will be reviewed and evaluated for use in the groundwater model

developed in Task VB. The new data will be used in running the model to further evaluate if and where additional monitoring wells would be required for the long-term monitoring program. The results of the modeling and analytical data will be used by Jordan to recommend the locations of additional perimeter survey monitoring wells for the Phase II exploration program. The findings of this Phase I evaluation will be presented in a written report for use by NYSDEC and Jordan, and is not meant to be a formal report for distribution outside of NYSDEC; that is, explanatory text and additional graphics generally included in reports provided for the layperson reader will not be included in this working document.

3.0 MANAGEMENT PLAN

This section of the work plan outlines the management plan which will be used during Task VC, Phase I. The following information describes the project organization, project staffing plan and the project management procedures which will be followed in the conduct of this work.

3.1 PROJECT ORGANIZATION

Figure 3-1 presents the project organization and project staffing plan for the Phase I work.

Donald R. Cote, Corporate Officer, is responsible for maintaining the availability of adequate staff and resources and maintaining technical quality throughout the project.

William R. Fisher, Project Manager, is responsible for the overall administration of the project, including:

- monitoring task activities with regard to established scope, schedule, and budget;
- establishing and administering all subcontracts for support services;
- communicating with NYSDEC regarding status of the project, monthly technical/cost progress reports; and
- satisfying appropriate financial record and reporting requirements.

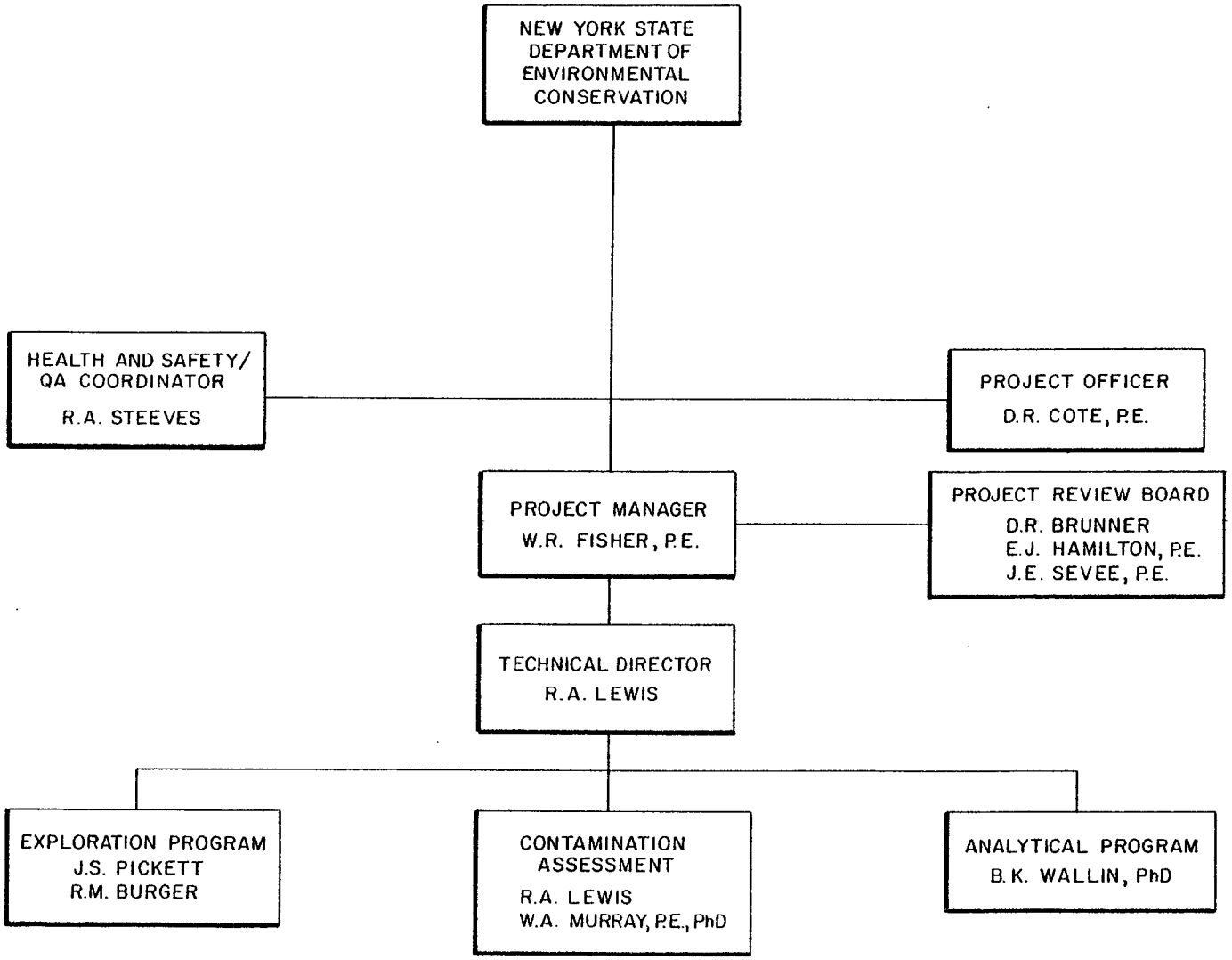


FIGURE 3-1
PROJECT ORGANIZATION
LOVE CANAL REMEDIAL PHASE I PROJECT
TASK V-C

Ronald A. Lewis, Technical Director, is responsible for the appropriateness and adequacy of the technical or engineering services provided. He is specifically responsible for the following:

- o developing the technical approach and level of effort for each project task;
- o coordinating the day-to-day conduct of the project work; and
- o providing on-going quality control.

Robert A. Steeves, Quality Assurance/Quality Control (QA/QC) Coordinator, is responsible for assuring that Jordan QA/QC protocols are followed on each task assignment. In addition, he is responsible for ensuring the project team complies with the company's and the site specific health and safety plan.

Dirk R. Brunner, John E. Sevee and E. James Hamilton, Project Review Board, will review and ensure that technically sound methodologies are applied to the project so that litigatively defensible data, interpretations and conclusions are developed.

Jeffery S. Pickett, is responsible for directing the exploration program including coordinating the activities of the exploration and survey subcontractor(s).

Robert Burger, is responsible for the collection of surface water and monitoring well samples and shipment of the same to the subcontracted analytical laboratory(s).

Bruce K. Wallin, is responsible for the day-to-day coordination of the subcontract laboratory(s) and validation of analytical data.

Mr. Lewis and Willard A. Murray, are responsible for conducting the contamination assessment. This effort will be supported by Richard L. Fortin in the area of hydrogeology and Frederic F. Bragdon in the area of geology; Mr. Lewis will be responsible for assuring the appropriateness of the groundwater modeling.

In addition, Jordan will be supported by subcontractors in the following major activities:

- Borings/monitoring well installation;
- Laboratory analyses; and
- Surveying.

3.2 PROJECT MANAGEMENT

Jordan will utilize computerized management information systems to assist in the overall management of the project and to track project and work assignment schedules, budgets and manpower requirements, including those of the subcontractors. Through the use of these systems, Weekly Project Status Reports will be produced for submission to NYSDEC.

To monitor manpower utilization and costs, separate account numbers will be assigned for each phase of the project. Labor expenditures will be allocated to the appropriate account on a weekly basis. This information will be compiled weekly in the Weekly Project Status Report.

These weekly data will be compared to project budgets to determine project status. These administrative tools will be used by Jordan in scheduling of work assignments and allocating staff resources.

The Weekly Project Status Report will also be used to: 1) determine if sufficient resources are being committed to each assignment; and 2) identify staff or budget variances as they develop. The reports will also be valuable in determining the status of the project for progress reports prepared once every 4 week period.

The budget for each phase will provide the basis for tracking project expenditures. This data will be supplemented by a brief written summary of work accomplished during that period, problems that developed, and steps taken to resolve problems.

Project invoices will be submitted to NYSDEC every four weeks. At a minimum, Jordan's Project Manager/Technical Director and NYSDEC's Project Administrator will review project status bi-weekly.

3.3 PROJECT PERSONNEL AND STATUS:

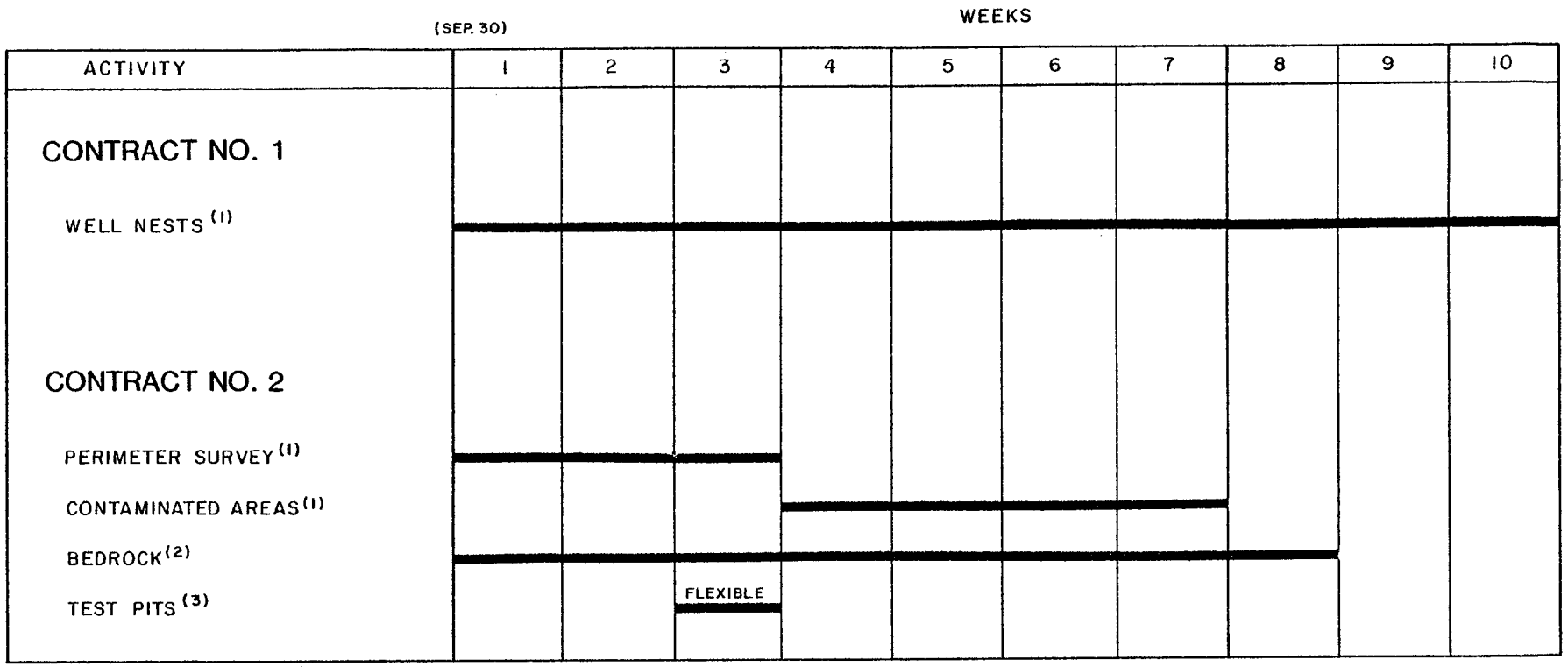
The current status of all proposed field personnel in the Jordan health monitoring program will be listed in the HASP developed in Task 1. If it becomes necessary to replace or to add to the list of personnel, NYSDEC will be notified of the changes or additions and supplied with necessary documentation.

4.0 SCHEDULE

4.1 PROJECT SCHEDULE

The schedule for the Love Canal Task VC Phase I work is shown in Figure 4-1. The schedule indicates that approximately 7 months are required to complete Phase I following approval of the Phase I Work Plan.

Completion of Phase I on schedule is contingent mainly upon timely approval of the Phase I Project Operation Plans. It will be necessary to begin field operations by October 1 in order to avoid delays caused by difficult working conditions brought about by the onset of winter. Early winter conditions may require demobilization for a time and then remobilization in the spring, as conditions permit, to complete the Phase I installations. A very wet fall or early and/or severe winter conditions may, by themselves, disrupt the schedule.



NOTES

1. BOMBADIER RIG REQUIRED
2. TRUCK RIG REQUIRED
3. BACKHOE REQUIRED

PROPOSED SCHEDULE
LOVE CANAL REMEDIAL PROJECT
TASK V-C

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