File on eDOCs ____________ Yes ____________ No
Site Name Sinclair Refinery
Site No. 902003
County Allegany
Town Wellsville
Foilable ____________ Yes ____________ No
File Name Documents / Reports
Scanned & eDOC ____________

report. HW902003. 1988-09. Project_Operation_Plan_Phase2_RI_FS_Vol2.

25A

ARCO

Project Operations Plan

for

Completion of Phase II Remedial Investigation and Work Plan for Feasibility Study

at the

Sinclair Refinery Site Wellsville, New York

Volume II of II

Field Operations Plan

Prepared By

Ebasco Services Incorporated

August 1988

ARCO Petroleum Products Company
515 South Flower Street
Los Angeles, California 90071
Telephone 213 486 1716

R. Walter Simmons
Manager
Superfund Operations and Divested Properties

RECEIVED

SEP 02 1988

BUREAU OF WESTERN REMEDIAL ACTION
DIVISION OF HAZARDOUS
WASTE REMEDIATION

August 30, 1988

Chief, Site Compliance Branch
Emergency and Remedial Response Division
U. S. Environmental Protection Agency, Region 2
26 Federal Plaza, Room 747
New York, New York 19278

Attn: Mr. Paul Olivo, Sinclair Refinery Site Project Manager

Dear Mr. Olivo:

Attached are three (3) copies of the Remedial Investigation Project Operations Plan (POP) for the Sinclair Refinery Site. Included in this document is the Feasibility Study Work Plan. The POP and the FS workplan are required by a Consent Order which requires ARCO to prepare an RIFS for the refinery portion of the Sinclair site in Wellsville, New York.

The POP also includes, as an attachment, the Pre-Excavation Sampling and Analysis Plan for the landfill Phase 1 remedial design. This plan is required by the Consent Decree which ARCO has signed, but which is not yet effective.

We would like to begin sampling on October 1, 1988 under both the POP and the Pre-Excavation Sampling and Analysis Plan. This early start date is needed in order to conduct the sampling before winter in upstate New York, and to allow the RIFS and the landfill remedial designs to be completed as scheduled. ARCO would greatly appreciate your expedited review and approval of these documents. Please call me if you have any questions.

Sincerely yours,

Walt Simmons

R. Walter Simmons

cc: Chief, New York/Caribbean Superfund Branch EPA
Chief, Environmental Enforcement Section, DOJ
Director, Division of Hazardous Waste Remediation, NYDEC
M. Dianne Smith, ARCO

ARCO

Project Operations Plan

for

Completion of Phase II Remedial Investigation and Work Plan for Feasibility Study

at the

Sinclair Refinery Site Wellsville, New York

Volume II of II
Field Operations Plan

Prepared By

Ebasco Services Incorporated
August 1988

EXECUTIVE SUMMARY

The Atlantic Richfield Company, Inc. (ARCO) and the U.S. Environmental Protection Agency signed an Administrative Order on Consent, effective August 3, 1988, allowing ARCO to proceed with the completion of a Remedial Investigation and Feasibility Study (RI/FS) for the Sinclair Refinery Site in Wellsville, New York. As agreed in the Consent Order, the first step in the RI/FS process is to prepare a Project Operations Plan (POP) describing the work to be performed and the procedures to be used.

The POP is divided into two major sections, the Work Plan and the Field Operations Plan (FOP) which are provided in Volumes I and II of the POP. The Work Plan presents a review of the existing data regarding the site, a preliminary analysis of the data, a preliminary identification of potential remedial alternatives, and a description of the technical scope of work for the RI/FS along with a project schedule. A description of the responsibilities and the anticipated levels of effort of key staff and other project personnel involved in the RI/FS and their curricula vitae are also provided in the Work Plan.

The FOP includes three major sections including the Field Sampling and Analysis Plan (FSAP) with its associated Brossman Short Form, the Site Management Plan (SMP) and the Health and Safety Plan (HASP). The sections of the FOP provide direction for field operations, ensuring that field investigations are performed in a safe manner and at a level of quality appropriate for the project needs. The FSAP defines specific standard operating procedures to be followed during the field investigation activities. Number, types, locations and quality assurance/quality control requirements of samples are also described. The SMP provides a description of the responsibilities of site personnel, procedures to control access to potentially contaminated areas and other operational considerations. Health and safety considerations, including a contingency plan for unanticipated emergencies are described in the HASP.

During the period of 1984 to 1987, SMC Martin, under contract with the New York State Department of Environmental Conservation (NYSDEC), began a two phased Remedial Investigation at the site. This Work Plan describes the work required to complete Phase II of the Remedial Investigation. The RI field work described in the POP focuses on sampling in areas of potential concern. The analytical testing program is limited to specific chemicals or groups of chemicals previously detected at the site.

The field investigation program includes sampling of groundwater, soils, sediments and surface water in the vicinity of the old refinery area. No sampling is proposed at the former Off-Site Tank Farm (OSTF), an area where the previous studies did not indicate a potential risk to human health or the environment. In the area of the landfill, a limited groundwater sampling program has been proposed. This is included to verify the previous results showing that groundwater in this area is not significantly affected by the materials in the landfill.

SITE MANAGEMENT PLAN (SMP)
REMEDIAL INVESTIGATION/
FEASIBILITY STUDY

SINCLAIR REFINERY SITE

WELLSVILLE, NEW YORK

AUGUST 1988

8373b

SITE MANAGEMENT PLAN (SMP)

TABLE OF CONTENTS

8373b

LIST OF TABLES

LIST OF FIGURES

SITE MANAGEMENT PLAN

1.0 INTRODUCTION

This Site Management Plan (SMP) has been prepared to support the completion of the Phase II Remedial Investigation (RI) for the Sinclair Refinery Site in Wellsville, New York. The SMP includes a brief site history and site description, a site control and site operations plan outlining project organization, and a description of the responsibilities of key staff and other project personnel and the field operations schedule.

1.1 SITE HISTORY

The Sinclair Site has a history dating back to the late 1800's. During the late 1800's operations at the site were started by Wellsville Refining Company. In 1924, the facility was purchased by the Sinclair Refining Company, who owned and operated the facility until a fire destroyed the facility in 1958. Products manufactured by the facility were made from New York and Pennsylvania crude oil, including crude brought in from wells several miles south of the refinery. Products included heavy oils and grease for lubrication, light oils for fuel, gasoline, lighter fluid, naptha and paraffin. When the Refinery closed, Sinclair transferred the majority of the property to the Village of Wellsville. The remaining property was turned over to the New York Refinery Project. Most of the structures, including the storage tanks at the Off-Site Tank Farm, were removed by 1964. Some of the structures remained, including the oil separator, located on the north side of the site near the river, and several refinery buildings including the power house. Some of the buildings were renovated by tenants of the existing industrial park, while others remain vacant. (see section 2.3 of the Work Plan for details of existing structures).

Since the termination of refinery activities in 1958, the site, with the exception of the landfill area, has become integrated into the local community and local economy. The refinery area has been redeveloped with very few of the refinery structures remaining. This area is currently occupied by a number of businesses, and the Village and Town of Wellsville, and the State University of New York at Alfred (SUNY at Alfred). The Off-Site Tank Farm is not developed, and the landfill area is not currently used.

1.2 SITE DESCRIPTION

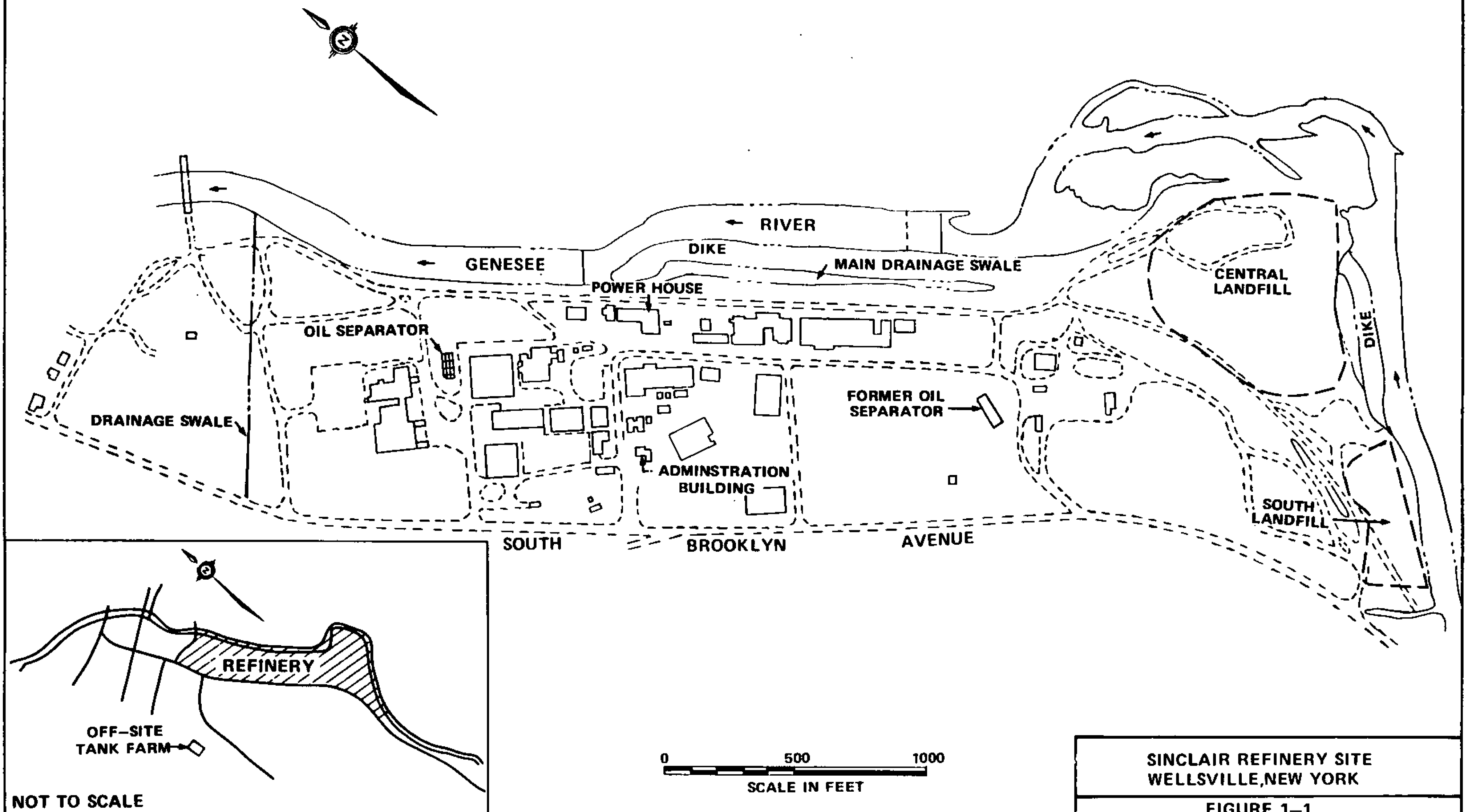
The Sinclair Site is located approximately one mile south of Wellsville, NY, in Allegany County, about ten miles north of the New York-Pennsylvania border. Situated on the Genesee River, the site can be viewed as three separate areas. The first, and largest of these, is the refinery area, approximately 90 acres in size. Next is the landfill area, located adjacent to the southern end of the refinery area. The landfill is also on the Genesee River, and is approximately nine to ten acres in size. Third is the Off-Site Tank Farm, located west of the refinery area, on the west side of South Brooklyn Avenue (River Road) (see Figure 1-1) covering an area of approximately 14 acres.

Five companies are currently using the site along with the University. The businesses operating at the site are Butler Larkin Company Inc.; Mapes Industries, Inc.; Otis Eastern Service, Inc.; Current Controls, Inc.; and National Fuel Co, Inc. Butler Larkin, Inc. is a manufacturer of drilling and completion equipment for oil, gas and water wells, and has its manufacturing facilities at the site. Mapes Industries, Inc. is a maker of toy chests, cribs, and other finished wood products, with production facilities at the site. Otis Eastern, Inc. is a drilling and construction company, having their main offices at the site. Current Controls, Inc. is a manufacturer of small electrical transformers and other electronic control devices, with manufacturing facilities on site. National Fuel Co, Inc., the local natural gas supplier, lease both their customer offices and vehicle maintenance facilities located at the Site. The SUNY at Alfred campus is an agricultural and technical college, including shops for automobile repair instruction.

The Village of Wellsville maintains its domestic water treatment facility approximately one quarter mile south of the southern boundary of the landfill area, upstream of the Site. Wellsville also maintains a Fire Fighting Training School at the north end of the Site.

The buildings occupied by each company are shown on Figure 1-2. The buildings used and types of structures are as follows. The SUNY at Alfred campus has approximately 21 buildings, of which about eight are of brick construction, having been renovated from old refinery buildings. The remaining campus buildings are of corrugated aluminum and steel frame construction. Several of the campus buildings contain shop facilities for automotive engine repair, body work, body painting, and other repair instruction facilities. Butler Larkin has seven buildings, of which two are brick, renovated refinery buildings, and the other five are corrugated aluminum and steel frame construction. Otis Eastern has six buildings, of which five are renovated refinery buildings, the sixth being aluminum and steel. The Wellsville Fire Academy has one small structure made of undetermined materials on the northern border of the refinery site. National Fuel has one large aluminum and steel building on the northern portion of the Site, as does Current Controls (an adjoining structure). Lastly, Mapes Industries has two modified refinery structures, one of them being a large brick structure, the other being a smaller building also of brick.

Several of the companies present on site have significant heavy vehicle traffic. Specifically, National Fuel and Otis Eastern have large numbers of heavy construction equipment present on their property most of the time. The college campus, due to the nature of its vocational program, also introduces vehicular traffic into the area, although much of this is passenger vehicles, not heavy equipment.



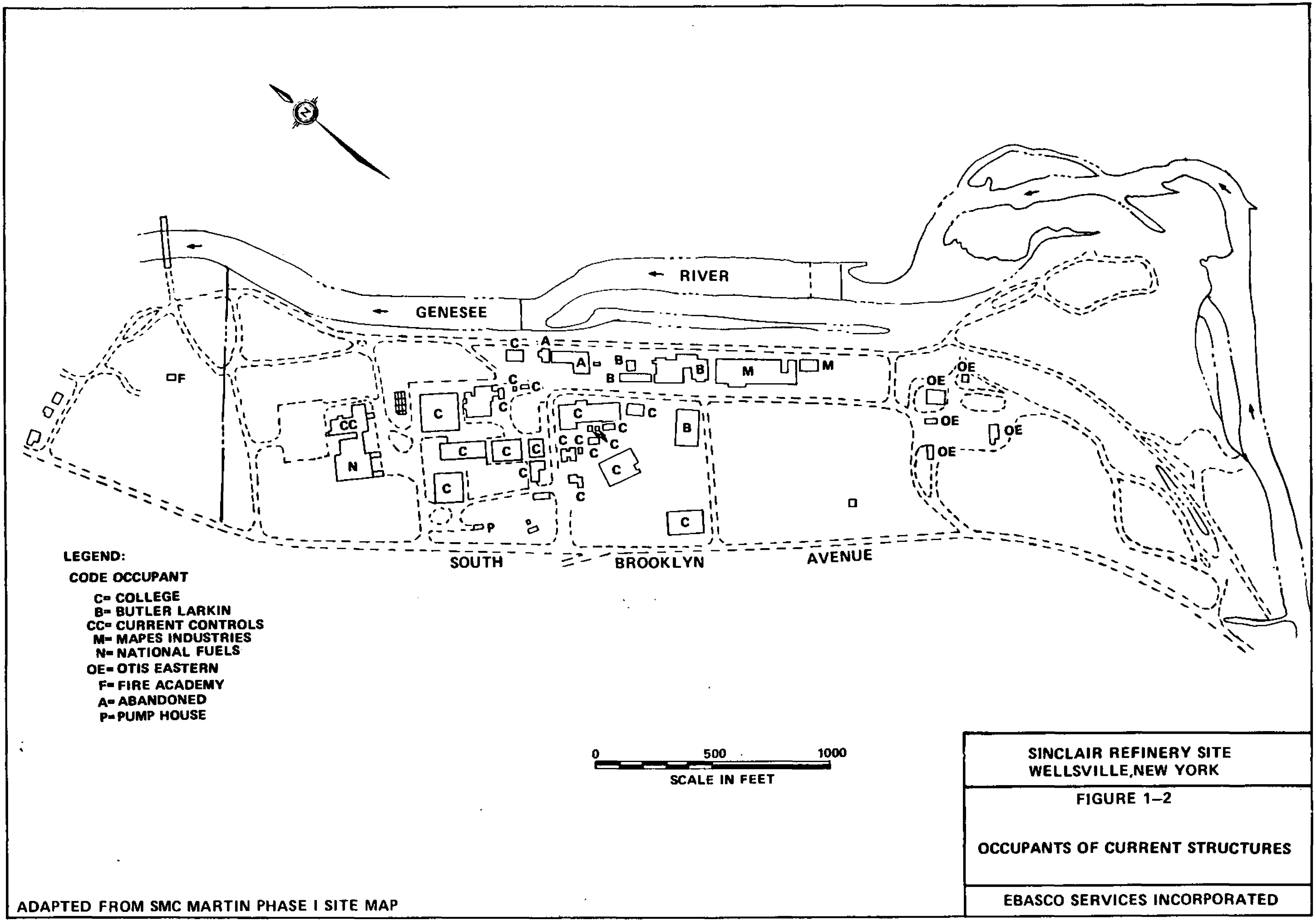
SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 1–1

SINCLAIR REFINERY SITE MAP

EBASCO SERVICES INCORPORATED

ADAPTED FROM SMC MARTIN PHASE I SITE MAP



SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

FIGURE 1–2

OCCUPANTS OF CURRENT STRUCTURES

EBASCO SERVICES INCORPORATED

2.0 SITE CONTROL

The site control section describes how approval to enter the areas of investigation will be obtained, along with the site security control measures and the field office/command post for the field investigation. The logistics of all field investigation activities are also described. These are particularly significant in this case due to the current state of site development and usage.

2.1 SITE ACCESS

ARCO will enter into access agreements and obtain all necessary approvals for Ebasco and its subcontractors to work at the Sinclair Refinery Site. Table 2-1 summarizes the proposed field investigation activities for which access approvals will have to be obtained, along with the current site users and owners of the various properties.

Field investigation activities will take place on these properties. ARCO will also obtain approval for Ebasco to stage a base for the field operations at one central location at the Sinclair Refinery site. It is planned that this will be the decontamination area used by SCM Martin Inc.

A portion of the work will be performed on the Alfred campus of SUNY, currently covering much of the site. Students, teachers, and other members of the public will often be present near equipment to be used for site exploration. In order to control access of these people to operating equipment and potentially contaminated materials, orange traffic cones will be set up around active work areas to help keep out curious onlookers. At night, all excavated pits/ trenches will have been backfilled to minimize the potential for injury to site users.

TABLE 2-1

FIELD INVESTIGATION ACTIVITIES
AND REQUIRED ACCESS APPROVALS

		PROPOSED FIELD ACTIVITIES				
Current Site User	Current Site Owner	Soil Borings	Well Sampling	Install Wells	Well Removal	Test Trenches
SUNY-Alfred	SUNY-Alfred	14	20	--	3	4
Butler Larkin	Butler Larkin	2	3	--	1	4
Current Controls	Village of Wellsville	4	3	--	1	--
Mapes Industries	Village of Wellsville	4	6	--	--	--
National Fuels	Village of Wellsville	2	3	2	--	--
Otis Eastern	Otis Eastern	5	8	--	5	--
Fire Academy	Village of Wellsville	2	--	--	--	--

2.2 SITE SECURITY

Throughout the duration of the field investigation, all portable equipment will be stored at the base trailer established at the Sinclair Refinery Site. The trailer will be locked when not occupied by project personnel. The SUNY Campus Security Office will be notified of all site activities and those persons authorized to access the base trailer and surrounding area.

2.3 FIELD OFFICE/COMMAND POST

It will be necessary to establish a field office, work area, and equipment storage facility at the site. It is estimated that one trailer will be required. The trailer will be used primarily as an office and for sample preparation and packaging, and equipment storage. The trailer facility will allow for the organized and efficient implementation of the Field Operations Plan. The facility will remain on the Sinclair Refinery Site for the duration of the field investigation. It is anticipated that the decontamination area used in the Phase I and II field investigations will be available for use by Ebasco and its subcontractors.

2.4 TRAFFIC CONTROL

Vehicles will be parked near the field office/command post. Drilling rigs and other essential equipment will be the only vehicles allowed into the various study and sampling areas of the Sinclair Refinery Site.

3.0 SITE OPERATIONS

The site operations section includes a project organization chart and delineates the responsibilities of key staff and other project personnel. The resumes of all key staff and other project personnel expected to participate in the RI are included in Appendix A of this SMP.

3.1 PROJECT ORGANIZATION

The proposed project organization and personnel assignments for the field investigation are shown in Figure 7-1 of the RI/FS Work Plan for the Sinclair Refinery site.

3.2 RESPONSIBILITIES OF KEY PERSONNEL

Mr. Thomas Granger is Ebasco's Project Manager for the Sinclair Refinery Site Phase II RI/FS Project. The Project Manager will coordinate all aspects of the project from cost/schedule to technical output, including quality control.

The Site Manager has primary responsibility for development and implementation of the remedial investigation and feasibility study, including coordination among the RI and FS leaders and support staff, development of contract bid packages, acquisition of engineering or specialized technical support and all other aspects of the day-to-day activities associated with the project. The Site Manager identifies staff requirements, directs and monitors site progress, ensures implementation of quality procedures and adherence to applicable codes and regulations, and is responsible for performance within the established budget and schedule. The Site Manager reports directly to the Project Manager. Mr. Neil Geevers is the Site Manager for the Sinclair Refinery Site project.

The Remedial Investigation Leader reports to and will work directly with the Site Manager to develop the Project Operations Plan (POP) and will be responsible for the implementation of the field investigation and the analysis, interpretation and presentation of data acquired relative to the site, including preparation of the RI report. The RI Leader for this site is Mr. Roger Pennifill.

The Field Operations Leader (FOL) will work with the RI Leader to ensure that the supplemental field investigation accomplishes its objectives. The FOL is responsible for on-site management for the duration of all site operations including the activities conducted by Ebasco such as sampling, and the work performed by subcontractors such as well drilling and surveying. The FOL will provide consultation and decide on factors relating to sampling activities and potential changes to the field sampling program. The FOL will be in constant communications with the RI Lead to ensure efficient/effective implementation of the work plan. All site personnel will report to the FOL while on the site. The FOL for the Sinclair Refinery Site project is Ms. Mindy Sayres.

The Analytical Chemistry Coordinator will ensure that the subcontracted analytical laboratory(ies) will perform analyses as described in the FSAP. The chemistry coordinator will be responsible for assuring that proper collection, packaging, preservation and shipping of samples is performed in accordance with EPA guidelines. The Analytical Chemistry Coordinator for this project is Dr. Jon Gabry.

4.0 FIELD OPERATIONS SCHEDULE

The Field Investigation is anticipated to last for a period of 6 weeks. Activities to be accomplished in this time include reconnaissance survey, groundwater sampling (existing wells) and well development, soil sampling, surface water/sediment sampling, test trench sampling, as well as well decommissioning as described in the Field Sampling Analysis Plan. The overall preliminary project schedule, including the field activities, is presented in Figure 7-2 of the Work Plan.

APPENDIX A

8326b

THOMAS GRANGER
MANAGER - ENVIRONMENTAL PROJECTS

SUMMARY OF EXPERIENCE (Since 1974)

Mr. Granger has fourteen years experience conducting and managing environmental and hazardous waste projects. Mr. Granger's experience covers hazardous waste sites, alternate fuel programs and power generation projects. These efforts have included site characterization, treatability studies, technology assessment, licensing and permitting strategies, evaluation of alternatives, environmental assessments, engineering design and specification, and construction supervision. Mr. Granger was the Project Manager for the design and construction phases of the PJP Landfill Remediation which received the Award for Engineering Excellence in 1987 from the Consulting Engineers Council of New Jersey.

EDUCATION - M.E., Environmental Engineering and Sciences, Manhattan College - 1980
- B.C.E., Civil (Sanitary) Engineering, Manhattan College - 1974

REPRESENTATIVE EBASCO EXPERIENCE (Since 1974)

Hazardous Waste Services Project Manager

Responsible for overall coordination of design and construction of interim remedial measure for extinguishment of fire at Superfund listed hazardous waste site in New Jersey. Duties included organizing and planning work which involved site investigation, identification and evaluation of alternatives, design of the final IRM recommendation and management of $20 million construction effort. Responsibilities also included technical quality of work, interface with client and support of Community Relations Program.

Management of Remedial Design for PCB cleanup at Superfund listed site in New York State. Remediation involves an emerging innovative technology to remove and dechlorinate PCBs from contaminated soils and restore site to useful condition as a residential area. Project includes site investigation to support design effort, bench-scale and pilot scale treatability studies for development of commercial scale process design and site remedial action and restoration specification.

REPRESENTATIVE EBASCO EXPERIENCE (Cont'd)

Responsible for day-to-day management and technical quality of work for private sector and governmental lead remedial investigation/feasibility studies for Superfund listed hazardous waste sites in several states. Duties include organizing and planning the work, establishing schedules and budgets, working with the QA officer to develop the Quality Assurance Plan and audits schedule, working with the H&S officer to develop the site-specific Health & Safety Plan, providing management interface with subcontractors and arranging for timely procurement and application of resources needed to complete the project. Responsibilities also include interface with the client and government agencies, and management of the Community Relations Plan in support of the client.

Environmental Services - Project Manager

Responsible for day-to-day management of a multidisciplinary team conducting an Environmental Compatibility Study for a transmission line in Connecticut. Duties include schedule and budget control and interface with client. Responsible for project and progress reports and the technical quality of work in compliance with Connecticut Siting Council (CSC) guidelines. Professional witness providing testimony at CSC hearing on project.

Hazardous Waste Sites - Task Leader

Responsibilities include identification and implementation of waste treatability studies, selection of remedial response objectives, development of remedial alternatives. Contributes to preliminary engineering and cost estimates for preferred alternatives, evaluates alternatives and conceptual design of preferred systems.

Environmental Services - Project Leader

As Project Leader, has identified regulatory requirements and coordinated monitoring programs, provided interface with engineering disciplines regarding control system design, and with the client and regulatory agency regarding a Third Party Environmental Impact Statement, PSD permit application and ER preparation. Additional management activities have included scheduling and budget control, contract negotiation, subcontractor supervision and report preparation.

REPRESENTATIVE EBASCO EXPERIENCE (Cont'd)

Environmental Engineer

Completed laboratory water, wastewater, and solid waste treatability studies to recommend a plant-wide waste management program for a Minnesota utility. Specified, selected and supervised on-site water quality monitoring programs, including coordination and supervision of laboratory subcontractors. Responsible for waste management related environmental assessments for major utility and industrial projects in Texas, Kentucky, Louisiana, Washington, Maryland, Minnesota, Iowa, Ohio and New York.

REPRESENTATIVE EBASCO PROJECT EXPERIENCE

Projects include:

Hazardous Waste

Maxey Flats Steering Committee	Remedial Investigation/Feasibility Study of Maxey Flats low-level radioactive waste disposal site.
U.S. Environmental Protection Agency	Remedial Design for PCB cleanup at Wide Beach Development Site
New Jersey Department of Environmental Protection	Design and Construction of IRM for PJP Landfill Site
New Jersey Department of Environmental Protection	Remedial Investigation/Feasibility Study for Syncon Resins Site
Confidential Client	Feasibility Study for Former Coal Gasification Plant Coal Tar Site
New Jersey Department of Transportation	Remedial Investigation of site of Route 1 & 9 roadway improvement
Howard Needles Tammen & Bergendoff	Remedial Investigation of former explosives manufacturing facility site

Environmental Services

Houston Natural Gas/ Texaco Inc.	Coal Gasification Environmental, Health and Safety Feasibility Study Ascension Parish, Louisiana - 12,0000 ST/D

REPRESENTATIVE EBASCO PROJECT EXPERIENCE (Cont'd)

W.R. Grace/DOE	Ammonia from coal, Feasibility Study, Baskett Kentucky-1200 ST/D
United Illuminating Co.	RESCO 115 kV Tie Project - Environmental Compatibility Study
Louisiana Power & Light Co.	Coal-Fired Units-2-800 MW Units and Transmission Line on a grass roots site - Third Party EIS
Houston Lighting & Power Co.	Chemical Effluent Compliance Plans for ten generating stations totaling 10,000 MW
	Freestone Project - Water and Wastewater Management Study
	W.A. Parish Auxiliary Cooling Water System Modifications
Niagara Mohawk Power Corp.	Lake Erie Generating Station Site Selection Study and Water Management Study
Minnesota Power & Light Co.	Clay Boswell Unit Nos. 1-4 Water, Wastewater and Solid Waste Treatability Study
Iowa Public Service Co.	George Neal Unit No. 4 Environmental Report and Water Management Study
The Dayton Power & Light Co.	Killen Station Environmental Report
Potomac Electric Power Co.	Dredge spoils disposal study

PRIOR EXPERIENCE

Tippetts, Abbett, McCarthy, Stratton

Assisted in study of turbine efficiency at Tarbela Dam, Pakistan, a major hydroelectric facility.

THOMAS GRANGER

PUBLICATIONS

Granger, T, M Kuo, M Verdibello 1987 "A Burning Wasteland Reclaimed," Civil Engineering Magazine, August.

Granger, T, R Quig 1983. "Coal Conversion-Environmental Planning," Encyclopedia of Environmental Science and Engineering Second Edition Gordon and Breach Science Publishers.

Granger, T, J Lekstutis, M S Brown 1981. "An Environmental Regulatory Challenge to the Synfuels Industry," Presented at Coal Technology 81, Houston, Texas, November.

Lekstutis, J, T Thompson, T Granger 1981. "Waste Stream Synthesis and Control in Coal Gasification Processes," Presented at 54th Annual WPCF Conference, Detroit, Michigan, October.

Weber, J C, J Lekstutis, T Granger 1981. "An Effective Plan and Strategy for Licensing Coal Gasification Facilities," Presented at 54th Annual WPCF Conference, Detroit, Michigan, October.

Lekstutis, J, T Granger 1980. "Coal Conversion - Planning for its Implementation and Opportunities," Presented at 51st Annual Ebasco Executive Conference, Marco Island, Florida, October.

El-Baroudi, H, V Velez, D Mirchandani and T Granger 1978. "Compliance of Bottom Ash Sluice Systems to Federal EPA Regulations," Presented at 6th Annual WWEMA Conference, St. Louis, Missouri, April.

CORNELIUS (NEIL) A. GEEVERS
Environmental Engineer

SUMMARY OF EXPERIENCE (Since 1979)

Six years experience in environmental engineering, including conceptual design, pilot-scale testing, sampling and analysis, technical evaluations, and permitting of waste treatment systems for a variety of industries. Conducted field investigations of physical-chemical and biological waste water treatment processes including design, construction and monitoring of pilot plants. Performed technical evaluations of hazardous waste management programs and equipment, groundwater monitoring, process troubleshooting, and waste minimization studies. Responsible for providing engineering support, managing project tasks, and interface with corporate environmental and legal departments, clients, operating personnel, and state and federal regulators.

EDUCATION - M.S., Environmental Engineering, Duke University Graduate School, 1985
- B.S., Environmental Engineering/Chemistry, Stevens Institute of Technology, 1981

PROFESSIONAL AFFILIATIONS - Air Pollution Control Association, Member
Water Pollution Control Federation, Member

REPRESENTATIVE EXPERIENCE (Since 1979)

Ebasco Services Inc. - Envirosphere Division
Environmental Engineer (1987 to Present)

Responsible for evaluating and developing thermal destruction and waste water treatment systems for remediation of uncontrolled hazardous waste sites. Typical project tasks include site investigations, feasibility studies and conceptual design.

Developed and evaluated alternate potable water supply systems as part of a Focused Feasibility Study for the American Thermostat site in South Cairo, NY. Alternatives were evaluated on the basis of effectiveness, implementability and cost.

Responsible for preliminary design of wastewater treatment system to handle aqueous waste streams resulting from the first operable unit of the Bog Creek Farm site remediation in Howell Township, NJ. Bench-scale treatability study results are being used to develop preliminary design criteria for chemical precipitation, sedimentation, air stripping, chemical oxidation and carbon adsorption unit operations. Also helped evaluate innovative treatment technologies such as enhanced volatilization and soil washing for use as the second operable unit at this site.

CORNELIUS (NEIL) A. GEEVERS

REPRESENTATIVE EXPERIENCE (Cont'd)

Involved in the development of an EPA Guidance Manual on Data Quality Objectives for Remedial Design/Remedial Action Activities at Superfund Sites which will assist project team members in specifying an appropriate data collection program to support these activities.

Estimated excavation requirements, including soil, roadway and concrete, for cleanup of a contaminated roadway in New Jersey. Work entailed correlating survey data to analytical sampling results from Remedial Investigation and proposed action levels to recommend procedures for handling of excavated material.

Westinghouse - Environmental Technology Division
Senior Engineer (1985 - 1987)

Responsible for process engineering design and evaluation of water and hazardous waste treatment technologies, including the Westinghouse mobile Pyroplasma system. Worked on RI/FS projects and RCRA, TSCA, Clean Air, and Clean Water Act permit applications.

Compiled all of the information necessary to submit an EPA RCRA Research, Development, and Demonstration permit application to conduct hazardous waste treatment experiments with an innovative high-temperature electric arc pyrolysis system. Developed the sampling and analysis program, contingency plan, technical description of proposed experiments, and closure plan.

Served as primary interface with corporate environmental and legal departments, other engineers, clients, operating personnel, and state and federal regulators.

Duke University - Civil and Environmental Engineering Dept.
Graduate Student (1984 - 1985)

Returned to graduate school full-time in order to obtain a Masters degree in Environmental Engineering. Completed courses in Hazardous Waste Management, Design of Water and Waste Water Treatment Systems, Air Pollution Control, Unit Operations, Engineering Management and Project Evaluation, and Environmental Law. Published thesis entitled "Estimating Polymer Requirements in Centrifuges" which recommended improvements for sludge dewatering equipment evaluation and operation.

Brown and Caldwell Engineers
Engineer (1981 - 1984)

Responsible for field investigations of physical-chemical and biological waste water treatment processes, sampling and laboratory analysis, data reduction, and design calculations. Completed more than 20 projects for clients in the following industries: chemicals, pulp and paper, food, cosmetics, pharmaceuticals, electronics, and medical products.

CORNELIUS (NEIL) A. GEEVERS

REPRESENTATIVE EXPERIENCE (Cont'd)

Conducted pilot plant investigation to develop design and performance criteria for sludge thickening, aerobic digestion, recessed-plate pressure filtration, and tertiary clarification systems for the waste water treatment system at a chemical plant in New Jersey. Designed, constructed, and monitored the pilot plant.

Other projects include sampling of groundwater monitoring wells, environmental audits, process troubleshooting, energy conservation studies and waste minimization surveys.

Lever Brothers - R&D Center
Engineering Trainee (1979 - 1980)

Developed a waste management program which enabled an R&D laboratory and pilot test facility to comply with RCRA and other state regulations. Characterized waste sources and types, established handling, storage and disposal procedures.

HONORS AND AWARDS

Dean's List, Stevens Institute of Technology

ROGER A. PENNIFILL
Principal Geologist

SUMMARY OF EXPERIENCE

Technical and project management experience in geological engineering and hydrogeology as related to radioactive and hazardous waste management. Primary responsibilities have included design and implementation of site characterization plans, analysis of risk posed by contaminated sites, groundwater flow and contaminant transport modeling and analysis of regulatory compliance at industrial facilities.

EDUCATION - B.S., Virginia Polytechnic Institute - Geology, 1974
M.S., University of Idaho - Geological Engineering, 1978

PROFESSIONAL MEMBERSHIP - Association of Engineering Geology

PROFESSIONAL REGISTRATION - Virginia, Certified Professional Geologist

REPRESENTATIVE EBASCO PROJECT EXPERIENCE (Since 1987)

Principal Geologist

Involved in RI/FS report preparation and radiologic waste disposal projects.

Experience includes: Preparation and review of the RI and FS reports for the CERCLA designated Maxey Flats Disposal Site. Included was technical review of technology and alternative evaluations, and preparation of supporting documentation for the RI and FS reports.

Participated in the preparation of the low-level radioactive waste alternative technology assessment study performed for the Department of Energy. Project responsibilities included interdisciplinary coordination of the safety analysis report, and assuring that the documentation complied with the regulatory guidance in NUREG-1199.

PRIOR EXPERIENCE (5 Years)

Dames & Moore (Pearl River, New York)

Project Manager (3 years)

Managed projects involving the characterization and assessment of hydrogeologic conditions and contaminants at hazardous and radiologic waste sites and conducted environmental audits at commercial properties.

ROGER A. PENNIFILL

PRIOR EXPERIENCE (Cont'd)

Primary responsibility for the management and preparation of a license application to the NRC for the on-site disposal of thorium contaminated waste under the provisions of 10 CFR 20.302.

Managed the Phase 2 investigation of a New State Superfund site in Niagara Falls, New York. The program included groundwater, soil, and air sampling and a geophysical (seismic) site survey.

Performed ground-water and contaminated transport modeling at sites containing hazardous and radiologic wastes in Ohio and New York. Several 1-D and 2-D flow models were utilized.

Conducted and managed environmental audits of commercial facilities for prospective purchasers and current owners to assist them in identifying potential environmental hazards associated with the sites. Audit components included reviews of local, state and federal records, interviews, and on-site observations and sampling.

U.S. Nuclear Regulatory Commission (Washington, D.C.)

Project Manager/Geotechnical Engineer (4 years)

Managed and participated in radiologic waste disposal and remediation projects.

Experience Includes:

Supervised the review of designs, environmental impact statements and site selection documents for the remediation and stabilization of abandoned uranium mill tailings (UMTRA) sites.

Managed technology development contracts in the fields of site characterization, geotechnical quality control, facility design and construction, and synthetic liners for low-level radioactive waste and uranium mill tailings facilities.

Soil Testing Services, Inc. (Fairfax, Va.)

Assistant Project Engineer (1 year)

Wrote geotechnical engineering reports relating to foundation design, supervised field data collection and performed soil property laboratory testing.

ROGER A. PENNIFILL

PRIOR EXPERIENCE (Cont'd)

Schlumberger Well Services (Sacramento, Calif.)

Field Engineer (1 year)

Interpreted results from and supervised the operation of a wireline logging truck for geophysical logging of oil, gas and geothermal wells.

PUBLICATIONS

Site Suitability, Selection and Characterization: Branch Technical Position Paper; Siefken, Pangburn, Pennifill, and Starmer; U.S.N.R.C., NUREG-0902, November, 1982.

Near-Surface Disposal Facility Design and Operation: Branch Technical Position Paper; Pangburn and Pennifill; U.S.N.R.C., November, 1982.

Onsite Disposal of Radioactive Wste, Volume 31: Estimating Potential Groundwater Contamination; Goode, Neuder, Pennifill, and Ginn; U.S.N.R.C., NUREG-1101 Vol. 3, November, 1986.

MINDY SAYRES
Associate Geologist

SUMMARY OF EXPERIENCE

Ms. Sayres has participated in a wide range of geologic and geotechnical projects in both industry and the academic community. Specific project experience includes hydrogeologic evaluation for the siting of a high-level nuclear waste repository, supervision of monitoring well installation and subsequent chemical sampling in hazardous waste sites, rock excavation inspection and geologic field mapping and analysis.

PROFESSIONAL AFFILIATIONS - Geological Society of America
Sigma Xi

EDUCATION - M.A., Geology, Queens College of CUNY - 1986
- B.A., Geology, State University of New York at Oneonta - 1979

SPECIAL TRAINING - Certification of Completion of REM III Health and Safety Training Course - NUS, Pittsburgh, PA - 1986

REPRESENTATIVE ENVIROSPHERE EXPERIENCE (Since November 1986)

Greenwood Chemical (REM III): Field Operations Leader supervising an interim investigation which included soil boring and sampling, bulk density testing and lagoon and stream sampling.

Brewster Well Field (REM III): Field Operations Leader of a Supplemental RI/FS. Responsibilities included the design of the geologic/hydrologic portion of the field investigation and subsequent generation of the Work Plan, Field Operations Plan and Drilling Specifications Document as well as the supervision of all field activities. Field activities included a preliminary soil gas investigation, soil boring and sampling, monitoring well installation and groundwater sampling and OVA headspace screening of soil samples.

Bog Creek Farm Site (REM III): Site geologist supervising drilling (mud and hollow stem auger) of test borings and monitoring wells. Responsibilities included soil identification and classification (USC and Burmister Systems), chemical sampling of water and soils, daily measurements of stream flow through rectangular and V-notch weirs and participation in a constant rate injection test.

New Jersey Route 1 & 9: Site geologist responsible for the direction of drilling crews conducting test borings and observation well installation, soil identification and classification, and engineering and chemical sampling of soils.

MINDY SAYRES

PRIOR EXPERIENCE

Woodward-Clyde Consultants (January-November 1986)

Ms. Sayres's experience includes work in nuclear waste management where she participated in the evaluation of the hydrogeology of crystalline rocks in the northeastern United States for the siting of a high-level nuclear waste repository. This work included computer generation of hydrologic data maps as input to finite element groundwater flow models, technical report writing and editing with coordination of accompanying graphics and the development of extensive quality assurance procedures and work plans under DOE guidelines.

Geotechnical experience at Woodward-Clyde includes rock excavation inspection, seismograph monitoring for rock blasting and pile driving, pre-construction surveys and compacted fill inspection/density testing.

Maine Geological Survey (1984)

As a field geologist for the survey, Ms. Sayres has gained extensive experience in geologic mapping and tectonic analysis.

HONORS

Associate Member Sigma Xi
Dean of Graduate Studies (Queens College) Special Fellowship
Grants: Geological Society of America
Sigma Xi

JON C. GABRY
Environmental Chemist/Health Scientist

SUMMARY OF EXPERIENCE (Since 1979)

Total Experience - Eight years experience in environmental chemistry and ecological analyses. Experience includes supervisory/managerial positions. One year experience in the chemical (surfactant) industry.

PROFESSIONAL AFFILIATIONS - American Association for the Advancement of Science
Atlantic Estuarine Research Study

EDUCATION - Ph.D., Ecology, Rutgers University - 1984. Thesis: "Long Term Effects of Overboard Dredge Disposal on a Marine Benthic Community."
MS, Biology, Rutgers University - 1981
BS, Biology, Pennsylvania State University - 1978
Certificate in Marine Science, Pennsylvania State University - 1978
BS, Pennsylvania State University, 1977, Premedicine (Minor: Chemistry)

CONTINUING EDUCATION - GC/MS Short Course "Environmental Applications of Gas Chromatographic Mass Spectrometry," 1987, Indiana University

REPRESENTATIVE ENVIROSPHERE PROJECT EXPERIENCE (Since 1985)

Environmental Chemist/Health Scientist

Responsible for reviewing and evaluating environmental chemical data and assessing human health effects resulting from multimedia exposures to toxic chemicals. Also responsible for providing technical expertise and direction where appropriate, and for evaluating and recommending analytical protocols for laboratory services bid packages. Specific experience includes:

Performed the analysis of chemical data on eight Superfund sites. This analysis included data validation, reduction and presentation into a final report. In conjunction with this activity, a detailed risk assessment of the chemical constituents present at each site was generated for five of these Superfund sites. Briefly, the risk assessment involved the following activities: analyzing site specific chemical data to indicate those chemical constituents of concern; identifying those human exposure pathways of importance; modeling the environmental transport and subsequent intake of the chemical constituents of concern; and determining the potential public health impacts resulting from the modeled chemical exposures. The analysis included evaluating acute/chronic toxic effects (including carcinogenicity). For one of the Superfund sites mentioned previously, participated in the environmental assessment of the site.

JON C. GABRY

REPRESENTATIVE ENVIROSPHERE PROJECT EXPERIENCE (Cont'd)

This entailed a detailed ecological assessment of the site prior to remediation, and for during and post-implementation of the remedial alternatives selected. Two of the aforementioned Superfund sites involved mixed waste (radiological and organic/inorganic contaminants). At one of the Superfund sites, developed and validated a rapid soil extraction/cleanup procedure for analyzing PCBs. The new procedure is currently being incorporated in a compendium of EPA approved analytical methods.

Developed sampling and analytical protocols, evaluated data, performed a risk assessment and prepared a final report for a private industrial client. The project principally addressed an odor problem occurring within the facility from non-point source contaminants. Identifications of potential sources of the contaminants were accomplished by utilizing comparative analytical techniques.

Performed an evaluation of bioaccumulation factors (BCFs) of selected pesticides and metals for the U.S. Army. This evaluation was utilized to develop probabilistic stochastic ranges of BCFs in various fish species for incorporation into an exposure pathway model. The exposure pathway model was subsequently used to assess potential human health risks.

Completed a detailed site investigation and risk assessment report for a private utility company's ash landfill (fly and bottom ash) site.

Supervisor, EPA Region II Data Validation Support

Developed REM III data validation support services for EPA Region II. Supervises professional and technician level staff performing data validation. Provides technical expertise where appropriate.

Regional Laboratory Sample Coordinator, EPA Region II

Coordinates laboratory services and sample tracking within EPA Region II for all REM III projects. Developed the sample tracking software and wrote the software user's manual utilized in all REM III EPA regions. Drafts bid packages and requests for special analytical services for CLP and/or REM III Team Laboratory Services. Wrote analytical deliverables requirements for all REM III Team Laboratories. Maintains sample bottle repository within Region II for CLP jobs. Supervises regional laboratory services staff. Provides technical assistance where appropriate.

JON C. GABRY

PRIOR EXPERIENCE (7 Years)

Princeton Testing Laboratory
Assistant Laboratory Manager (2 months)

Supervised all aspects of the organic laboratory sections' operations. Performed non-routine chemical analysis when required and trained entry level chemists/technicians. Increased productivity 90 percent.

Princeton Testing Laboratory
Senior Organic Chemist (10 months)

Responsible for trace organic analysis of pesticides, polychlorinated biphenyls, volatile organics and non-routine organic chemical analysis. Supervised and trained chemical technicians. Developed and wrote standardized laboratory methods and computer programs for the data acquisition systems. In charge of laboratory automation and computer interfacing. Performed GC (FID, HECD, ECD, PID, NPD), GC/MS, HPLC and UV analysis on a variety of sample matrices.

Onyx Chemical Company
Quality Control Chemist (1 year)

Responsible for wet and instrumental analysis of raw materials, in-process and final product samples. Directed operators on in-process adjustments via in-lab formulations. Performed UV, GC and LC analysis when required.

Rutgers University, Camden
Graduate Research Assistant (5 years)

Responsible for the benthic invertebrate section of the NJDEP Overboard Disposal Project granted to Rutgers University. Directed the collection and taxonomic identification of all benthic samples. Wrote computer programs and technical reports to NJDEP. Supervised undergraduate employees. Compiled a list of polychaete species found in New Jersey and their biogeographical distributions. Studied the reproductive biology of Asabellides oculata and an exoskeletal disease in Callinectes sapidus. Designed, constructed and field tested a low velocity current meter.

JON C. GABRY

PUBLICATIONS

Durand, J B, J Gabry and K Schick. 1979. Overboard Disposal of Dredge Material, Second Annual Report prepared for NJDEP.

Durand, J B, J Gabry and K Schick. 1980. Overboard Disposal of Dredge Material. Third Annual Report prepared for NJDEP.

Durand, J B, J Gabry. 1981. Overboard Disposal of Dredge Material. Fourth Annual Report prepared for NJDEP.

Durand, J B, J Gabry and B Spillane. 1982. Overboard Disposal of Dredge Material. Fifth Annual Report prepared for NJDEP.

Durand, J B, and J Gabry, 1984. Overboard Disposal of Dredge Material. Final Report prepared for NJDEP. Rutgers University CCES publication, 186p.

Gabry, J C and J Singerman. 1987. A Rapid Soil Extraction and Cleanup Procedure for Polychlorinated Biphenyls (PCBs). Proceedings, Hazardous Material Control Research Institute Superfund 1987 Conference.

Papers Presented:

"Benthic community responses to overboard dredge disposal in Absecon Bay, New Jersey," Atlantic Estuarine Research Society, April, 1983.

"The effects of dredging and overboard disposal on the benthic communities of Absecon Bay, New Jersey," Rutgers University Colloquium Series, March, 1983.

"A rapid soil extraction and cleanup procedure for polychlorinated biphenyls," Hazardous Materials Control Research Institute Superfund 1987 Conference, November, 1987.

JOHN M. GUSHUE
Supervising QA/QC Engineer

SUMMARY OF EXPERIENCE (Since 1973)

Registered Professional Quality Engineer with over 11 years experience in Quality Assurance and Quality Control.

PROFESSIONAL AFFILIATIONS - American Society for Quality Control
American Nuclear Society

REGISTRATIONS - Professional Quality Engineer - California

EDUCATION - M.B.A., Pace University (in progress)
- B.A., Philosophy/Physical Sciences, Don Bosco College - 1968

CONTINUING EDUCATION - Mathematics/Computer Science Coursework, Boston College - 1968
- Electrical Technology Coursework, Wentworth Institute - 1969
- Electrical Engineering Coursework, Northeastern University - 1970

REPRESENTATIVE EBASCO PROJECT EXPERIENCE (Since 1978)

Quality Assurance

Developed and implemented the Quality Assurance (QA) Programs for field investigations associated with feasibility studies at several sites; prepared numerous QA programs for nuclear power stations as stipulated by the Nuclear Regulatory Commission and Nuclear Industry standards; prepared procedures for the implementation of these programs in such areas as document control, design control, audits and records; conducted QA/QC audits to evaluate the implementation of the QA program laboratory and engineering facilities; determined the adequacy of subcontractor QA programs; actively pursued the resolution and corrective action for numerous nonconforming conditions affecting various equipment and services for industrial facilities and hazardous waste sites/laboratories; reviewed project criteria, specifications and drawings for the inclusion of quality criteria suitable for site/project requirements; performed audits of nuclear activities in accordance with ANSI N45.2.12 while qualified as a lead auditor in accordance with ANSI N45.2.23.

JOHN M. GUSHUE

REPRESENTATIVE EBASCO PROJECT EXPERIENCE (Cont'd)

Quality Control

Performed audits of field sampling program at several Superfund sites, site inspection programs at power generating stations, and inspection services provided by equipment manufacturers; evaluated the performance of subcontractors for compliance to established QA Programs and standard operating procedures.

Administrative Responsibilities

Quality Assurance Officer responsible for QA program at several hazardous waste sites; Project Quality Assurance Engineer responsible for directing the total QA program of the architect/engineer for several nuclear power stations; provided technical supervision to twenty Quality Assurance Engineers; maintained budget controls for QA staffs located at job sites and at the home office; performed staffing responsibilities for site and engineering office.

PRIOR EXPERIENCE (5 Years)

Stone & Webster Engineering Corporation, Boston, MA
Quality Assurance Engineer (4 years)

Responsible for auditing the implementation of Quality Assurance Programs at several Nuclear and Fossil Power stations. Particular emphasis given to electrical systems. Performed statistical analysis of audit data for use by upper management. Prepared detailed procedures to implement the requirements of the established QA program, including requirements for sampling, data collection, retention and retrievability.

Avionics Research, Plainview, NY
Quality Control Engineer (1 year)

Responsible for performing field inspections at Indian Point Nuclear Power Station. Prepared inspection program based upon industry standards such as: 10CFR50, Appendix B, IEEE, IPCEA and ANSI.

HEALTH AND SAFETY PLAN

SINCLAIR REFINERY SITE

SAMPLING FOR REMEDIAL INVESTIGATION AND FINAL DESIGN STUDY

REFINERY AND LANDFILL AREAS

WELLSVILLE, NEW YORK

AUGUST 1988

8355b

TABLE OF CONTENTS

SITE HEALTH AND SAFETY PLAN

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared in accordance with established EBASCO policies and procedures and the regulatory requirements of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response. It addresses all those activities associated with Sampling for Final Design Study at the Sinclair Refinery Site, Wellsville, N.Y., and will be implemented by the Health and Safety Officer (HSO) during site work. Compliance with this HASP is required of all personnel who enter this site.

The content of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any proposed changes will be reviewed by the Health and Safety Manager.

Telephone numbers which may be required in a site emergency are listed below for easy reference.

Police	Wellsville Police Dept	911
	Wellsville Fire Dept	911 or (716) 593-4980
Rescue Service	Wellsville Volunteer	911 or (716) 593-4330
Hospital	Jones Memorial	(716) 593-1100
Poison Control Center		(314) 772-5200
CHEMTREC (24 Hours)		(800) 434-9300
Project Manager (Ebasco)	Tom Granger	(201) 460-6197
Health & Safety Manager	Bill Beckett	(201) 460-6255
Health & Safety Officer	Bob Bliss	(201) 460-6201
Field Operations Leader	Mindy Sayres	(201) 460-6369
RI Lead	Roger Pennifill	(201) 460-6288
Project Coordinator (ARCO)	Walt Simmons	(213) 486-1716
SUNY Campus Security		(716) 593-6270

2.0 ORGANIZATION AND ADMINISTRATION

2.1 COMPANY HEALTH AND SAFETY MANAGER (HSM)

The Company Health and Safety Manager, Mr. William Beckett, is responsible for the development of safety protocols and procedures necessary for field operations. He has overall responsibility for development and implementation of this HASP, and will approve changes to this plan due to modification of procedures or newly proposed site activities. The HSM is also responsible for the resolution of any outstanding safety issues which arise during the conduct of site work. Health and safety-related duties and responsibilities will be assigned by the HSM only to qualified individuals.

2.2 SITE HEALTH AND SAFETY OFFICER

The designated Health and Safety Officer (HSO) for this project is Mr. Robert Bliss. The HSO is responsible for implementing and enforcing all aspects of the HASP, and he, or his designee, will be present on site during all activities involving potentially hazardous materials or conditions. The HSO may direct or participate in downrange activities as appropriate when this does not interfere with his primary responsibilities. The HSO will conduct regular and frequent safety inspections of the work area(s) to ensure ongoing compliance with the HASP, and has the authority to stop work in case of imminent safety hazards, emergency conditions, or other potentially dangerous situations such as adverse weather conditions.

2.3 ASSISTANT HEALTH AND SAFETY OFFICER

When conditions have been characterized as low-hazard level C or level D, the HSO may direct the site health and safety efforts through an Assistant HSO approved by the HSM. The Assistant HSO may have collateral duties but will be qualified for the health and safety responsibility by the HSM. The Assistant HSO will share responsibility with the Field Operations Lead and the HSO for ensuring that all safety practices are utilized by downrange teams and that during emergency situations appropriate procedures are immediately and effectively initiated. In addition, an Assistant HSO may be required to support the HSO when multiple operations are conducted that require monitoring and/or surveillance.

For level B or high-hazard level C activities, Assistant HSOs provide the downrange health and safety support for field sampling teams. The number of Assistant HSOs will be dependent upon the number of downrange operations occurring simultaneously, designated level of protection, and the individual assignments made by the HSO.

3.0 SITE HISTORY AND PHYSICAL DESCRIPTION

The Sinclair Refinery is located in Allegany County in southwestern New York State, in the town and village of Wellsville. A location map of the site is provided as Figure 1. The property is bounded by the Genesee River on the east and south. An abandoned rail line to the west separates the old refinery grounds from the landfill area. The refinery operated from the late 1800's until 1958. During operation, the refinery manufactured various petroleum derivatives including heavy oils and grease for use as lubricants, light oil for fuel, naphtha, gasoline, lighter fluid, kerosene, and paraffin. Site documents indicate that the southernmost portion of the property was used for many years as a landfill for a variety of refinery materials. This portion of the site has been divided into two areas, a large landfill referred to as the Central Elevated Landfill Area (CELA), and a smaller landfill to the south, referred to as the South Landfill Area (SLA). Landfill activities apparently continued long after the cessation of refinery operations in 1958. Aerial photographs from 1964, 1970, 1974, and 1982 indicate that additional landfilling occurred during this period.

When the refinery closed, Sinclair transferred the majority of the property to the Village of Wellsville. The remaining property was turned over to the New York Refinery Project. Most of the structures, including the storage tanks at the Off-Site Tank Farm, were removed by 1958. Some of the structures remained, most notably the oil separator, located on the north side near the river, and several refinery buildings. Some of the buildings were renovated by tenants of the existing industrial park, while others remain vacant. Today, the property is used by several companies and by the State University of New York as a campus.

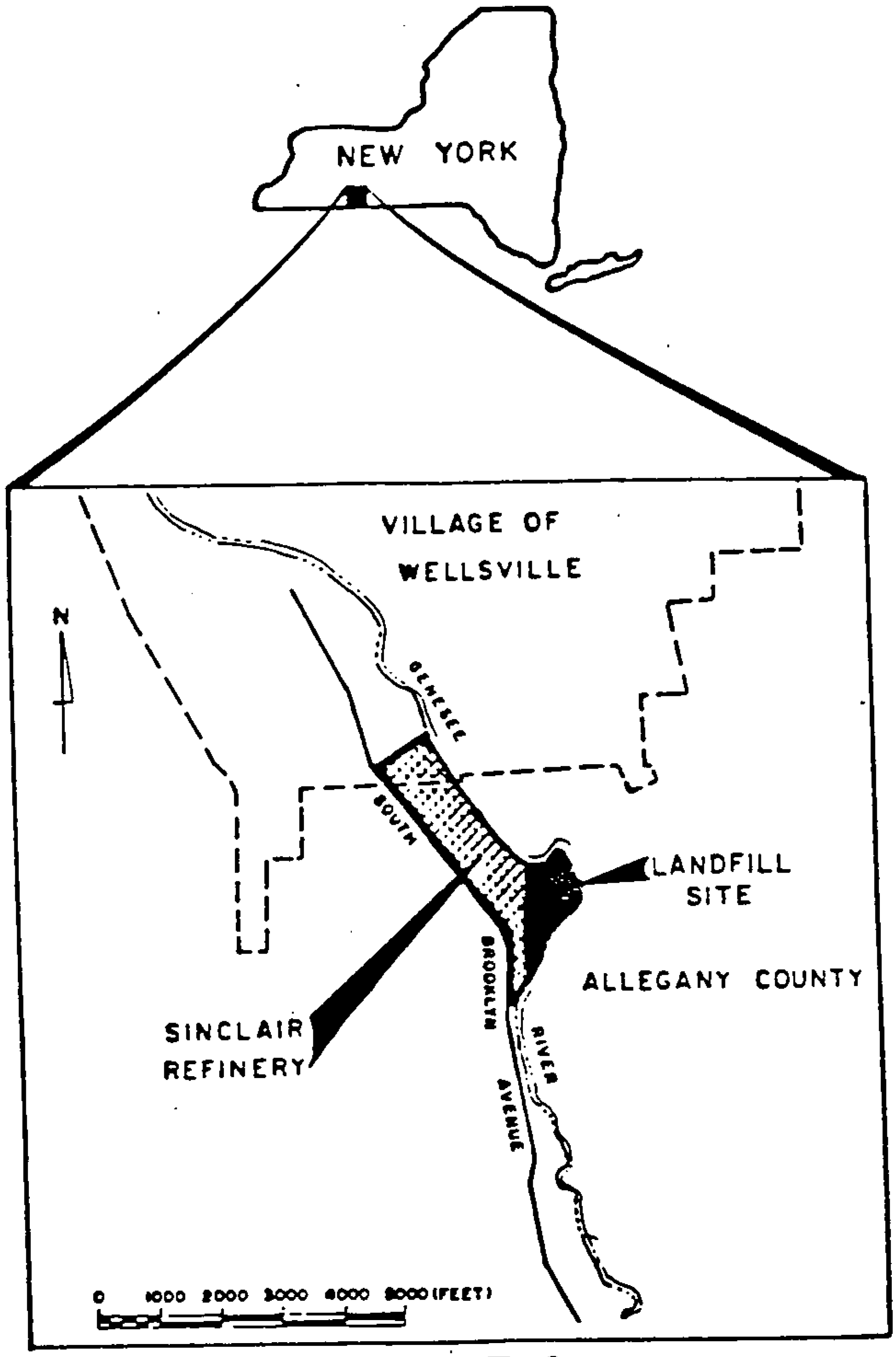


FIGURE 1
SITE LOCATION

4.0 HAZARD ASSESSMENT

4.1 LANDFILL AREA

The landfill area was previously sampled during the RI/FS for the landfill. The earlier sampling detected some priority pollutants as well as non-priority pollutants. While a variety of contaminants have been detected in the landfill, most were found in very low concentrations and are not expected to present an occupational hazard. A few contaminants, identified in sufficient concentrations to be potential health concerns, are discussed below. Those found in very low concentrations are mentioned as classes of compounds, while the potential hazards of those found in concentrations of concern are discussed individually in more detail. Chemical data sheets for significant contaminants are provided in Appendix A.

Volatile organics have been identified both in the surface and subsurface soil. The concentrations of the compounds, however, are low relative to occupational exposure standards. For example, a trace of benzene was detected in subsurface soil, but below quantifiable limits. Thus, the potential for exposure to benzene is assessed to be quite low. Even ethylbenzene, which was the most abundant of the volatile organics, found at a concentration of 180 ppm in an auger boring soil sample in the landfill area, is not expected to present an exposure hazard because of its low vapor pressure and high vapor density.

Of the base/neutral extractables on the priority pollutant list, pyrene and napthalene are most prominant. Pyrene is confined mostly to surface soil in the landfill, while napthalene was found only in the subsurface soil. Since Both compounds are in the solid state, exposures can be minimized by suppressing fugitive dust and strictly adhering to standard operating procedures. If temperatures are elevated during intrusive activities, both compounds could be volatilized, creating the potential for an inhalation exposure. Both naphthalene and pyrene are polycyclic aromatic hydrocarbons belonging to the coal tar class of compounds. According to Patty's Industrial Hygiene and Toxicology, Volume IIB, Third Edition, Revised naphthalene is not carcinogenic and pyrene has low carcinogenic potential. Considering the low carcinogens potential and the low risk of exposure, no significant hazard is expected from these compounds.

Total cyanides and total recoverable phenolics were also identified in low concentrations on site. Phenolics reached a maximum subsurface soil concentration of 140 ppm in test pit areas. Cyanides were found at a maximum concentrations of 1.3 ppm in the landfill area. Since cyanides and phenolics occur in the soil as solids, exposure to these compounds can also be reduced or eliminated through effective dust control measures.

A wide range of pesticides have been tested for, and identified in varying concentrations within the landfill. All of the pesticides were found to be present in higher concentrations near the surface of the landfill, while subsurface concentrations were extremely low. The residual pesticides bound to the surface soil could potentially become entrained in fugitive dust, resulting in an inhalation or skin absorption exposure. Since most of the pesticides have a low vapor pressure, the presence of vapors from these compounds is not expected to be significant.

The priority pollutants of most concern are the metals, chromium, copper, lead, zinc, that have been identified in the landfill soil. All four metals are present in concentrations that, if they were released to the atmosphere during site exploration, could exceed occupational exposure standards. Methods for controlling such potential exposures are discussed later.

Several non-priority pollutants have also been found to exist in the landfill soils. However, most are in low enough concentrations that, if they volatilized completely their individual exposure standards would not be exceeded.

A number of base/neutral extractables (non-priority pollutants) were identified throughout the soil in the landfill. Several long chained hydrocarbon compounds (Docosane, Eicosane, and others) are present in concentrations reaching 10,000 ppm. The compounds are generally low in toxicity, take a sludge-like form, and are combustible. 1,3,5

Trimethylbenzene(mesitylene) was also found in the landfill area at concentrations reaching 1400 ppm. While these compounds are not expected to volatilize in significant amounts, based on their chemical properties, their high soil concentrations present a concern for potential occupational exposures.

The landfill area contains a wide variety of chemical contamination. The majority of contaminants identified are in low concentrations and pose only a low health hazard independently. When multiple compounds are present, however, an additive effect can be conservatively assumed. Also, due to the diversity of chemical contaminants present, synergistic relationships may exist, which would effectively increase the potential for elevated exposure levels.

The potential routes of exposure are inhalation, ingestion, and skin absorption. Both chemical vapors and airborne fugitive dust are capable of being inhaled by workers on site. For this reason, direct reading instruments will be used to monitor the workers breathing zone (see Section 9.0) and dust control measures will be incorporated to reduce the amount of airborne contaminants. Specifically, water will be used to dampen the soil prior to any intrusive activity and used subsequently to reduce the total airborne dust concentration as deemed necessary by the HSO (see Section 9.2). These control measures should effectively limit the inhalation hazard. Exposure from ingestion should be minimized by strict adherence to standard operating procedures, personal hygiene practices, and decontamination procedures. The proper use of personal protective equipment should limit the potential for skin absorption as a route of exposure.

4.2 REFINERY AREA

Both chemical and physical hazards are expected in the refinery area. No radiological, biological, or laboratory wastes are suspected. The chemical contaminants of concern identified from reports of previous site investigations are listed in Table 1. It is important to note that some unidentified volatile organic materials, including cyclic compounds, are listed in site sampling results. Chemical Data Sheets for significant contaminants, that list hazards, protective measures, and exposure limits, are provided in Appendix A.

The primary routes of exposure expected are inhalation and skin absorption from potentially contaminated dust, soil samples, and liquid waste samples. Exposures from ingestion should be minimized by strict adherence to good hygiene and safe work practices, and decontamination procedures. The HSO will evaluate individual site operations and locations to ensure adequate levels of protection and appropriate control measures.

The risk from chemical exposure should remain minimal during site activities because of the low concentrations in soil and water, the contamination control measures to be implemented, and the use of appropriate respiratory protective devices and other personal protective equipment.

Physical safety hazards on site could include rugged terrain, holes, ditches, and slippery surface. Heat or cold stress and other adverse weather conditions could be encountered, necessitating implementation of specific monitoring procedures and control measures. Heat and cold stress control measures are described in Appendix B. Noise exposures related to drilling operations are expected to be minimal. The HSO will implement appropriate hearing protection and control measures as necessary.

TABLE 1

CHEMICAL CONTAMINANTS OF CONCERN
REFINERY AREA

VOLATILE ORGANICS	BASE NEUTRAL/ACID EXTRACTABLES
Acetone	Benzo(a)pyrene (minimal)
Benzene (minimal)	bis (2-ethylhexyl) phthalate
Carbon disulfide (minimal)	Dibenzofuran (minimal)
Chlorobenzene (minimal)	Diethylphthalate (minimal)
Ethylbenzene (minimal)	Di-n-butylphthalate
Methylene chloride	Fluoranthene (minimal)
Toluene (minimal)	Fluorene (minimal)
Xylenes	2-methylnaphthalene
	Naphthalene
	Phenanthrene (minimal)
	Phenol (minimal)

METALS (all minimal amounts in soil and water samples)

Arsenic
Chromium
Lead

5.0 EMPLOYEE TRAINING AND INFORMATION

5.1 BASIC TRAINING

All employees who will perform work in areas on this site where the potential for a toxic exposure exists shall have completed the 40-hour offsite initial instruction and practical experience requirements of 29 CFR 1910.120 (e), Training. Any contractor and subcontractor personnel assigned to these areas shall provide written documentation to the HSO that the required training and experience have been completed.

5.2 ADVANCED TRAINING

Management and supervisory personnel shall also complete the additional, required 8 hours of specialized health and safety training. In addition, in the unlikely event any personnel will be required to use level A protective equipment or perform specialized work, such as emergency response, they shall have completed advanced training as necessary.

5.3 SITE-SPECIFIC TRAINING

Site-specific training addressing the activities, procedures, potential hazards, monitoring, equipment, and emergency procedures for site operations, will be provided for all personnel. It will detail all provisions contained within this HASP. This training will also allow field workers the opportunity to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

5.4 FIRST AID AND CPR

The HSO will identify those individuals on site who are certified to administer first aid and cardiopulmonary resuscitation, (CPR). Their identity will be made known to all those onsite. Their duties and responsibilities in a site emergency will be clarified before the start of operations. Certifications will be equivalent to that of the American Red Cross.

5.5 SAFETY BRIEFINGS

Project personnel will be given safety briefings by the HSO or Assistant HSO on a daily or as needed basis. These briefings will be provided when new operations are to be conducted, changes in work practices must be implemented due to new information made available, or if site or environmental conditions change. Briefings will also be given to facilitate compliance with prescribed safety practices when performance deficiencies are identified during routine daily activities or as a result of safety audits.

6.0 MEDICAL SURVEILLANCE

6.1 MEDICAL EXAMINATION

Preassignment and/or periodic medical examinations, consistent with the requirements of 29 CFR 1910.120 (f) Medical Surveillance and the Ebasco Medical Surveillance Program, shall continue to be provided for Ebasco personnel assigned to the project. This examination includes:

1. Medical and occupational histories.

2. Physical examination, including an evaluation of the candidate's ability to work with hazardous materials, to wear respirators and protective equipment, and to work in biothermal stress conditions.

3. Diagnostic blood tests, including:

   - Complete blood count - differential and platelets
   - Hemoglobin and/or hematocrit
   - Methemoglobin
   - Albumin, globulin and total protein
   - Total bilirubin
   - SGOT, SGPT
   - LDH
   - Alkaline phosphatase
   - Calcium
   - Phosphorus
   - Uric acid
   - Creatinine
   - Cholesterol
   - Glucose

4. Urinalysis - including microscopic examination.

5. Chest x-ray - including posterior-anterior and lateral views.

6. Electrocardiogram - standard, 12-lead, resting type, as a minimum.

7. Pulmonary function tests

8. Audiometry - Pure tone audiometer tests at 500, 1000, 2000, 3000, 4000, and 6000 Hz.

9. Visual acuity.

6.2 SUBCONTRACTOR MEDICAL SURVEILLANCE

All subcontractor personnel who will be performing field work at the site will be required to have successfully completed a medical surveillance examination consistent with the requirements of 29 CFR 1910.120 (f). A release for work will be confirmed by the HSO before a subcontractor employee can begin work activities in hazardous areas. Additional medical testing may be required by the HSM in consultation with Ebasco's medical consultant and the HSO if an overt exposure or accident occurs, or if other site conditions warrant further medical surveillance.

6.3 EMERGENCY MEDICAL TREATMENT

Provision for emergency medical treatment shall be integrated with the overall site emergency plan and shall include:

- Identification of those on site who are certified to render first aid and CPR

- Emergency first aid stations at the command post or in the Contamination Reduction Zone(s)

- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities

- Maps and directions to medical facilities

- Arrangements with medical facilities and rescue services prior to the start of site operations

7.0 SITE CONTROL MEASURES

7.1 GENERAL

Site control measures will be implemented to minimize potential exposure to site hazards. These measures will include (1) Site Work Zones; and (2) General Safe Work Practices.

7.2 SITE WORK ZONES

Three work zones will be used to control the potential spread of contamination, the Exclusion Zone (contaminated area), the Contamination Reduction Zone (CRZ), and the Support Zone.

Exclusion Zone (EZ) - is defined as the area where contamination is present or expected. Access to the EZ will be controlled, and a clearly defined boundary or "Hotline" will be established at the entrance to the EZ. The HSO may establish more than one restricted area within the EZ when different levels of protection may be employed or different hazards exist.

Contamination Reduction Zone (CRZ) - is the transition area between the contaminated area and the clean area, and is designed to reduce the probability that the clean area(s) will become contaminated. Decontamination will occur in the CRZ. For control at sampling or drilling points, the CRZ will extend out from the EZ 10 more feet, and will be clearly delineated from the EZ by the "Hotline".

Support Zone (or Clean Zone) - contains the project Command Post, sanitary facilities, and support equipment.

7.3 GENERAL SAFE WORK PRACTICES

To maintain a strong safety awareness and enforce safety and health procedures at the site, the following list of general safe work practices will be distributed to all site personnel and visitors, and posted in the Command post:

1. Only properly trained and equipped personnel shall be allowed to work in potentially contaminated areas.

2. The number of personnel and equipment in the contaminated areas will be kept to a minimum, consistent with safe site operations.

3. All workers shall adhere to the "Buddy System" while working downrange and in designated exclusion areas. Visual contact shall be maintained between pairs on site in order to assist each other in case of emergencies.

4. Workers shall not exit the CRZ until contaminated equipment and clothing have been removed and decontaminated or properly disposed.

5. No food, beverages or tobacco products shall be present or used in the potentially contaminated areas of the site.

6. All safety equipment shall be regularly inspected before each days use to ensure proper operation.

7. All respiratory protective equipment use and maintenance shall meet, as a minimum, the OSHA requirements of 29 CFR 1910.134, including prohibitions on facial hair and other facepiece-seal obstructions.

8. All personnel entering the site shall be instructed in emergency procedures including locations of emergency equipment, procedures for site evacuation, emergency assembly areas and head count procedures, alarm systems, and site communications.

9. Personnel shall avoid walking directly through the areas of obvious contamination, and avoid handling contaminated materials directly.

8.0 PERSONAL PROTECTIVE EQUIPMENT

8.1 GENERAL

The level of protection to be worn by field personnel will be defined and controlled by the HSO with approval of the HSM. Personal protective equipment for general operations will be consistent with the requirements of 29 CFR 1910 Subpart I, Personal Protective Equipment. Basic levels of protection for hazardous waste operations will be selected in accordance with the provisions of 29 CFR 1910.120 (g) (3) Personal Protective Equipment Selection, and its Appendix B, General Description and Discussion of the Levels of Protection and Protective Gear (these levels of protection are described in HASP Appendix C). Modification to basic protective equipment ensembles may be necessary for specific operations. In these cases, further definition will be provided by review of specific hazards, conditions, and proposed operational requirements, and by monitoring at the particular operation being conducted. Protection may be upgraded or downgraded, as deemed appropriate by the HSO and as authorized by the HSM.

8.2 INITIAL RECONNAISSANCE

A reconnaissance team will conduct initial monitoring to identify the presence of contaminants and to assess the safety conditions of the site for the proposed investigation and sampling. Careful attention will be paid to conform with the requirements of 29 CFR 1910.120(c) relating to Site Characterization and Analysis. The recon team will be limited to a minimum number of personnel. The team will enter suspected hazardous areas cautiously with appropriate monitoring equipment. The initial reconnaissance will allow for the selection of appropriate protection levels for planned operations, decontamination procedures, site layout, sampling strategies, and general safety planning.

8.3 SITE OPERATIONS

8.3.1 Landfill Operations

The following levels of protection have been identified by task for field investigation:

TASK	LEVEL OF PROTECTION
**Test pit excavation (adjacent to landfill)	C/B
**Drilling operations (through landfill)	C/B
Decontamination of personnel	D*/C
Decontamination of equipment	C

*Personnel whose work will likely result in contact with soils/sludges will be required to wear Tyvek outergarments, in addition to standard Level D PPE.

**Ongoing site surveillance and air monitoring will be conducted during these activities.

No concentrations requiring level A protection are anticipated for the RI/FS work. Ongoing site surveillance and air monitoring will be conducted during sampling, excavating and drilling operations.

8.3.2 Refinery Operations

The following levels of protection have been identified by task for field investigation:

TASK	LEVEL OF PROTECTION
Pre-survey preparation	D
Survey Operations	D/C
Sampling operations	C/D

TASK	LEVEL OF PROTECTION
Drilling operations	C/D
Water level measurements	D/C
Decontamination of personnel	D/C
Decontamination of equipment	C

8.4 SAFETY EQUIPMENT

Basic emergency and first aid equipment will be available at the Support Zone and/or the CRZ, as appropriate. This may include communication equipment, first aid kit, emergency eyewash, and fire extinguishers. The need for a backup field team is not anticipated due to the low hazard associated with the planned activities. A minimum of three people will be available on site which will facilitate quick access to communications in an emergency and provide support for decontamination of personnel and equipment. The Command Post will be manned at all times when teams are downrange, communications will be maintained, and personnel will be available to assist in decontamination procedures for personnel and equipment. Other safety equipment will be located at the site of specific operations as appropriate.

8.5 COMMUNICATIONS

Telephones - A telephone will be available either in the Command Post trailer or the nearest public phone will be identified for communication with emergency support services/facilities.

Air Horns - These will be carried by downrange field teams and also will be maintained at the Support Zone for announcing emergency evacuation procedures and backup for other forms of communications.

Hand Signals - As appropriate, hand signals will be used by downrange teams as part of the buddy system. All team members and visitors will be instructed in the correct use of hand signals as part of the site-specific training.

SIGNAL	MEANING
Hand gripping throat	Out of air; cannot breathe
Grip partner's wrist or place both hands around arm	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK, I'm alright
Thumbs down	No, Negative

9.0 AIR MONITORING

9.1 GENERAL

Direct Reading Instruments will be used to monitor on site concentrations of total organic vapors, selected toxic contaminants, combustible gases (%LEL), and respirable airborne dust. In the event respirable dust concentrations exceed 1.0 $\frac{MG}{M^3}$, on a time-weighted average basis, personnel monitoring will be initiated. The monitoring will represent the worse case exposure. All samples will be collected and analyzed in accordance with applicable OSHA or NIOSH standards.

9.2 DIRECT READING INSTRUMENTS

An HNu photoionization detector (PID) and/or OVA flame ionization detector (FID) equipped organic vapor meter will be utilized to monitor the breathing zone, the borehole, and all geological samples upon their retrieval. Drill cuttings will also be monitored. A combustible gas indicator (CGI) with oxygen alarm will be used to monitor the borehole for the presence of combustible gases, and a hand held aerosol monitor (HAM) will be used to measure respirable dust concentrations.

9.2.1 Action levels for direct-reading instruments in the Breathing Zone (BZ) for unknown compounds are as follows:

Instrument	Action Levels	Level of Respiratory Protection/Action
HNu/OVA	0.0 to 0.2 ppm above background in BZ	Level D
HNu/OVA	0.2 to 5 ppm above background in BZ	Level C
HNu/OVA	5 to 500 ppm above background in BZ	Level B

Instrument	Action Levels	Level of Respiratory Protection/Action
HAM	0.0 to 1.0 $\frac{MG}{M^3}$ TWA in BZ	Level D
HAM	1.0 to 5.0 $\frac{MG}{M^3}$ TWA in BZ	Level C/Initiate Dust Control Measures
HAM	Above 5.0 $\frac{MG}{M^3}$ TWA in BZ	Level B

A combustible gas indicator (CGI) with oxygen meter will also be available.

Instrument	At Point of Operation	Action
CGI	0-25% LEL	Proceed Normally
CGI	25-50% LEL	Proceed, Continuous Monitoring
CGI	50% LEL	Cease work, vent

Note: The action levels presented above will be incorporated for work at both the landfill area and the refinery area.

10.0 DECONTAMINATION PROCEDURES

10.1 GENERAL

Decontamination involves physically removing contaminants and/or converting them chemically into harmless materials. The level of decontamination required depends greatly on the nature of the contamination, the planned activities on site, and the degree of compliance with safe work practices implemented to control contamination. The HSO will determine the level of decontamination required based on his evaluation of the specific work activities.

10.2 PERSONNEL AND PORTABLE EQUIPMENT DECONTAMINATION

All personnel and equipment exiting the exclusion zone shall be thoroughly decontaminated. Figures 2 and 3 illustrate the general decontamination procedures for personnel and portable equipment for the protection levels D and C. The decontamination process uses cleaning solutions followed by water rinses.

10.3 HEAVY EQUIPMENT

Heavy equipment, if utilized for operations in contaminated areas, will require surface decontamination. A decontamination area established at the site during Phase I will be reused in this work. The equipment will be parked on the decontamination pad. A steam wand will be used for decontamination to minimize the quantity of waste water generated. The decontamination area has sufficient capacity to accommodate the wash water generated from cleaning. The associated wastes generated will be properly disposed.

10.4 CONTAMINATION PREVENTION

All personnel entering the contaminated areas are to adhere to the following contamination prevention practices:

1. Know the limitations of all personal protective equipment being used.

2. Do not enter a contaminated area unless it is necessary.

3. Avoid direct contact with contaminated materials whenever possible.

4. Walk around pools of liquids, discolored areas, or any area that shows obvious evidence of contamination.

5. Do not sit or lean on contaminated surfaces.

6. Stay upwind of contaminated areas if possible.

7. Do not carry food, beverages, gum, or tobacco products into contaminated areas.

FIGURE 2

LEVEL D DECONTAMINATION PROCEDURES

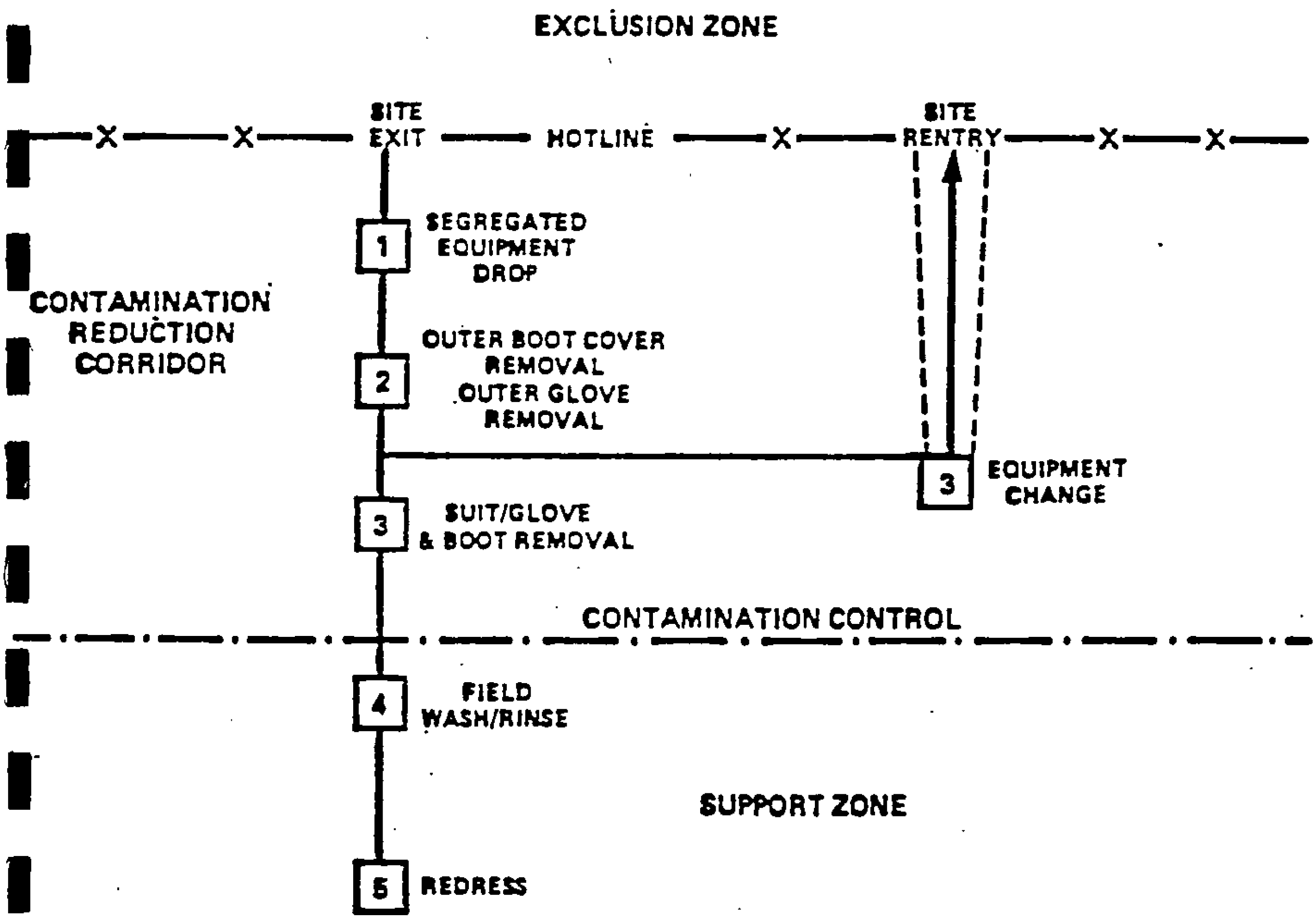
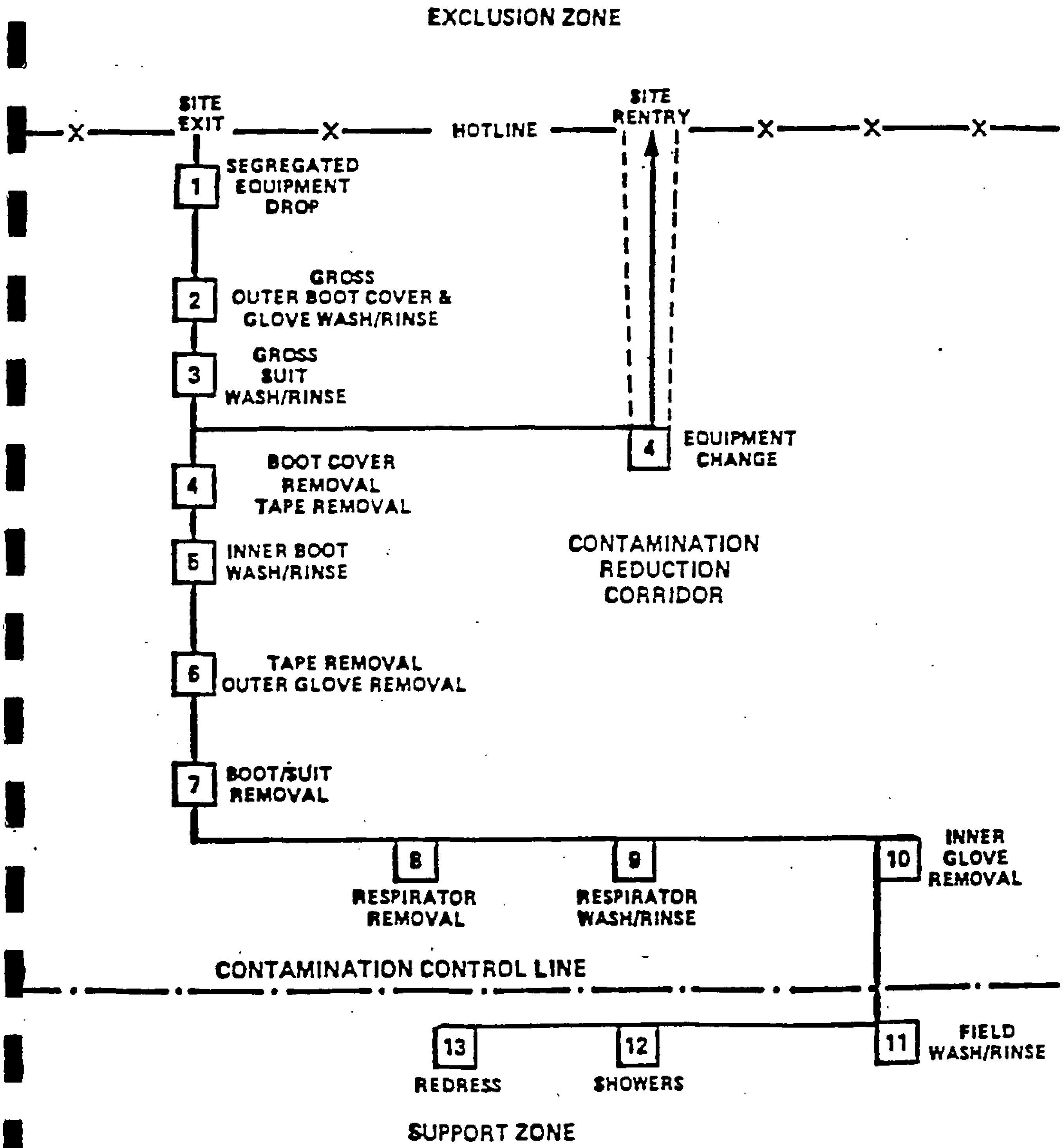


FIGURE 3

LEVEL C DECONTAMINATION PROCEDURES



11.0 EMERGENCY PLAN

11.1 GENERAL

Due to the potential chemical and physical hazards on site and the work activities to be conducted, an emergency situation is possible. The site emergency plan is maintained as a discrete section of the HASP. The HSO and the Site Manager are jointly responsible for updating the emergency plan as site conditions change.

The following conditions may require implementation of the emergency plan:

- Fire or explosion on site
- Personal injury
- Combustible gases or vapors in excess of 20% LEL in the work area
- Release of hazardous materials, including gases or vapors at levels greater than the maximum use concentrations of respirators
- Unsafe working conditions, such as inclement weather

11.2 SITE EMERGENCY COORDINATOR

The Emergency Coordinator will implement the contingency plan whenever conditions at the site warrant such action. The coordinator will be responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel as necessary, and notification of emergency response units and the appropriate management staff.

Emergency Coordinator:	Robert Bliss
Alternate(s):	Mindy Sayres Roger Pennifill

11.3 EMERGENCY SERVICES CONTACTS

Meetings between site personnel and local emergency services should be held to initiate a good working relationship and provide an opportunity for the development of effective, overlapping emergency plans. The Emergency Coordinator will make contact with local fire, police, ambulance, and other emergency services prior to beginning work on site. The Emergency Coordinator will inform the emergency services about the nature and duration of work expected on the site, and the types of contaminants. These contacts will be documented as part of the site records.

11.4 IMPLEMENTATION

Evacuation

Two levels of evacuation will be established, depending upon the degree of hazard associated with the emergency conditions:

1. Immediate work area evacuation - Evacuation of the immediate work area and withdrawal to a safe upwind location will be required if air contaminant concentrations exceed action levels for the level of protection worn. Personnel may reenter the immediate area after upgrading to a higher level of protection.

2. Site Evacuation - In the event of a major emergency situation, such as fire, explosion, or significant release of toxic gases, an air horn will be sounded for approximately 10 second intervals, indicating the inititation of evacuation procedures. All personnel in both the restricted and nonrestricted areas will evacuate and assemble near the Support Zone in their assigned assembly areas. The assembly area location(s) will be designated daily by the HSO, and will be upwind of the site as determined by the wind direction indicator. For efficient and safe site evacuation and assessment of the emergency situation, the Emergency Coordinator will have authority to initiate proper action if outside services are

required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The HSO or Assistant HSO must see that access for emergency equipment is provided and that all field equipment has been shut down once the alarm has been sounded. Once the safety of all personnel is established the emergency response groups will be notified by telephone of the emergency. The site evacuation plan will be reviewed regularly as part of the overall training program for site operations.

Fire or Explosion

If concentrations of combustible gases or vapors are above 20% LEL in the occupied work zone, or if an actual fire or explosion has taken place, emergency steps will include (1) evacuation of site (air horn will sound for 10 second intervals); and (2) notification of local fire and police departments, and other appropriate emergency response groups.

Fire Dept. - 911 or (716) 593-4980
Police Dept. - 911
State Police - (716) 593-1000

Personal Injury

Emergency first aid will be administered on site as deemed necessary. Then, the individual will be decontaminated, if possible, depending on the severity of the injury, and transported to the nearest medical facility if needed. The HSO will supply medical data sheets to appropriate medical personnel and complete the appropriate incident report.

The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. However, since some situations may require transport of an injured party by other means, a hospital route has been firmly identified. A hospital route map is provided in Figure 4 and copies of it will be conspicuously posted on site.

Overt Personnel Exposure

SKIN CONTACT:	Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. An emergency eyewash will be provided onsite at the CRZ and/or Support Zone as appropriate. Eyes should be rinsed for 15 minutes upon chemical contamination.
INHALATION:	Move to fresh air, if necessary decontaminate, and transport to hospital.
INGESTION:	Decontaminate and transport to emergency medical facility.
PUNCTURE WOUND OR LACERATION:	Decontaminate and transport to emergency medical facility. HSO will provide medical data sheets to medical personnel as requested.

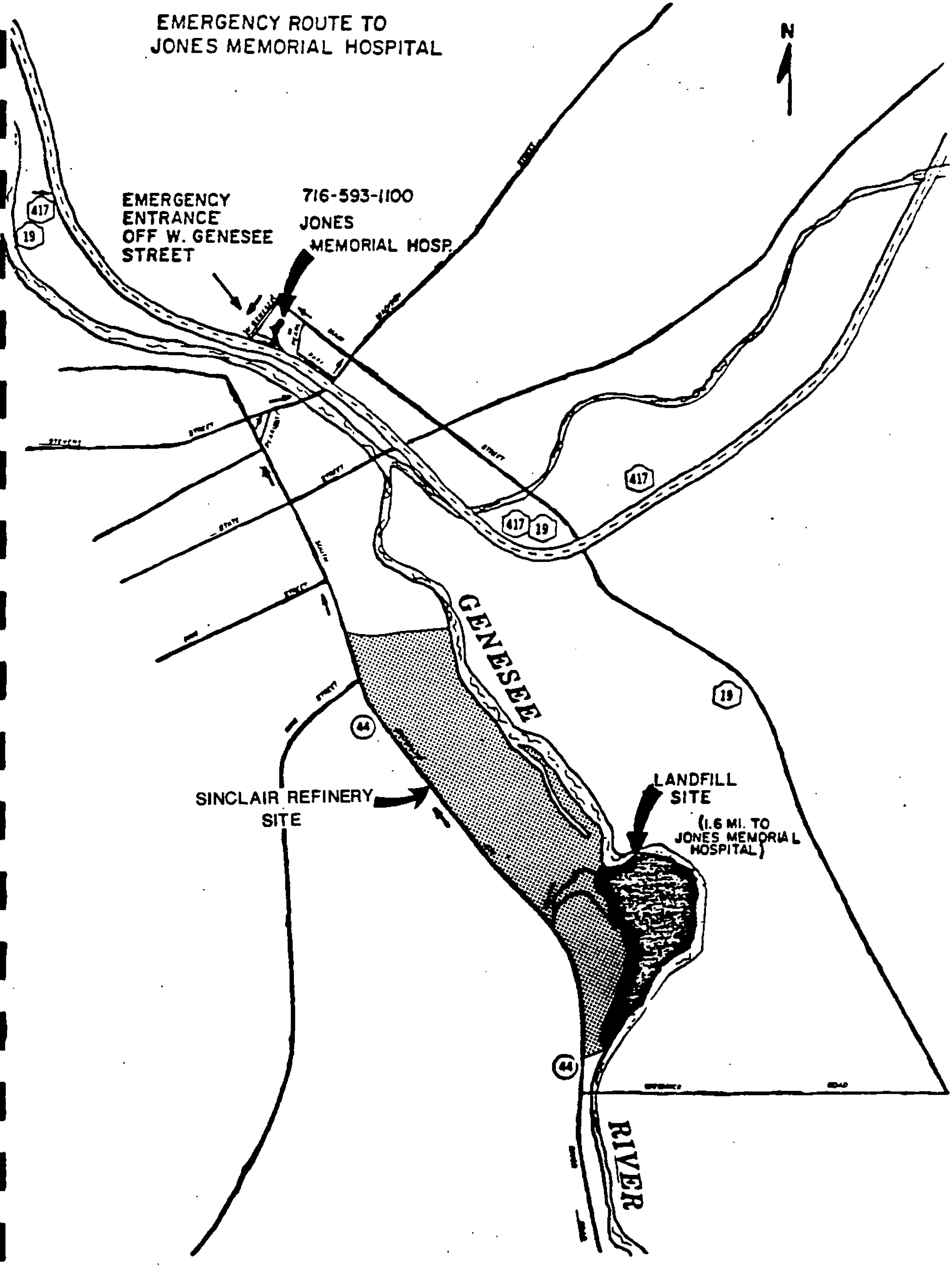
Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- o Potential for heat stress and heat-related injuries
- o Potential for cold stress and cold-related injuries
- o Treacherous weather-related working conditions
- o Limited visibility
- o Potential for electrical storms

FIGURE 4

EMERGENCY ROUTE TO
JONES MEMORIAL HOSPITAL



12.0 FIELD TEAM REVIEW

Each Field Team Member will be required to read the HASP and sign the Field Team Review Record after site-specific training is completed.

FIELD TEAM REVIEW

SITE / PROJECT: SINCLAIR REFINERY SITE

I have read and understand this site-specific Health and Safety Plan (HASP). I will comply with the provisions contained therein.

Name Printed	Signature	Date

8355b

13.0 AUTHORIZATIONS

Personnel authorized to enter the Sinclair Refinery Site while operations are being conducted must be certified by the Ebasco Health and Safety Officer. Authorization will involve completion of appropriate training courses and medical examination requirements as required by OSHA 29 CFR 1910.120 and review and sign-off of this HASP. All personnel must utilize the buddy system or trained escort, and check in with the Field Team Leader at the Command Post.

1. Ebasco Personnel Authorized to Perform Work Onsite:

1. Neil Geevers	11.
2. Roger Pennifill	12.
3. Mindy Sayres	13
4. Robert Bliss	14.
5. Ed Garvey	15.
6. Bob Bliss	16.
7. Bill Beckett	17.
8. Thomas Abrey	18.
9. Tom Granger	19.
10.	20.

2. Other Personnel Authorized to Enter Site:

1. EPA Personnel	6.
2. State Environmental Personnel	7.
3. Police, Fire Emergency Personnel	8.
	9.
4. Ebasco Subcontractors	
5.	10.

14.0 MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all onsite personnel and will be kept in the Command Post during the conduct of site operations. Completion is required in addition to compliance with the Medical Surveillance Program requirements described in Ebasco's Safety and Health Program. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project ______ Sinclair Refinery Site ______

Name ______ Home Telephone ______

Address ______

Age ______ Height ______ Weight ______

Name of Next of Kin ______

Drug or other Allergies ______

Particular Sensitivities ______

Do You Wear Contacts? ______

Provide a Checklist of Previous Illnesses or Exposures to Hazardous Chemicals ______

______

______

What medications are you presently using? ______

______

______

Do you have any medical restrictions? ______

______

Name, Address, and phone number of personal physician: ______

______

______

______

______

15.0 APPROVALS

By their signature the undersigned certify that this HASP is approved and will be utilized at the Sinclair Refinery site.

Health and Safety Officer	Date
Site Manager	Date
Health and Safety Manager	Date
Project Manager	Date

8355b

APPENDIX A

CHEMICAL DATA SHEETS

CHEMICAL DATA SHEET DATE: 3/88

I. Chemical/Compound Name: Chromium, soluble chromic and chromous salts

A. Synonyms: Dependent upon specific compound

B. CAS #: 7440-47-3

II. Physical Characteristics:

A. ____ Liquid X Solid ____ Powder ____ Gas

B. Color Colorless - green violet (dependent on compound)

C. Odor Odorless

D. LEL ____ Flash Point ____ °F

E. Boiling Point ____ °F Melting Point ____ °F

Ionization Potential ____ eV

F. Other ____

III. Recommended Air Purifying Cartridge:

X Dust, Fumes, Mists

X HEPA

____ Acid Gases

____ Air Purifying is Inappropriate

X Other SCBS - at concentrations greater than 250 mg/m^3 (TWA)

____ Organic Vapors

____ Ammonia/Amines

____ Pesticides

IV. Health Hazards Data:

A. Routes of Entry: Inhalation X Skin Absorption X Ingestion X

B. OSHA Listed Carcinogen: X No ____ Suspect ____ Yes

C. Sensitizer: ____ No ____ No Data ____ Suspect X Yes

D. Acute Toxicity:

Eye Contact Irritant

Skin Contact Dermatitis

Inhalation ____

E. Chronic Toxicity:

Target Organs Skin

Long Term Effects Irritating and corrosive effect on tissue leading to ulcers

V. Exposure Limits:

A. OSHA PEL 0.5 mg/m^3 (TWA)

B. ACGIH TLV 0.5 mg/m^3

C. IDLH 250 mg/m^3

D. NIOSH REL 25 ug/m^3 (10 hr TWA), 50 ug/m^3 (15 min ceiling)

E. STEL ____

VI. Other Pertinent Information / Special Precautions:

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Ethyl benzene
   A. Synonyms: Phenylethane, ethylbenzol
   B. CAS #: 100-41-4

II. Physical Characteristics

   A. X Liquid ____ Solid ____ Powder X Gas
   B. Color Colorless
   C. Odor Aromatic
   D. LEL 1.0 % Flash Pt. 59°F
   E. Boiling Point 277 °F Melting Point 139°F
      Ionization Potential 8.76 eV
   F. Other

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists	___ Acid Gases
X Organic Vapors	___ Pesticides
___ HEPA	___ Air Purifying is Inappropriate
___ Ammonia/Amines	___ Other

IV. Health Hazards Data

   A. Routes of Entry: X Inhalation X Skin Absorption
      X Ingestion
   B. OSHA Listed Carcinogen: X No ____ Suspect ____ Yes
   C. Sensitizer: ____ No ____ No Data X Suspect ____ Yes
   D. Acute Toxicity:
      Eye Contact Irritant, lacrimation immediate and severe at high levels
      Skin Contact Dermatitis
      Inhalation Headaches, dizziness, sense of constriction of chest, nose and throat irritant, vertigo
   E. Chronic Toxicity:
      Target Organs Eyes, upper respiratory system, skin, CNS
      Long-Term Effects Narcosis, coma

V. Exposure Limits
   A. OSHA PEL 100 ppm (435 mg/m^3) TWA
   B. ACGIH TLV
   C. IDLH 2000 ppm TWA
   D. NIOSH REL
   E. STEL 125 ppm (545 mg/m^3) TWA

VI. Other Pertinent Information/Special Precautions:
   The TLV established to prevent eye irritation (1977)

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Naphthalene

A. Synonyms: White tar, naphthalin, tar camphor

B. CAS #: 91-20-3

II. Physical Characteristics

A. ____ Liquid X Solid X Powder ____ Gas

B. Color Colorless - brown

C. Odor Mothball, coal tar

D. LEL 0.9 % Flash Pt. 174°F

E. Boiling Point 424°F Melting Point 165-176°F

Ionization Potential 8.14 eV

F. Other

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists ___ Acid Gases

X Organic Vapors ___ Pesticides

___ HEPA ___ Air Purifying is Inappropriate

___ Ammonia/Amines ___ Other

IV. Health Hazards Data

A. Routes of Entry: X Inhalation X Skin Absorption X Ingestion

B. OSHA Listed Carcinogen: X No ____ Suspect ____ Yes

C. Sensitizer: X No ____ No Data ____ Suspect ____ Yes

D. Acute Toxicity:

Eye Contact Irritation, optical neuritis, corneal injuries

Skin Contact Dermatitis

Inhalation Headaches, confusion, malaise, homolytic anemia, nausea

E. Chronic Toxicity:

Target Organs Eyes, blood, liver, kidneys, skin, RBC, CNS depression

Long-Term Effects Renal failure, jaundice, hematuria, hemoglobinuria, convulsions, coma

V. Exposure Limits

A. OSHA PEL 10 ppm (50 mg/m^3) TWA

B. ACGIH TLV

C. IDLH 500 ppm TWA

D. NIOSH REL

E. STEL 15 ppm (75 mg/m^3) TWA

VI. Other Pertinent Information/Special Precautions:

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Methylene Chloride
   A. Synonyms: Dichloromethane, Methylene Dichloride
   B. CAS #: 75-09-2

II. Physical Characteristics

   A. X Liquid ____ Solid ____ Powder X Gas
   B. Color Colorless
   C. Odor Chloroform, Sweet
   D. LEL 12% Flash Pt. -96.7°F
   E. Boiling Point 104°F Melting Point 142°F
   Ionization Potential 11.35 eV
   F. Other ____

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists	___ Acid Gases
X Organic Vapors	___ Pesticides
___ HEPA	___ Air Purifying is Inappropriate
___ Ammonia/Amines	___ Other SCBA - At any detectable concentration (NIOSH)

IV. Health Hazards Data

   A. Routes of Entry: X Inhalation X Skin Absorption
   X Ingestion
   B. OSHA Listed Carcinogen: ____ No X Suspect ____ Yes
   C. Sensitizer: ____ No ____ No Data X Suspect ____ Yes
   D. Acute Toxicity:
   Eye Contact Irritant

   Skin Contact Irritant

   Inhalation Fatigue, weakness, light-headed, numbness/ tingling of limbs, nausea, blurred vision staggered gait

   E. Chronic Toxicity:
   Target Organs Skin, CVS, eyes, CNS
   Long-Term Effects Nertigo, angina complications, narcosis, bone marrow depression, difficulty in speech

V. Exposure Limits
   A. OSHA PEL 500 ppm (TWA), 1000 ppm (ceil); 2000 ppm (5 min/2h peak)

   B. ACGIH TLV 500 ppm (TWA)
   C. IDLH 5000 ppm (NIOSH - 1978) TWA
   D. NIOSH REL Lowest feasible limit
   E. STEL 100 ppm (205 mg/m^3) 1980

VI. Other Pertinent Information/Special Precautions: ____

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Bis(2-ethylhexyl)phthalate

A. Synonyms: Di(2-ethylhexyl)phthalate, BEHP, DOP, Di-sec-octyl phthalate, DEHP

B. CAS #: 117-81-7

II. Physical Characteristics

A. X Liquid ____ Solid ____ Powder ____ Gas

B. Color Colorless

C. Odor Slight

D. LEL ? % Flash Pt. 425 (open cup) °F

E. Boiling Point 727 °F Melting Point -51°F

Ionization Potential - eV

F. Other ____

III. Recommended Air Purifying Cartridge:

___	Dusts, Fumes, Mists	___	Acid Gases
___	Organic Vapors	___	Pesticides
___	HEPA	X	Air Purifying is Inappropriate
___	Ammonia/Amines	X	Other Air-supplied respirator at any detectable concentration

IV. Health Hazards Data

A. Routes of Entry: X Inhalation X Skin Absorption X Ingestion

B. OSHA Listed Carcinogen: ___ No X Suspect ___ Yes

C. Sensitizer: ___ No ___ No Data X Suspect ___ Yes

D. Acute Toxicity:

Eye Contact Irritant

Skin Contact No available data

Inhalation Mucous membrane irritant, nausea, diarrhea

E. Chronic Toxicity:

Target Organs Eyes, upper respiratory system, GI tract

Long-Term Effects ____

V. Exposure Limits

A. OSHA PEL 5 mg/m^3 TWA

B. ACGIH TLV ____

C. IDLH ____

D. NIOSH REL Lowest feasible limit

E. STEL 10 mg/m^3 TWA

VI. Other Pertinent Information/Special Precautions:

A "reproductive toxicant" in CD-mice and Fischer 344 rats (teratogenic)

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: 1,1,2,2-Tetrachloroethane

A. Synonyms: Symmetrical tetrachloroethane, acetylene tetrachloride sym-tetrachloroethane

B. CAS #: 79-34-5

II. Physical Characteristics

A. X Liquid ____ Solid ____ Powder ____ Gas

B. Color Colorless - pale yellow

C. Odor Sickly sweet (as chloroform)

D. LEL ____ % Flash Pt. ____ °F

E. Boiling Point 295°F Melting Point -45°F

Ionization Potential 11.1 eV

F. Other ____

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists	___ Acid Gases
X Organic Vapors	___ Pesticides
___ HEPA	___ Air Purifying is Inappropriate
___ Ammonia/Amines	X Other SCBA at any detectable concentration

IV. Health Hazards Data

A. Routes of Entry: X Inhalation X Skin Absorption X Ingestion

B. OSHA Listed Carcinogen: ___ No X Suspect ___ Yes

C. Sensitizer: ___ No ___ No Data X Suspect ___ Yes

D. Acute Toxicity:

Eye Contact Irritant

Skin Contact Dermatitis

Inhalation Nausea, vomiting, abdominal pain, narcotic effects, salivation

E. Chronic Toxicity:

Target Organs Liver, kidneys, CNS depression

Long-Term Effects Kidney and liver damage, tremors (fingers), monocytosis, jaundice, paresthesia, edema of brain, hepatic necrosis/cirrhosis

V. Exposure Limits

A. OSHA PEL 5 ppm (35 mg/m^3) TWA

B. ACGIH TLV ____

C. IDLH 150 ppm TWA (NIOSH-1978)

D. NIOSH REL 1 ppm (7 mg/m^3) TWA

E. STEL ____

VI. Other Pertinent Information/Special Precautions: ____

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Benzene
   A. Synonyms: Benzol, cyclohexatriene, coal tar naphtha, phenyl hydride
   B. CAS #: 71-43-2

II. Physical Characteristics

   A. X Liquid ____ Solid ____ Powder ____ Gas
   B. Color Colorless
   C. Odor Aromatic
   D. LEL 1.3 % Flash Pt. 12°F
   E. Boiling Point 176°F Melting Point 42°F
      Ionization Potential 9.25 eV
   F. Other ____

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists
X Organic Vapors
___ HEPA
___ Ammonia/Amines
___ Acid Gases
___ Pesticides
___ Air Purifying is Inappropriate
X Other SCBA at any detectable concentration

IV. Health Hazards Data

   A. Routes of Entry: X Inhalation X Skin Absorption X Ingestion
   B. OSHA Listed Carcinogen: ___ No X Suspect ____ Yes
   C. Sensitizer: ____ No X No Data ____ Suspect ____ Yes
   D. Acute Toxicity:
      Eye Contact Irritant
      Skin Contact Dermatitis
      Inhalation Giddiness, headache, staggered gait, fatigue lassitude, nose/respiratory irritant, abdominal pain
   E. Chronic Toxicity:
      Target Organs Blood, CNS, skin, bone marrow, eyes, respiratory system
      Long-Term Effects Bone marrow depression, anorexia, aplastic anemia

V. Exposure Limits
   A. OSHA PEL 10 ppm TWA; 50 ppm (ceil) 10 min
   B. ACGIH TLV 10 ppm TWA
   C. IDLH 2000 ppm TWA (NIOSH-1978)
   D. NIOSH REL 0.1 ppm TWA (15 min ceil)-
   E. STEL 25 ppm (75 mg/m^3) TWA

VI. Other Pertinent Information/Special Precautions: ____

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Phenol

A. Synonyms: Carbolic acid, monohydroxy benzene, phenic acid

B. CAS #: 108-95-2

II. Physical Characteristics

A. X Liquid X Solid ___ Powder ___ Gas

B. Color Colorless - pink - red

C. Odor Sweet tarry

D. LEL 1.7 % Flash Pt. 174°F

E. Boiling Point 359°F Melting Point 106°F

Ionization Potential 8.5 eV

F. Other ___

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists
X Organic Vapors
___ HEPA
___ Ammonia/Amines
___ Acid Gases
___ Pesticides
___ Air Purifying is Inappropriate
___ Other ___

IV. Health Hazards Data

A. Routes of Entry: X Inhalation X Skin Absorption X Ingestion

B. OSHA Listed Carcinogen: X No ___ Suspect ___ Yes

C. Sensitizer: ___ No X No Data ___ Suspect ___ Yes

D. Acute Toxicity:

Eye Contact Irritant

Skin Contact Intense burning, dermatitis, gangrene

Inhalation Nose/throat irritant, cyanosis, weakness, dizziness, irregular/rapid breathing, weak pulse, dyspnea,

E. Chronic Toxicity:

Target Organs Liver, kidneys, skin

Long-Term Effects Liver/kidney, pancreas/spleen damage, tremors, convulsions, anorexia, twitching, edema of lungs, mental disturbance

V. Exposure Limits

A. OSHA PEL 5 ppm (19 mg/m^3) TWA

B. ACGIH TLV ___

C. IDLH 250 ppm TWA

D. NIOSH REL 20 mg/m^3 (10 hour TWA)

E. STEL 10 ppm (38 mg/m^3) TWA

VI. Other Pertinent Information/Special Precautions: ___

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Lead, inorganic, as dust and fume
   A. Synonyms: Pb, solder, dross
   B. CAS #: 7439-92-1

II. Physical Characteristics

   A. ____ Liquid _X_ Solid ____ Powder ____ Gas
   B. Color Silvery to gray, depending upon oxidation
   C. Odor Varies with compound
   D. LEL Dust may be explosive% Flash Pt. NA °F
   E. Boiling Point 3164°F Melting Point 621°F
   Ionization Potential NA eV
   F. Other ____

III. Recommended Air Purifying Cartridge:

_X_ Dusts, Fumes, Mists
___ Organic Vapors
_X_ HEPA
___ Ammonia/Amines
___ Acid Gases
___ Pesticides
___ Air Purifying is Inappropriate
_X_ Other Higher concentrations may require supplied air

IV. Health Hazards Data

   A. Routes of Entry: _X_ Inhalation ___ Skin Absorption
   _X_ Ingestion
   B. OSHA Listed Carcinogen: ___ No _X_ Suspect ____ Yes
   C. Sensitizer: _X_ No ____ No Data ____ Suspect ____ Yes
   D. Acute Toxicity:
   Eye Contact Dust is irritant
   Skin Contact Molten lead causes burns. Generally, in solid state lead causes no acute symptoms.ant and a strong
   Inhalation Lassitude, insomnia, weakness, GI disturbances, colic.
   E. Chronic Toxicity:
   Target Organs CNS, blood, GI tract, kidneys, gigival tissue
   Long-Term Effects Anorexia, weight loss, constipation, pallor, neuro-muscular motor weakness, "wrist drop". A suspect carcinogen of the lungs and kidneys. An experimental teratogen.

V. Exposure Limits
   A. OSHA PEL 0.05 mg/m^3 TWA
   B. ACGIH TLV 0.15 mg/m^3 TWA
   C. IDLH ____
   D. NIOSH REL Below 0.1 mg/m^3 10-hour TWA
   E. STEL ____

VI. Other Pertinent Information/Special Precautions: ____

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Tetrachloroethylene
   A. Synonyms: Perchloroethylene, Perk, Tetrachloroethylene
   B. CAS #: 127-18-4

II. Physical Characteristics

A. X Liquid ____ Solid ____ Powder ____ Gas
B. Color Colorless
C. Odor Ether, Chloroform
D. LEL Not Combustible % Flash Pt. ____ °F
E. Boiling Point 250 °F Melting Point ____ °F
   Ionization Potential 9.32 eV
F. Other

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists
X Organic Vapors
___ HEPA
___ Ammonia/Amines
___ Acid Gases
___ Pesticides
___ Air Purifying is Inappropriate
X Other SCBA-at any detectable concentration

IV. Health Hazards Data

A. Routes of Entry: X Inhalation ___ Skin Absorption
   X Ingestion
B. OSHA Listed Carcinogen: ____ No X Suspect ____ Yes
C. Sensitizer: ____ No X No Data ____ Suspect ____ Yes
D. Acute Toxicity:
   Eye Contact irritant

   Skin Contact Burns, blistering, erythena

   Inhalation Nose, throat irritant, headaches, nausea flushing

E. Chronic Toxicity:
   Target Organs liver, kidneys, heart, eyes, upper resp. tract, CNS
   Long-Term Effects vertigo, somnolence, incoordination, necrosis, unconsciousness

V. Exposure Limits
A. OSHA PEL 100 ppm TWA, 200 ppm coil, 200 ppm/5 min 3 hr peak
B. ACGIH TLV 50 ppm TWA (335 mg/m3)
C. IDLH
D. NIOSH REL lowest feasible limit
E. STEL 200 ppm TWA (1340 mg/m3) ACGIH

VI. Other Pertinent Information/Special Precautions:

7339b

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Toluene

A. Synonyms: Toluol, methyl benzene

B. CAS #: 108-88-37

II. Physical Characteristics

A. X Liquid ___ Solid ___ Powder ___ Gas

B. Color Colorless

C. Odor Benzene-like

D. LEL 1.3 % Flash Pt. 40°F

E. Boiling Point 231°F Melting Point -139°F

Ionization Potential 8.82 eV

F. Other

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists

X Organic Vapors

___ HEPA

___ Ammonia/Amines

___ Acid Gases

___ Pesticides

___ Air Purifying is Inappropriate

___ Other

IV. Health Hazards Data

A. Routes of Entry: X Inhalation ___ Skin Absorption ___ Ingestion

B. OSHA Listed Carcinogen: X No ___ Suspect ___ Yes

C. Sensitizer: ___ No X No Data ___ Suspect ___ Yes

D. Acute Toxicity:

Eye Contact Irritant

Skin Contact Redness, drying of skin

Inhalation Headache, nausea, lassitude, intoxication, dilated pupils

E. Chronic Toxicity:

Target Organs Liver, CNS, skin

Long-Term Effects No conclusive data. Possibly liver damage.

V. Exposure Limits

A. OSHA PEL 200 ppm TWA, 300 ppm ceiling, 500 ppm 10-min peak

B. ACGIH TLV 100 ppm TWA

C. IDLH 2,000 ppm

D. NIOSH REL 100 ppm 10-hr TWA; 200 ppm 10-min ceiling

E. STEL 150 ppm (ACGIH)

VI. Other Pertinent Information/Special Precautions:

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Xylene (o-, m-, and p-isomers)
   A. Synonyms: 1,2-; 1,3-; and 1,4-dimethyl-benzene
   B. CAS #: 1330-20-7

II. Physical Characteristics

A. X Liquid ___ Solid ___ Powder ___ Gas
B. Color Colorless
C. Odor Aromatic
D. LEL 1-1.1 % Flash Pt. 81-90°F
E. Boiling Point 281-292°F Melting Point -12 to 55°F
   Ionization Potential 844-8.56 eV
F. Other

III. Recommended Air Purifying Cartridge:

___ Dusts, Fumes, Mists ___ Acid Gases
X Organic Vapors ___ Pesticides
___ HEPA ___ Air Purifying is Inappropriate
___ Ammonia/Amines ___ Other

IV. Health Hazards Data

A. Routes of Entry: X Inhalation X Skin Absorption
   ___ Ingestion
B. OSHA Listed Carcinogen: X No ___ Suspect ___ Yes
C. Sensitizer: ___ No X No Data ___ Suspect ___ Yes
D. Acute Toxicity:
   Eye Contact Irritant
   Skin Contact Dryness
   Inhalation Irritant of mucous membranes, CNS depressant. Intoxication-like symptoms: dizziness, drowsiness, staggering gait, headache, nausea
E. Chronic Toxicity:
   Target Organs CNS, eyes, blood, liver kidneys
   Long-Term Effects No conclusive data. Suspect liver, kidneys damage.

V. Exposure Limits
A. OSHA PEL 100 ppm TWA
B. ACGIH TLV 100 ppm TWA
C. IDLH 10,000 ppm
D. NIOSH REL 100 ppm 10-hr TWA; 200 ppm 10-min ceiling
E. STEL 150 ppm (ACGIH)

VI. Other Pertinent Information/Special Precautions:

7339b

APPENDIX B

HEAT AND COLD STRESS CONTROL MEASURES

HEAT STRESS CONTROL

1.0 PURPOSE

To establish procedures for the implementation of a heat stress control program.

2.0 SCOPE

Applies to all field activities where personnel may be exposed to environments exceeding 70°F.

3.0 RESPONSIBILITIES

Site Personnel - All site personnel must be alert to signs and symptoms of heat stress in themselves and in those working with them. Personnel must also be aware of emergency first aid action.

Health and Safety Officer (HSO) - The HSO is responsible for implementing a heat stress monitoring program according to this guideline.

4.0 GUIDELINES

A. Effects of Heat Stress

Adverse weather conditions are important considerations in planning and conducting site operations. Hot weather can cause physical discomfort, loss of efficiency, and personal injury. Of particular importance is heat stress resulting when protective clothing decreases natural body ventilation. Because of these factors a heat stress evaluation procedure is essential to the health and safety of personnel conducting field work.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue; irritability; anxiety; and decreased concentration, dexterity, or movement) to fatal. Standard reference books shall be consulted for specific first-aid treatment.

Heat-related problems include:

1. Heat Rash caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.

2. Heat Cramps caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: muscle spasms and pain in the extremities and abdomen.

3. Heat Exhaustion caused by increased stress on various organs to meet increased demands to cool the body. Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; or lassitude.

4. Heat Stroke, the most severe form of heat stress. Body must be cooled immediately to prevent severe injury and/or death. Signs and symptoms are: red, hot, dry skin*; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; or coma.

*NOTE: When vapor barrier clothing is being worn, the skin will be completely wetted with perspiration.

B. Work-Rest Regimen

Work-Rest Regimen - This is a ratio of time spent working versus time spent resting. The ratio applies to one hour periods. For example, a work-rest regimen of 75% work, 25% rest corresponds to 45 minutes work, 15 minutes rest each hour.

In order to establish a proper work-rest regimen, the Wet Bulb - Globe Temperature Index (WBGT) will be used in conjunction with the work load required to perform each task. Light work examples include sitting or standing to control machines or performing light hand or arm work. Moderate work includes walking about with moderate lifting and pushing or use of coated coveralls and respirators. Heavy work corresponds to pick and shovel-type work or the use of full body protective clothing.

The work-rest regimen selected using the WBGT procedure will be used as a baseline. The actual or adjusted period of work will be determined based on the biological monitoring outlined in Section D.

C. WBGT Determination

Wet-Bulb Globe Temperature (WBGT) - This is the simplest and most suitable technique to measure the environmental factors associated with heat stress. A direct-reading WBGT Index Indicator (such as the Reuter-Stokes Wibget RSS-214) will be used to determine the WBGT.

D. Biological Monitoring

One of the following procedures shall be followed when the work-place temperature is 70°F or above in order to make sure the work/rest regimen is providing proper personal protection.

1. Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/min. If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of rest period stays the same. If the pulse rate is 100 beats/min. at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. The length of the initial work period will be determined by using the table below.

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES

(VALUES ARE GIVEN IN °F WBGT)

	Work Load		
Work-Rest Regimen	Light	Moderate	Heavy
Continuous Work	80.0	80.0	77.0
75% Work - 25% Rest, Each Hour	87.0	82.4	78.6
50% Work - 25% Rest, Each Hour	88.5	85.0	82.2
25% Work - 75% Rest, Each Hour	90.0	88.0	86.0

2. Body temperature shall be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99°F. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the OT exceeds 99°F at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent, OT should be measured at the end of the rest period to make sure that it has dropped below 99°F. At no time shall work begin with OT above 99°F.

E. Heat Stress Control Measures

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries. To reduce heat stress conditions, the following steps should be taken:

1. Adjust work schedules:

   - Modify work/rest schedules according to monitoring requirements listed above.

   - Mandate work slowdowns as needed.

   - Rotate personnel: alternate job functions to minimize overstress or overexertion at one task.

   - Add additional personnel to work teams.

   - Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.

2. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. At a minimum, use tarps to provide shaded areas.

3. Maintain workers' body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., 8 fluid ounces of water must be ingested for approximately every 8 ounces of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:

   - Maintain water temperature at 50 to 60^{o}F

   - Provide small disposable cups that hold 4 ounces.

   - Have workers drink 16 ounces of liquid (preferably water or dilute drinks) before beginning work.

   - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons of fluid per day are recommended, but more may be necessary to maintain body weight.

4. Encourage workers to maintain an optimal level of physical fitness:

   o Where indicated, acclimatize workers to site work conditions: temperature, protective clothing, and workload.

   o Urge workers to maintain normal weight levels.

5. Provide cooling devices to aid natural body heat exchange during prolonged work or severe heat exposure. Cooling devices shall include:

   o Field showers or hose-down areas to reduce body temperature and/or to cool off protective clothing.

   o Cooling vests (provide additional blue-ice on site as needed).

6. Train workers to recognize and treat heat stress. As part of training identify the signs and symptoms of heat stress.

COLD STRESS CONTROL

1.0 PURPOSE

To prescribe the health and safety procedures, safe work practices, and protective equipment and apparel required for safe work during extremely cold weather conditions.

2.0 SCOPE

This guideline applies to field operations occurring during extremely cold weather conditions where field workers may be subject to cold stress.

3.0 RESPONSIBILITIES

Site Personnel - All site personnel shall be alert to signs of development of excessive cold stress in themselves and in those working with them and shall be aware of emergency first aid action.

Health and Safety Officer (HSO) - The HSO is responsible for implementing a cold stress monitoring program according to this guideline.

4.0 GUIDELIINES

A. Effects of Cold Stress

When the human body is exposed to a cold environment, certain physiologic mechanisms come into play which tend to limit heat loss and increase heat production. The first mechanism reduces the amount of heat lost to the environment by constricting the blood vessels, especially in the extremities, resulting in a marked drop in skin temperature. Chilling of the extremities places a severe strain on this mechanism; and if activity is restricted, the toes and fingers may approach freezing temperatures very rapidly. When vasoconstriction is no longer adequate to maintain body heat balance, metabolic heat production is augmented by voluntary movements and by the onset of shivering. It is possible to increase the metabolic rate five to seven times for short periods by shivering, but this increase cannot be maintained indefinitely. These two mechanisms reduce the blood flow through the skin and thus lower the temperature so that less heat is lost by conduction and radiation. Reduction of surface area by changes in posture, such as curling up the body, also assists in reducing heat loss.

Tolerance to cold is usually estimated by observing the time of exposure at which shivering, pain or numbness appear. These subjective criteria are not always trustworthy because the cold numbs all body sensation. Of the objective physiological criteria, the most valuable is the skin temperature, particularly of the extremities.

In cold environments, wind chill temperature is a better description of thermal conditions than the ambient temperature alone. The wind adds to the rate of cooling and it is the combination of wind speed and air temperature that is most important.

B. Harmful Effects

1. Frostbite: occurs when there is actual freezing of the tissues and associated mechanical damage of cell structures. Theoretically, the freezing point of skin is $-1^{o}C$; however, with increasing wind velocity, heat loss is greater and frostbite will occur more rapidly. Once started, freezing progresses rapidly. Additionally, if the skin comes in direct contact with objects whose surface temperature is below the freezing point, frostbite may develop in spite of warm environmental temperatures. Injury from frostbite may range from superficial injury with redness of the skin, numbness, and blisters; to deep tissue freezing with obstruction of circulation, blood clotting, tissue discoloration, and gangrene.

2. Trench foot or immersion foot: may be caused by long continuous exposure to cold without freezing, combined with persistent dampness or actual immersion in water. This condition is due to persistent local tissue anoxia (oxygen deficiency), combined with mild or severe cold with resultant injury to the capillary walls. During rewarming of the tissue, the worker may experience numbness, extreme edema, tingling, itching, and severe pain. Prolonged exposures may result in blistering, superficial skin damage and even superficial gangrene.

3. General hypothermia: a general lowering of body temperature with a decrease in pulse rate and blood pressure after an initial rise, sudden vasodilation with resultant rapid loss of heat, and critical cooling of the body core. Under normal conditions, the body temperature does not usually fall more than 2 to $3^{o}F$. If however, the exposure to cold air is intense and prolonged or if the body is unable to

compensate sufficiently, the body temperature may continue to fall. The feeling of cold and pain give way to numbness and loss of sensation, and eventually muscular weakness and a desire to sleep ensue. When the body temperature reaches 80°F, coma sets in. Death usually occurs when the body temperature falls below 70°F.

C. Windchill Index

1. General

The windchill index is the cooling effect on the human body of any combination of temperature and wind velocity or air movement. Like the other established cold stress indices, the windchill index has limitations. Under the right conditions of proper measurement and appropriate use, however, the information it provides can be helpful in establishing protective work-rest schedules.

2. Basic measurement

a. Ambient temperature: a mercury-in-glass thermometer, capable of covering the range of expected maximum to minimum temperatures, should be used to measure the ambient temperature. (Direct sunlight will cause erroneous readings. Measure temperature in a shaded area.)

b. Air velocity: air velocity is easily obtained from the site wind speed indicator at large projects. For smaller operations, a hot wire anemometer, cup anemometer, velometer, or other similar velocity indicators must be used. Note that air speed must be given in miles-per-hour for comparison to the Windchill Index chart (Table 1).

3. Limitations

a. The windchill temperatures have no significance other than that expressed - the effect on the body. Although the windchill temperature may be below the freezing point of water, the water will not freeze unless the ambient air temperature is also below the freezing point.

b. The windchill index does NOT take into account that part of the body which is exposed to cold, the level of work activity with its effect on body heat production, or the amount of clothing worn.

TABLE 1

Cooling Power of Wind on Exposed Flesh Expressed as an equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	*LITTLE DANGER* In < hr with dry skin. Maximum danger of false sense of security				*INCREASING DANGER* Danger from freezing of exposed flesh within one minute.				*GREAT DANGER* Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

c. Measurement of the windchill temperature is a "point-in-time" assessment. One morning measurement will not account for the entire day's rise and fall in wind velocity and sudden temperature changes. Periodic measurement, such as once each hour, should be conducted during extreme cold weather conditions.

5.0 CONTROL MEASURES

A. Employee Training and Information

1. All employees who are subject to exposure to cold stress conditions shall complete a formal training program prior to their assignment to cold work environments. This training shall be repeated annually. The training shall include, as a minimum, the following information:

   a. A description of typical work assignments in cold environments that could result in cold stress conditions;

   b. An explanation of the Windchill Index and its application to cold stress control measures;

   c. A description of the cold stress injuries and related health effects from prolonged exposure to cold environments, and the required first aid treatment;

   d. The purpose, proper selection, fitting, use and limitations of personal protective equipment required for cold environments; and

   e. The safe work practices and administrative/engineering control measures required for the control of cold stress.

2. Written first aid information and precautionary measures for control of cold stress shall be available at each site for employee review.

B. Work/Warming Regimen

If work is performed continuously in the cold at a Windchill Index temperature of 20°F or below, heated warming shelters shall be made available for use by employees during warmup breaks. A work/warming regimen will be established using the schedule in Table 2. This table assumes that all workers are properly clothed for periods of work at temperatures below freezing.

TABLE 2

WORK/WARM-UP SCHEDULE FOR 4-HOUR SHIFT*

	Air Temp. Sunny Sky °F	No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
		Max. No. of Period	Work Breaks	Max. No. of Period	Work Breaks	Max. No. of Period	Work Breaks	Max. No. of Period	Work Breaks	Max. No. of Period	Work Breaks
1.	-15° to -19°	(Norm Breaks)	1	(Norm. Breaks)	1	75 min	2	55 min	3	40 min	4
2.	-20° to -24°	(Norm Breaks)	1	75 min	2	55 min	3	40 min	4	30 min	5
3.	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
4.	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease			
5.	-35° to -39°	40 min	4	30 min	5	Non-emergency work should cease					
6.	-40° to -44°	30 min	5	Non-emergency work should cease							
7.	-45° & below	Non-emergency work should cease									

NOTES:

1. Schedule applies to moderate to heavy work activity with warm-up breaks of 10 minutes in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule one step lower. For example, at -30°F with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period fo 40 minutes with four breaks in a 4-hour period (Step 5).

2. The following is suggested as a guide for estimating wind velocity. If accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended; 15 mph: raises newspaper sheet; 20 mph: blowing and drifting snow.

*From Occupational Health & Safety Division, Saskatchewan Department of Labour.

When entering the heated shelter the outer layer of clothing shall be removed and the remainder of clothing loosened to permit sweat evaporation or a change of dry work clothing provided.

C. Safe Work Practices

1. Protective Clothing

a. Clothing for both cold-wet (moderately cold weather above 14°F) and cold-dry (temperatures below 14°F) should be available. Many layers of relatively light clothing with an outer windproof material should be used.

Caution: No one type of clothing is best for all weather conditions. Denim is relatively loose woven, which not only allows water to penetrate but allows wind to blow away essential body heat. Goose or duck down is good for stopping wind but is inefficient when wet. Plastic or closely woven nylon offers good wind and rain insulation but little insulation from the cold.

b. Clothing must be kept dry. If not, the exposure to cold must be alternated with periods of rewarming and drying of clothes. Moisture should be kept off clothes by brushing or shaking snow from it prior to entering heated shelters.

c. Workers should be encouraged during breaks to take measures to evaporate accumulated perspiration by opening the neck, waist, sleeves and ankle fasteners of clothing.

d. Cold weather masks or similar face protection may be worn during severe wind-chill conditions.

Caution: The face, which has good circulation of blood, will usually be adequately protected if a forward-protecting fur ruff is worn to protect against the wind. Masks are NOT recommended for prolonged use in extreme cold because frostbite may develop unnoticed. It is essential when wearing face protectors that they be removed periodically to check for frostbite.

e. When the nature of the work permits, a water-proof hat and water repellent but vapor permeable loose long coat should be worn over other garments.

f. The foot wear for outdoor work in wet snow should be water proof and reach well up on the leg. The soles and uppers should be insulated (a combination of work boots and rubber overboots provides this insulation at relative low cost).

g. Conventional trousers should be tucked in and lapped over boot tops to prevent the entry of snow and cold water into the boots.

h. In extreme cold, mittens are better than gloves for protecting the hands, because they reduce the amount of skin surface exposed.

2. <u>Other Precautions</u>

a. The fingers, toes, nose tips, ears and cheeks should be checked during breaks for numb or hard areas indicative of frostbite.

b. In extreme windchill conditions, workers should use the "buddy system" to detect signs and symptoms of cold stress on coworkers.

c. Workers should be encouraged to eat balanced meals and to maintain adequate liquid intake for work in cold environments. Warm liquids such as hot soup or tea should be made available on site, and cold foods and drinks should only be eaten as a matter of necessity.

d. Electric razors may be preferable to safety razors since they do not remove protective oils from the face.

e. Workers should be cautioned that facial hair may serve as a base for ice build-up and could mask the appearance of frostbite.

f. New employees and others unaccustomed to cold environments should not be allowed to work full time until accustomed to work conditions and required protective clothing.

APPENDIX C

LEVELS OF PROTECTION

AND PROTECTIVE GEAR

Sample Protective Ensembles[a]

LEVEL OF PROTECTION	EQUIPMENT	PROTECTION PROVIDED	SHOULD BE USED WHEN:	LIMITING CRITERIA
A	RECOMMENDED: • Pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA. • Fully-encapsulating, chemical-resistant suit. • Inner chemical-resistant gloves. • Chemical-resistant safety boots/shoes. • Two-way radio communications. OPTIONAL: • Cooling unit. • Coveralls. • Long cotton underwear. • Hard hat. • Disposable gloves and boot covers.	The highest available level of respiratory, skin, and eye protection.	• The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either: — measured (or potential for) high concentration of atmospheric vapors, gases, or particulates or — site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the intact skin. • Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible. • Operations must be conducted in confined, poorly ventilated areas until the absence of conditions requiring Level A protection is determined.	• Fully-encapsulating suit material must be compatible with the substances involved.
B	RECOMMENDED: • Pressure-demand, full-facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA. • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit). • Inner and outer chemical-resistant gloves. • Chemical-resistant safety boots/shoes. • Hard hat. • Two-way radio communications. OPTIONAL: • Coveralls. • Disposable boot covers. • Face shield. • Long cotton underwear.	The same level of respiratory protection but less skin protection than Level A. It is the minimum level recommended for initial site entries until the hazards have been further identified.	• The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: — with IDLH concentrations of specific substances that do not represent a severe skin hazard; or — that do not meet the criteria for use of air-purifying respirators. • Atmosphere contains less than 19.5 percent oxygen. • Presence of incompletely identified vapors or gases is indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin.	• Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through the intact skin. • Use only when it is highly unlikely that the work being done will generate either high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.

[a]Based on EPA protective ensembles.

LEVEL OF PROTECTION	EQUIPMENT	PROTECTION PROVIDED	SHOULD BE USED WHEN:	LIMITING CRITERIA
C	RECOMMENDED: • Full-facepiece, air-purifying, canister-equipped respirator. • Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit). • Inner and outer chemical-resistant gloves. • Chemical-resistant safety boots/shoes. • Hard hat. • Two-way radio communications. OPTIONAL: • Coveralls. • Disposable boot covers. • Face shield. • Escape mask. • Long cotton underwear.	The same level of skin protection as Level B, but a lower level of respiratory protection.	• The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin. • The types of air contaminants have been identified, concentrations measured, and a canister is available that can remove the contaminant. • All criteria for the use of air-purifying respirators are met.	• Atmospheric concentration of chemicals must not exceed IDLH levels. • The atmosphere must contain at least 19.5 percent oxygen.
D	RECOMMENDED: • Coveralls. • Safety boots/shoes. • Safety glasses or chemical splash goggles. • Hard hat. OPTIONAL: • Gloves. • Escape mask. • Face shield.	No respiratory protection. Minimal skin protection.	• The atmosphere contains no known hazard. • Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.	• This level should not be worn in the Exclusion Zone. • The atmosphere must contain at least 19.5 percent oxygen.

FIELD SAMPLING AND ANALYSIS PLAN

PHASE II REMEDIAL INVESTIGATION

SINCLAIR REFINERY SITE

WELLSVILLE, NEW YORK

8310b

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

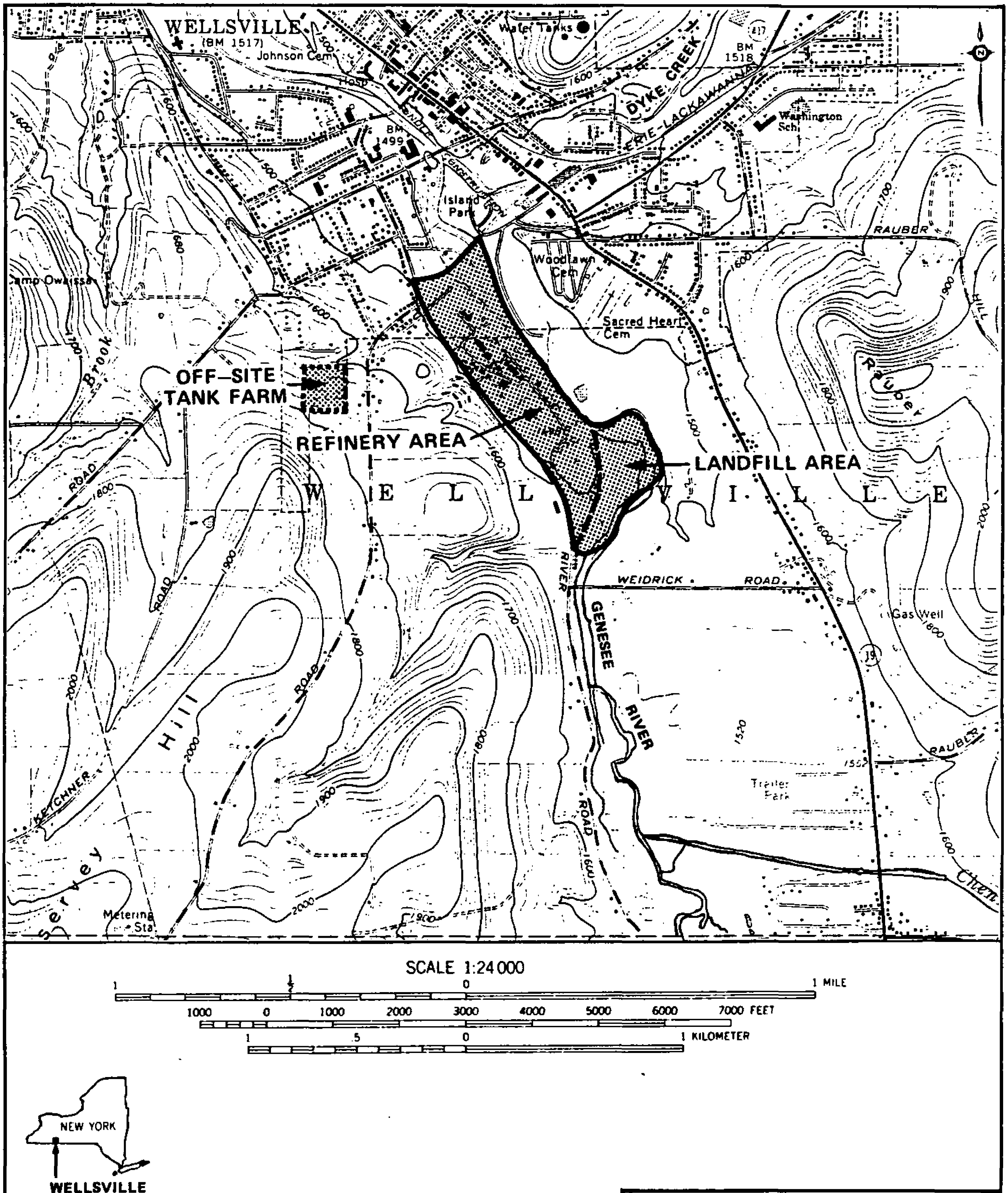
LIST OF TABLES

1.0 INTRODUCTION

This document presents the Field Sampling and Analysis Plan (FSAP) for the completion of the Phase II Remedial Investigation (RI) to be undertaken by Atlantic Richfield Company (ARCO) and their contractor, Ebasco Services Incorporated (Ebasco), at the Sinclair Refinery Site located in the village and town of Wellsville, New York (Figure 1-1). The FSAP, along with the RI/FS Work Plan, Site Management Plan (SMP), and Health and Safety Plan (HASP) comprise the Project Operations Plan (POP) for the site. Phase I and II of the RI, were initiated by SMC Martin for the New York State Department of Environmental Conservation (NYSDEC). The scope and preliminary findings of those investigations, as well as the site's location, history and hydrogeology are described in the Sinclair Refinery Site Phase II RI/FS Work Plan (Volume I of the POP).

The FSAP defines the procedures to be followed during all field investigation activities. Specifically, the FSAP addresses:

- Standard Operating Procedures (SOPs) for Field Investigations including Sampling, Monitoring, and Field Instrument Calibration;
- Number, Location and Types of Samples;
- Parameters to be Analyzed and Analytical Methods;
- Chain-of-Custody Procedures;
- Decontamination Procedures;
- QA/QC of Field Sampling;
- Procedures for Field Changes and Corrective Actions, and
- Responsibilities of Site Personnel.



SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 1–1

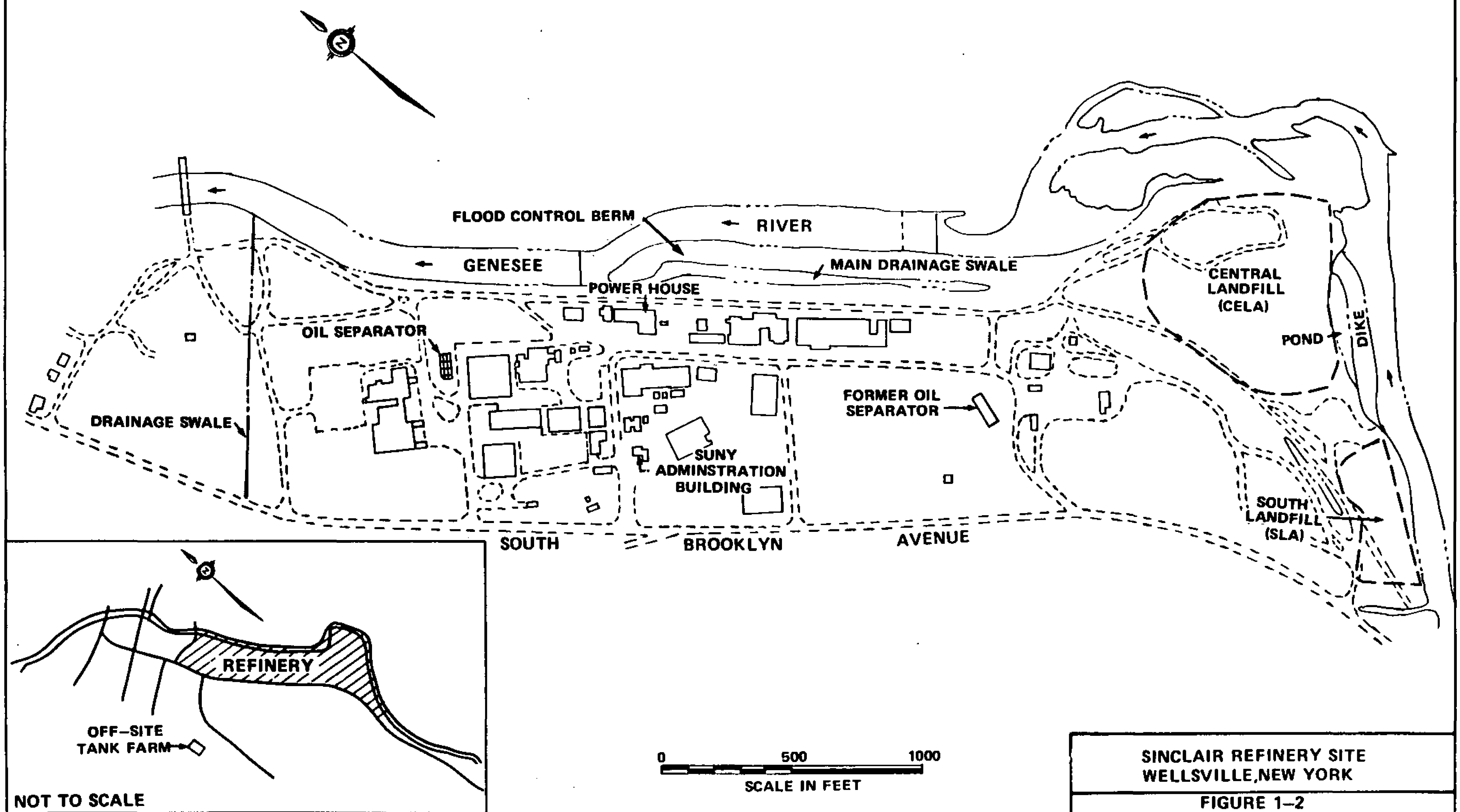
SITE LOCATION MAP

EBASCO SERVICES INCORPORATED

Each SOP or QA/QC protocol is in accordance with EPA Region II guidelines and the site-specific Health and Safety Plan (HASP).

The purpose of this RI is to collect site specific data on soil, sediment, surface water and groundwater to define the nature and extent of contamination in areas where the Phase I and II data indicated the potential need for remediation. This RI should provide an adequate data base for the performance of the Risk Assessment and the Feasibility Study. To meet this objective, sampling will be performed primarily in the refinery area of the Sinclair Refinery Site (Figure 1-2) with limited sampling of ground- water at the landfill area. No additional sampling is planned in the Off-Site Tank Farm Area of the site.

Appendix B to this FSAP provides the modification and additions to the procedures which will control sampling of soils in the landfill area. The landfill area sampling will be used to support final design for closure of the landfill. The data gathered in the landfill will not be used in the RI/FS, since the RI/FS specifically excludes the landfill.



ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

FIGURE 1–2

SINCLAIR REFINERY SITE MAP

EBASCO SERVICES INCORPORATED

2.0 GENERAL SITE OPERATIONS

2.1 BRIEF DESCRIPTION OF SAMPLING PROGRAM

The field investigation program will include sampling of groundwater, surface water, and soils and sediments within the refinery area, and groundwater in the area of the landfill. No additional sampling will be performed in the area of the old Off-Site Tank Farm (OSTF). A summary of the samples to be taken is provided in Table 2-1.

Approximately 35 groundwater samples will be collected; 34 from the shallow aquifer and 1 from the deep aquifer. Twenty seven of the 34 shallow samples are from the refinery area, five are from the landfill area (one well, on the boundary between the two areas, is included in the count of refinery area wells) and two are background (off-site) wells. All 35 samples will be tested for Target Compound List (TCL) volatile organic compounds (VOCs). Twelve of the 27 refinery area and one background groundwater sample will be tested for TCL Base/Neutral/Acid Extractables (BNAs) and TCL metals in addition to the volatiles.

Soil samples will be taken from both soil borings and test pits. Approximately 25 soil borings will be made in areas with potentially elevated levels of lead to depths of 10 feet. Samples will be taken at the 0-6 inch, 2-4 foot and 8-10 foot intervals in each boring. Sixty of the 75 soil samples will be analyzed for lead, with the other 15 samples analyzed for TCL metals. The 15 samples tested for full TCL metals will be surficial samples. Six samples will also be analyzed for total organic carbon (TOC) and grain size distribution.

In or adjacent to the main drainage swale, three additional soil borings will be made with three samples taken at each location (0-6 inch, 2-4 foot and 8-10 foot intervals). The uppermost sample from each boring may be surficial sediments. Each of these samples will be analyzed for TCL BNAs, VOCs, and metals. The three surficial samples will also be analyzed for TOC and grain size distribution.

TABLE 2-1

SUMMARY OF PROPOSED ANALYTICAL PROGRAM
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

	Number of Sample Locations[1]	Samples Per Locations	Analysis						
			Lead Only	TCL[2] Metal	TCL[3] Volatiles	TCL[4] BNAs	Total Organic Carbon	Grain Size Analysis	Oil and Grease
Groundwater Samples									
Refinery Area: Shallow Wells	27	1	-	12	27	12	-	-	-
Deep Wells	1	1	-	-	1	-	-	-	-
Landfill Area: Shallow Wells	5	1	-	-	5	-	-	-	-
Background Area: Shallow Wells	2	1	-	1	2	1	-	-	-
Total Groundwater Samples			-	13	35	13	-	-	-
Other Water Samples									
o Genesee Surface Water	3	1	-	3	-	-	-	-	-
o Seeps, Outfalls, Ponded Water	6	1	-	6	6	6	-	-	-
Total Other Water Samples			-	9	6	6	-	-	-
Soil Samples									
o Soil Borings	25	3	60	15	-	-	6	6	-
o Drainage Swale Borings	3	3	-	9	9	9	3	3	-
o Test Pits/Trenches	32	1	-	16	16	16	-	-	32
Total Soil Samples			60	40	25	25	9	9	32
Sediment Samples									
o Genesee River	3	1	-	3	3	3	3	3	-
Total Sediment Samples			-	3	3	3	3	3	-
Blanks									
o Trip	-	-	-	-	24	-	-	-	-
o Field	-	-	-	20	21	13	-	-	-
o Duplicate	-	-	-	9	6	5	1	-	2
Total Blanks				29	51	18	1		2

1 Number of samples location is approximate. Numbers may increase as described in text, based on field conditions.
2 TCL metals including lead.
3 Including 10 tentatively identified compounds
4 Including 20 tentatively identified compounds

8310b

Test pits and trenches will be dug in the vicinity of the existing and previously removed oil separators. Approximately 32 samples will be taken from the test pits. All the samples will be tested for oil and grease and 16 of the samples will be tested for full TCL BNAs, VOCs and metals.

Six surface water samples will be taken from the outfalls, seeps and ponded water in the main drainage swale. These will be tested for BNAs, VOCs and metals. Three additional surface water samples will be taken from the Genesee River and analyzed for metals.

Lastly, three sediment samples will be taken from the Genesee River and analyzed for BNAs, VOCs and metals.

2.2 FIELD TEAM AND RESPONSIBILITIES

The field team will include the following personnel:

- Field Operations Leader - responsible for management and supervision of the entire sampling program and providing consultation and decision-making on factors relating to sampling activities and potential changes to the field sampling program;

- Project Chemist - responsible for assuring that the chemical analysis of samples from the site is performed in accordance with EPA guidelines;

- Project Geologist(s) - responsible for the hydrogeological investigation of the Sinclair Refinery Site;

- Site Health and Safety Officer - responsible for the safety of all site personnel, and

- Field Technician(s) - responsible for assisting in health and safety monitoring and field operations.

2.3 SAMPLE IDENTIFICATION SYSTEM

Each sample will be designated by an alphanumeric code which will identify the site, the matrix sampled and contain a sequential sample number. The matrix identification system, used in the Phase I and II RI, will be continued except for soil samples where the designations MW, SS and AB were previously all used for soils. All soil samples to be obtained in the rest of the Phase II RI will be designated AB. Matrix identifiers are: AB (soil); RS (river sediment); GW, GWD or GWB for groundwater samples from the shallow, deep and background groundwater aquifers, respectively; SW (surface water); FB (field blank); DI (deionized water blank); and TB (trip blank).

Each matrix sampling location will also be identified by a two digit number. Existing well numbers are from MW01 through MW57. New soil sampling locations will start at AB42, new sediment sample numbers will start at RS15 and new surface water sample numbers will start at SW46. Sequential sample numbers at each location will begin with 01.

The project code for the Sinclair Refinery Site is SR.

The following illustrates use of the system. The first soil sample obtained at soil location 42, will be identified as SR-AB42-01. The next successive (i.e., deeper) soil sample obtained at the same location will be identified as SR-AB42-02. A duplicate sample from this location would be identified as SR-AB42-02D.

2.4 SAMPLE CONTAINER REQUIREMENTS AND HOLDING TIMES

Sample container requirements and holding times are specified in Table 3-1 of Section 3. These requirements are in accordance with EPA Contract Laboratory Protocol (CLP) guidelines.

2.5 SAMPLE PACKAGING AND SHIPPING

Samples will be packaged and shipped according to CLP guidelines. The sample packaging requirements include:

- o Place sample container, properly identified and with a sealed lid, in a polyethylene bag, and seal the bag.
- o Place sample in a fiberboard container or picnic cooler which has been lined with a large polyethylene bag.
- o Pack with enough noncombustible, absorbent, cushioning materials to minimize the possibility of the container breaking.
- o Seal large bag.
- o Seal or close outside container.
- o Mark outside of container "Environmental Sample"

When sample shipments are to be sent, the receiving laboratory will be telephoned on that day or the following morning and notified of the shipment, airbill number, and number and type of samples being shipped.

2.6 SAMPLE DOCUMENTATION

The sampling team or individual performing a particular sampling activity is required to keep a field notebook. This field notebook will be a bound weatherproof logbook that shall be filled out at the location of sample collection immediately after sampling. It will contain information on the samples including sample number, sample collection time, sample location, sample descriptions, sampling methods used, daily weather condition, field measurements, name of sampler, and other site specific observations. The field notebook will contain any deviations from protocol, visitor's names or community contacts during sampling, and other site-specific information which the Field Operations Leader determines to be noteworthy.

Chain of Custody Forms (Figure 2-1), Sample Labels, and Custody Seals will be filled out for each sample. Field team members will also use other field data sheets such as Boring Logs (Figure 2-2), Well Purge Data Sheets (Figure 2-3) and Monitoring Well Construction Sheets (Figure 2-4).

2.7 DATA QUALITY OBJECTIVES (DQOs)

DQOs are qualitative and quantitative statements which specify the quality of data required to support specific remedial response decisions on regulatory actions. The DQOs focus on the identification of the end use of the data to be collected and to the degree of certainty with respect to the precision, accuracy, reproducibility, completeness and comparability (PARCC) necessary to satisfy the intended end use. Because the data may be used for risk assessment and remedial design purposes, analytical methods and data validation will be performed at Level 4. These levels are characterized by rigorous QA/QC protocols and documentation and provide qualitative and quantitative analytical data. Analyses will be performed by an EPA-CLP/NYSDOH approved laboratory. Five laboratories, Aquatech, CompuChem, ETC, ENSECO and Versar, have been selected to potentially perform the analyses. One or more of the five laboratories will actually perform the analyses.

3.0 FIELD INVESTIGATION AND SAMPLING

This section describes the field investigation and sampling procedures including:

- Soil sampling;
- Sediment sampling;
- Groundwater sampling;
- Surface water sampling;

EBASCO SERVICES INCORPORATED
CHAIN OF CUSTODY RECORD

PROJECT																		PRESERVATION	
SAMPLERS: (Signature)																			
SAMPLE NUMBER	DATE	TIME	COMP.	GRAB	NO. CONTAINERS	P P METALS	P P MERCURY	BASE/NEUTRAL EXT.	ACID EXT.	VOLATILE ORG.						REMARKS OR SAMPLE LOCATION		ICED	SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN

Relinquished by: (Signature) 1	Date / Time	Received by: (Signature)	Relinquished by: (Signature) 4	Date / Time	Shipped via:
Relinquished by: (Signature) 2	Date / Time	Received by: (Signature)	Received for Laboratory by: (Signature)	Date / Time	Shipping Ticket No.
Relinquished by: (Signature) 3	Date / Time	Received by: (Signature)	Remarks		

CHAIN OF CUSTODY RECORD FIGURE 2-1

BORING ________

PROJECT:	PROJECT NO:
DATE:	LOCATION:
DRILLING CONTRACTOR:	INSPECTOR:
DRILLING METHOD:	SAMPLING METHOD:
ELEVATION:	DATUM:

SAMPLE				DEPTH	STRATA	SOIL DESCRIPTION density, color, SOIL, admixtures, moisture, other notes, ORIGIN	WELL CONST.	REMARKS
no.	depth	blows per 6"						
				5				
				10				
				15				
				20				
				25				
				30				
				35				

NOTES:

SHEET 1 OF _____

FIGURE 2–2
BORING LOG

FIGURE 2–3

WELL PURGE DATA SHEET

Well I.D. ____________ **Date** ______________

Well Depth (from TOC) = __________ft **Well Diameter (d)** = __________in

Static Water Level (from TOC) = __________ft **Well Radius** $\left(\frac{d}{2}\right)$ = __________in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = ________ - ____________
T = ________ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(ft) \times r(in)^2$$
$$= 0.163 \times \_\_\_\_ \times \_\_\_\_^2$$
$$= \_\_\_\_\_\_\_\_\ \text{gallons}$$

Total Volume Purged

Design = ____________gallons

Actual = ____________gallons

Water Quality

	PH (SU)	SP COND (μ mhos/cm)	TEMP (°C)	Eh (mV)	D.O. (ml/L)
Initial	____	____	____	____	____
Volume 1	____	____	____	____	____
Volume 2	____	____	____	____	____
Volume 3	____	____	____	____	____
Volume 4	____	____	____	____	____
Volume 5	____	____	____	____	____

Purge Method

_____SUCTION PUMP _____SUBMERSIBLE PUMP _____BAILER _____OTHER ____________

Notes/Observations: ________________________________

____

____

____

Ebasco Sampler(s) ________________________________

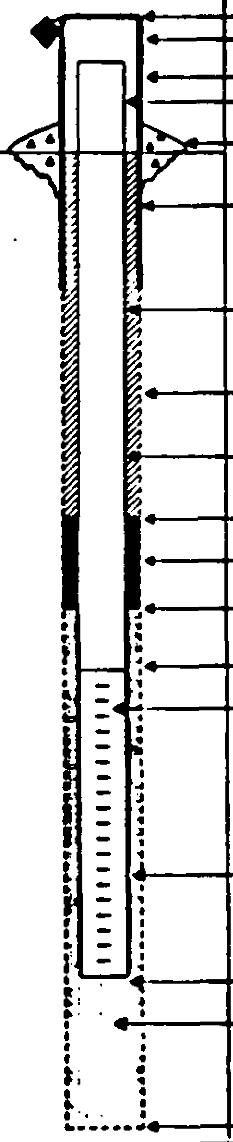
BORING NO ________

OVERBURDEN
MONITORING WELL SHEET

PROJECT ________ LOCATION ________
PROJECT NO. ________ BORING ________
ELEVATION ________ DATE ________
FIELD GEOLOGIST ________

DRILLER ________
DRILLING METHOD ________
DEVELOPMENT METHOD ________

GROUND ELEVATION



ELEVATION OF TOP OF SURFACE CASING : ________
ELEVATION OF TOP OF RISER PIPE: ________
STICK - UP TOP OF SURFACE CASING: ________
STICK - UP RISER PIPE : ________
TYPE OF SURFACE SEAL: ________
I.D. OF SURFACE CASING: ________
TYPE OF SURFACE CASING ________
RISER PIPE I.D. ________
TYPE OF RISER PIPE ________
BOREHOLE DIAMETER. ________
TYPE OF BACKFILL: ________
ELEVATION / DEPTH TOP OF SEAL: ________
TYPE OF SEAL: ________
DEPTH TOP OF SAND PACK. ________
ELEVATION / DEPTH TOP OF SCREEN: ________
TYPE OF SCREEN ________
SLOT SIZE x LENGTH: ________
I.D. OF SCREEN: ________
TYPE OF SAND PACK: ________
ELEVATION / DEPTH BOTTOM OF SCREEN. ________
ELEVATION / DEPTH BOTTOM OF SAND PACK ________
TYPE OF BACKFILL BELOW OBSERVATION WELL: ________
ELEVATION / DEPTH OF HOLE ________

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 2–4

OVERBURDEN
MONITORING WELL SHEET

EBASCO SERVICES INCORPORATED

- o Well installation;
- o Well decommissioning, and
- o Decontamination.

A summary of all samples to be taken and analyses to be performed is given in Table 3-1.

3.1 GROUNDWATER SAMPLING

Thirty four shallow and one deep monitoring well will be sampled as part of the RI (Section 3.5 describes an optional well installation program. If installed, these wells will also be sampled). All well locations to be sampled are shown on Figure 3-1. The shallow wells to be sampled include 27 wells in the refinery area (including MW-06 on the boundary of the refinery and landfill areas), five wells in the landfill area, and two background well locations. The one deep well to be sampled, MWD-47 had anomalously high VOC (xylene, benzene and toluene) concentrations in the Phase II sampling. If significant concentrations of VOC's are measured in MWD-47 during this RI sampling, additional wells may be installed adjacent to MWD-47 and sampled (see Section 3.5).

3.1.1 Well Development

Each well to be sampled will be redeveloped prior to sampling. The purpose of the redevelopment is to help ensure that the water sample obtained from each well does not contain soil particles which may affect the analytical chemistry test results.

Wells will be redeveloped using a pump and surge method. The pump used may either be a submersible or centrifugal pump. The development water will be reapplied to the ground surface and allowed to percolate, provided it remains close to the well. The wells will be developed until the water is free of sand and silt size particles. If a well is pumped for at least four hours, with no significant improvement in the clarity of the water, or pumped for at least six hours without becoming clear, the site geologist may elect to take both filtered and unfiltered metals samples to evaluate the effect of the sediments on sample quality. Section 3.1.2 discusses filters and sampling.

TABLE 3-1

(FSAP) SUMMARY OF ANALYTICAL METHODS, PRESERVATION, AND HOLDING TIMES
FOR ALL SAMPLES

SAMPLE	MATRIX	NUMBER OF SAMPLES[3]	ANALYSIS	SAMPLE CONTAINERS	PRESERVATION	METHOD	HOLDING TIME
Refinery Area							
Shallow Wells	Aqueous	27	TCL VOCs	3-40 ml VOA vial with teflon cap	Cool to 4°C HCL to pH <2	CLP-IFB-SOW (8/87)	10 days from VTSR[2]
		12	TCL BNAs	2-1 Liter amber glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days to extract 40 days to analyze
		12	TCL Metals	1-1 Liter polyethylene	Cool to 4°C HNO_3 to pH <2	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
Deep Wells	Aqueous	1	TCL VOCs	3-40 ml VOA vial with teflon cap	Cool to 4°C HCL to pH <2	CLP-IFB-SOW (8/87)	10 days from VTSR
Soil Borings	Soils	60	Pb only	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	6 months
		15	TCL Metals	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
		6	TOC	1-8 oz glass	Cool to 4°C	EPA-ESD Reg II Method	14 days from VTSR
		6	Grain Size	1-8 oz glass	None	ASTM D-422	6 months
Test Pits/Trenches	Soils	16	TCL Metals	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
		16	TCL VOCs	3-40 ml VOA vials with teflon cap	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days from VTSR
		16	TCL BNAs	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days from VTSR 40 days to analyze
		32	Oil and Grease	1-8 oz glass	Cool to 4°C	Standard Method 503	7 days from VTSR
Drainage Swale Boring	Soils	9	TCL Metals	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
		9	TCL VOCs	3-40 ml VOA vials with teflon caps	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days from VSTR
		9	TCL BNAs	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days to extract 40 days to analyze
		3	TOC	1-8 oz glass	Cool to 4°C	EPA-ESD Reg II Method	14 days from VTSR
		3	Grain Size	1-8 oz glass	None	ASTM D-422	6 months
Drainage Swale/Water, Seeps	Aqueous	6	TCL Metals	1-1 liter polyethylene	Cool to 4°C HNO_3 to pH <2	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
		6	TCL VOCs	3-40 ml VOA vials with teflon caps	Cool to 4°C HCl to pH <2	CLP-IFB-SOW (8/87)	10 days from VTSR
		6	TCL BNAs	2-1 liter amber glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days to extract 40 days to analyze

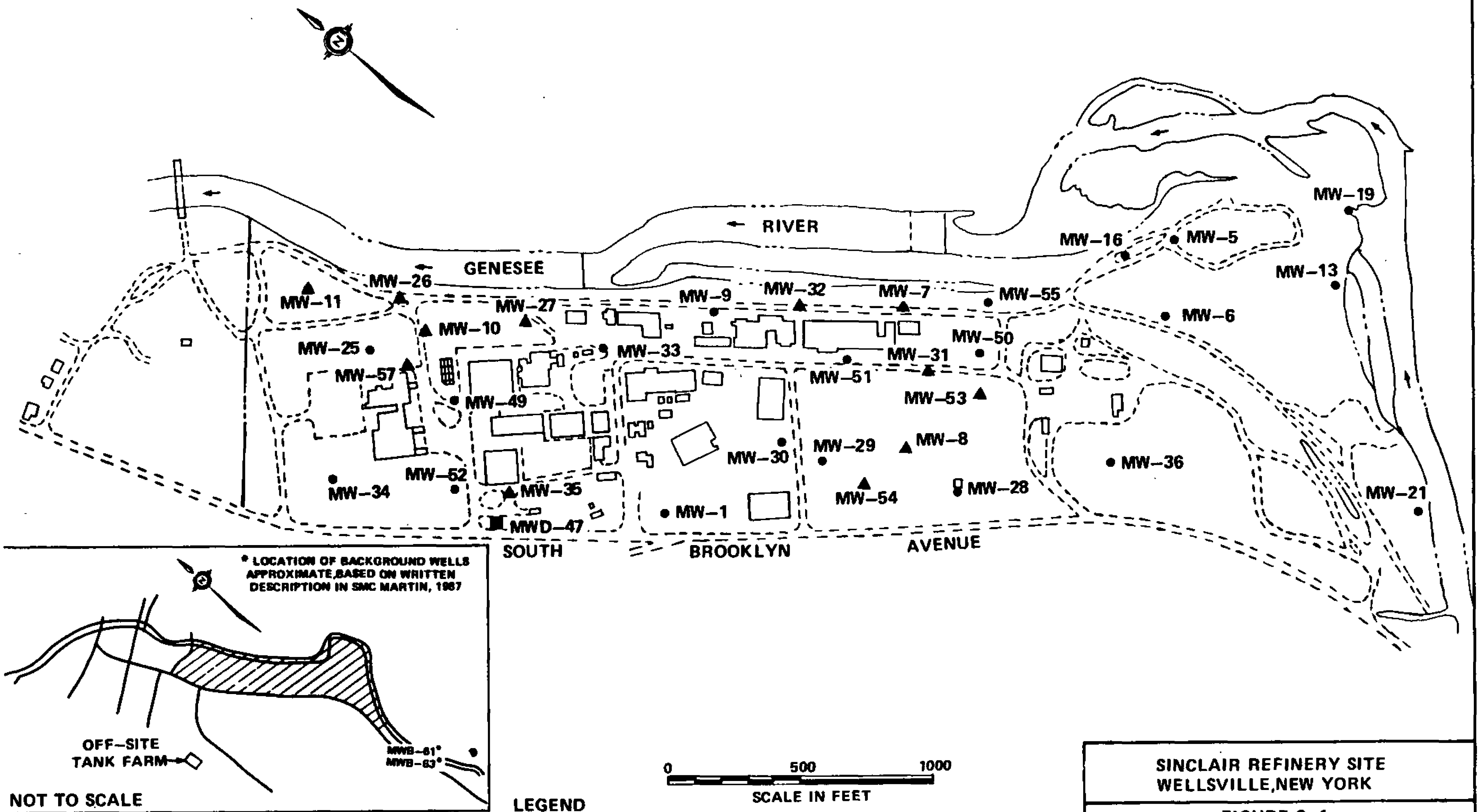
TABLE 3-1 (Cont'd)

(FSAP) SUMMARY OF ANALYTICAL METHODS, PRESERVATION, AND HOLDING TIMES FOR ALL SAMPLES

SAMPLE	MATRIX	NUMBER OF SAMPLES	ANALYSIS	SAMPLE CONTAINERS	PRESERVATION	METHOD	HOLDING TIME
Landfill Area							
Shallow Wells	Aqueous	5	TCL VOCs	3-40 ml VOA vials with with teflon caps	Cool to 4°C HCl to pH <2	CLP-IFB-SOW (8/87)	10 days from VTSR
Off-site							
Shallow Wells (bkgd)	Aqueous	1	TCL Metals	1-1 liter polyethylene	Cool to 4°C HNO_3 to pH <2	CLP-IFB-SOW (7/85)	10 days from VTSR
		2	TCL VOCs	3-40 ml VOA vials with teflon caps	Cool to 4°C HCl to pH <2	CLP-IFB-SOW (8/87)	10 days from VTSR
		1	TCL BNAs	2-1 liter amber glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days to extract 40 days to analyze
Surface Water	Aqueous	3	TCL Metals	1-1 liter polyethylene	Cool to 4°C HNO_3 to pH <2	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
Sediments	Soil	3	TCL Metals	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	Hg - 26 days All Others - 6 months
		3	TCL VOCs	3-40 ml VOA vials with teflon caps	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days from VTSR
		3	TCL BNAs	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days to extract 40 days to analyze

NOTE: All VOC analyses require lower detection limits.

1 Method includes tentatively identified compounds for VOC and BNA Analyses.
2 VTSR - Verified Time of Sample Receipt
3 Number of samples do not include blanks and duplicates.



LEGEND

MW-11 ▲ SHALLOW WELL WITH SAMPLE ANALYZED FOR VOCs

MW-34 ● SHALLOW WELL WITH SAMPLE ANALYZED FOR VOCs,BNAs AND METALS

MWD-47 ■ DEEP WELL WITH SAMPLE ANALYZED FOR VOCs

ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3-1

GROUNDWATER SAMPLING LOCATIONS

EBASCO SERVICES INCORPORATED

3.1.2 <u>Well Sampling (SOP1)</u>

One round of groundwater samples will be taken to supplement the existing data on site water quality. Figure 3-1 shows the wells to be sampled and the parameters to be tested in each well. If any wells have been severely damaged since the last set of samples were taken in 1986, the field geologist may elect not to sample the well, or to sample the well but to document the damage in the field notebook and on sampling records so that sample results may be properly evaluated.

The groundwater samples will be tested for either TCL VOCs or TCL VOCs, BNAs and metals. TCL Pesticides, PCBs, phenolics and cyanide are not included in sample analysis because they have not been previously detected at the site or were found at very low, concentrations in isolated samples. Sample data collected in the field will include pH, temperature and specific conductivity. Other field tests such as oxidation-reduction potential (Eh) and dissolved oxygen (DO) may also be performed.

The following procedure will be used for groundwater sampling:

1. The well should be sampled at least 72 hours after well development.

2. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

3. Unlock well cap.

4. Measure the static water level in the well with a steel tape or other water level indicator.

5. Calculate the volume of water in the well as follows:

   $$\text{Volume (gals)} = 0.163 \times T\ r^2$$

   where T = well depth (feet) - static water level (feet)
   r = well radius (inches)

6. Purge a minimum of 3 volumes of water from the well, with a decontaminated stainless steel or teflon bailer, or submersible or centrifugal pump. The intake on the pump should be in the screened interval of the well. The purge water may be discharged to the ground surface and allowed to percolate.

7. Measure and record temperature, pH, and specific conductivity of purged well water.

8. After the above readings stabilize and after purging 3-5 well volumes of water, allow the static water level to recover to its approximate original level. If due to low yield the well does not recover within 30 minutes of being purged, the well may be sampled after recovery to 30% of the original water level.

9. Obtain a sample from the well with a decontaminated stainless steel or teflon bailer suspended on a clean stainless steel teflon coated wire. If a bailer was used in purging, the same bailer may be used for sampling. The first bailer full of water should be discarded after measuring pH, temperature and specific conductivity.

10. Sample for TCL VOCs first, then pour the remaining samples into appropriate containers. The bottles for VOCs should contain the appropriate preservatives prior to sampling. When sampling for metals, one set of filtered metal samples may be taken at the discretion of the field geologist using a filter with a pore size of 0.45 microns.

11. Re-lock the well.

12. Decontaminate bailer, and teflon coated stainless steel wire.

13. Preserve appropriate samples and/or place on ice (see Table 3-1 for appropriate preservation guidelines).

14. Fill out field notebook, labels, and Chain-of-Custody forms.

3.2 SURFACE WATER SAMPLING (SOP2)

Surface water samples will be taken at approximately nine locations including three in the Genesee River and up to six from seeps, outfalls and ponded water from the main drainage swale east of the site. Three of the six samples from the drainage swale will be from ponded water in the swale, and up to three from the outfalls or seeps observed to discharge into the swale. Approximate sampling locations are shown on Figure 3-2.

The samples from the Genesee River will be analyzed for TCL metals. The samples from the swale will be tested for TCL metals, BNAs and VOCs. Sample data collected in the field will include pH, temperature and specific conductivity.

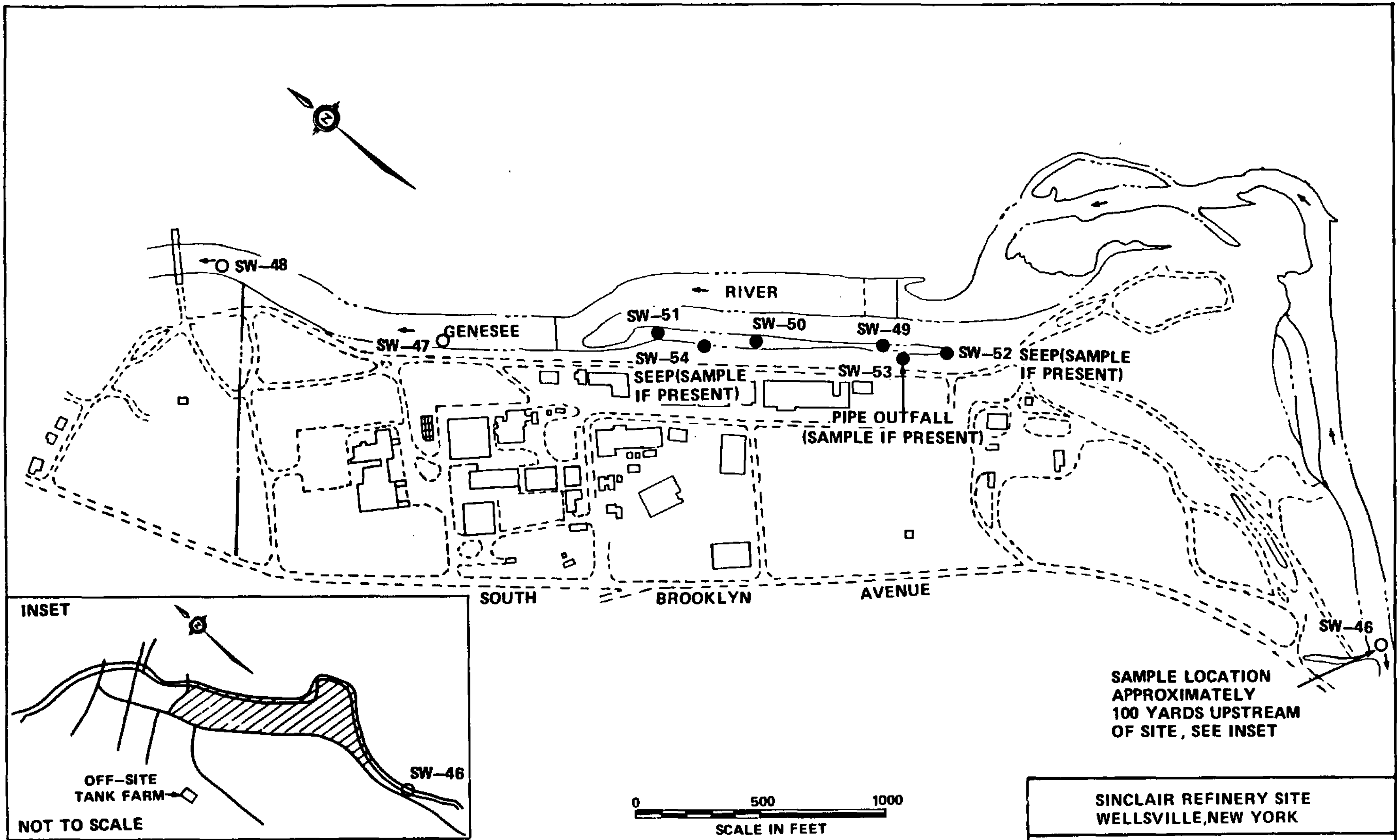
The following procedures will be used for surface water sampling:

1. Wear protective gear as specified in the Health and Safety Plan.

2. Submerge a properly decontaminated beaker or sample bottle and collect a sample. Care should be taken to minimize disturbance of sediments. When sampling standing water, it may be necessary to use a stainless steel scoop to deepen a sample collection area sufficiently to allow the sample bottle to be submerged. If this occurs, the water conditions should be allowed to stabilize at least 24 hours before the sample is taken. The beaker may be clamped to a pole if necessary to reach the river. If sample bottles are used to directly capture the sample, the sample preservative must be added after sample collection.

3. If a beaker is used, transfer sample to the appropriate containers exercising care in pouring the water out slowly to reduce VOC loss.

4. Repeat steps 2 and 3 until enough sample containers have been filled.



LEGEND

○ SURFACE WATER TO BE ANALYZED FOR METALS

● SURFACE WATER TO BE ANALYZED FOR METALS AND ,BNAs AND VOCs

ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3–2

SURFACE WATER SAMPLING LOCATIONS

EBASCO SERVICES INCORPORATED

5. Fill polyethylene or stainless steel bucket.

6. Take pH, specific conductivity, and temperature readings of water in the bucket.

7. Preserve samples if required and/or place samples on ice.

8. Record all data in field notebooks. Fill out labels, and chain-of-custody forms.

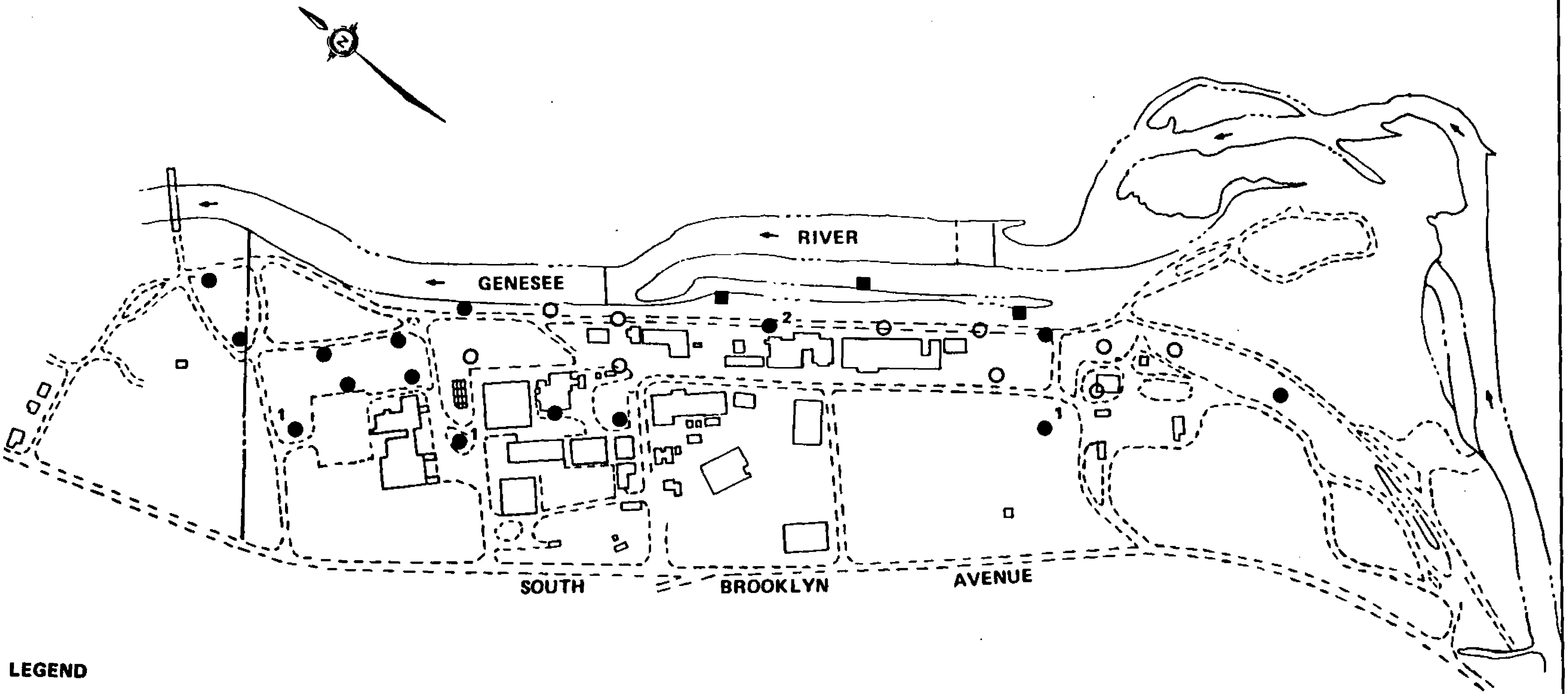
3.3 SOIL SAMPLING

Soil samples will be taken from shallow soil borings and test pits in areas containing potentially contaminated soils. Twenty-five soil borings will be made in areas suspected of having elevated levels of lead in the surficial soils, with three samples taken at each location. In addition, three soil borings with three samples at each location will be made in or adjacent to the main drainage swale. Lastly, approximately eight test pits or trenches will be excavated surrounding the existing and former oil separators from which approximately 32 soil samples will be taken.

3.3.1 Split Spoon Sampling Procedure for Soil Borings (SOP3)

The 28 proposed soil boring sampling locations are shown on Figure 3-3. Twenty-five of the borings (AB42 to AB66) are in areas of suspected lead contamination. The remaining three, AB67 to AB69, are near the main drainage swale east of the site where groundwater and underground pipes from the site may discharge. At each boring location soil samples for analytical testing will be taken at depths of 0-6 inches, 2-4 feet and 8-10 feet. The uppermost sample, at 0-6 inches may be obtained, at the discretion of the field geologist, using a stainless steel scoop (SOP5). The shallow soil and deeper soil samples may also be taken using hollow stem auger and split spoon (SOP3) or hand auger (SOP4).

The 25 soil borings to evaluate potential lead contamination will result in a total of 75 soil samples for analytical testing. Of these, 60 will be analyzed for lead only, and 15 for full TCL metals. The 15 samples for full



LEGEND

● SOIL BORING SURFACE SAMPLE ANALYZED FOR TCL METALS. REMAINING SAMPLES ANALYZED FOR LEAD ONLY

○ SOIL BORING,SAMPLES ANALYZED FOR LEAD ONLY

■ SOIL BORING SAMPLES ANALYZED FOR TCL BNAs, VOCs AND METALS. 0–6 INCHES SAMPLE WILL ALSO BE ANALYZED FOR TOC AND GRAIN SIZE

1. 8 TO 10 FOOT SAMPLE WILL ALSO BE ANALYZED FOR TOC AND GRAIN SIZE
2. 0–6 INCH,2–4 FEET,AND 8 TO 10 FEET SAMPLE WILL ALSO BE ANALYZED FOR TOC AND GRAIN SIZE

0 500 1000
SCALE IN FEET

ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3–3

SOIL BORING LOCATIONS

EBASCO SERVICES INCORPORATED

metals analysis will be surficial samples. Sample locations are shown on Figure 3-3. In addition, 6 soil samples will be taken and tested for TOC. The six sample locations and their depths are also shown on Figure 3-3.

The three borings near the drainage swale will provide a total of nine soil samples for analytical testing. Each of the nine will be analyzed for TCL BNAs, VOCs and metals. Surficial samples from these three borings will also be analyzed for TOC and grain size distribution.

The following procedure will be used for the soil boring split-spoon sampling:

1. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

2. Drill borehole to the desired sampling depth. Drilling will be by use of a hollow stem auger. Drive decontaminated split-spoon into the undisturbed soil which is to be sampled.

3. A decontaminated carbon steel two inch outside diameter split-spoon sampler will be driven with blows from a 140 lb hammer falling 30 inches until either approximately 2 feet of soil has been penetrated or 100 blows within a six (6) inch interval have been applied. This process is referred to as the Standard Penetration Test (ASTM D-1586).

4. Record the number of blows required for each 6 inches of penetration or fraction thereof. The first 6 inches is considered to be a seating drive. The sum of the number of blows required for the second and third 6 inches of penetration is termed the penetration resistance. If the sampler is driven less than 2 feet, the penetration resistance is that for the last 1 foot of penetration. (If less than 1 foot is penetrated, the logs shall state the number of blows and the fraction of 1 foot penetrated).

5. Bring the sampler to the surface and remove both ends and one half of the split-spoon so that the soil recovered rests in the remaining half of the barrel. Describe carefully the approximate recovery (length), composition, color, moisture, etc. of the recovered soil; then put into jars using stainless steel spatulas. Upon opening the split-spoon, the sample will be screened using HNu or OVA monitors.

6. VOC samples must be taken as discrete grab samples. These should be taken immediately from the split-spoon, and properly packaged.

7. Fill out field notebook, labels and Chain-of-Custody forms for analytical samples

8. Cool analytical samples on ice (4°C). Samples will be shipped to the laboratory within 24 hours.

9. A decontaminated split-spoon will be used for each sample collected for chemical analyses.

10. Upon completion of sampling, drill cuttings will be returned to the borehole or the borehole will be grouted with a cement-based grout mixed with potable water in a ratio of approximately one, 94 pound bag of Portland Type I cement to 3-5 pounds of flake or pellet bentonite and six gallons of water.

3.3.2 Hand Auger Sampling (SOP4)

Hand augers may be used to obtain soil samples at some of the smpling locations shown on Figure 3-3. The sampling depths and analytical testing parameters would be the same as discussed in Section 3.3.1 (SOP3) regardless of the sampling method used.

The following procedure will be used for hand auger sampling:

1. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

2. Drill borehole to the desired sampling depth. Drilling will be by use of a 2-3 inch ID hand auger. The drill head may be constructed of carbon or stainless steel. The auger head used for augering will be decontaminated prior to augering at each location.

3. A decontaminated auger will be used to obtain a soil sample at the desired sampling depth.

4. Bring the auger to the surface. Use a decontaminated stainless steel scoop to remove the sample. If a sample for VOC analysis is to be taken, it should be removed first and transferred directly to the VOC sample jar. The remainder of the sample will then be removed from the auger and placed in the sample jars.

5. If additional sample volume is required to fill sample containers, repeat steps 3 and 4 until sufficient volume is obtained.

6. Fill out field notebook, labels and Chain-of-Custody forms for analytical samples.

7. Cool analytical samples on ice (4°C). Samples will be shipped to the laboratory within 24 hours.

8. A decontaminated auger head will be used for each sample collection for chemical analyses.

9. Upon completion of sampling, auger cuttings will be returned to the borehole.

3.3.3 Surface Soil Sampling (SOP5)

The uppermost (0-6 inch) soil sample at each boring location may be taken using the following procedure, in place of using the split-spoon sampling method

(SOP3) or hand auger sampling (SOP4). The decision to use this procedure will be made at the discretion of the field geologist based on surface soil conditions and sample recovery using the split-spoon. This procedure shall also be used to obtain samples from test pits (SOP6). The parameters to be analyzed are described in Section 3.3.1.

The following procedure will be used for surface soil sampling:

1. Wear protective gear as specified in the Health and Safety Plan.

2. Use a decontaminated stainless steel scoop or shovel to scrape away surficial organic material (grass, leaves etc.). Obtain soil sample using the scoop, when the organics have been scraped away.

3. Transfer sample for VOC analyses (if any) into an appropriate container. VOC sample vials will be filled immediately, directly from the scoop.

4. Repeat steps 2 and 3 until enough soil is collected to fill required containers.

5. Fill out field notebook, labels and Chain-of-Custody forms

6. Keep analytical samples cool, on ice (4°C), as required. Samples will be shipped to the laboratory within 24 hours.

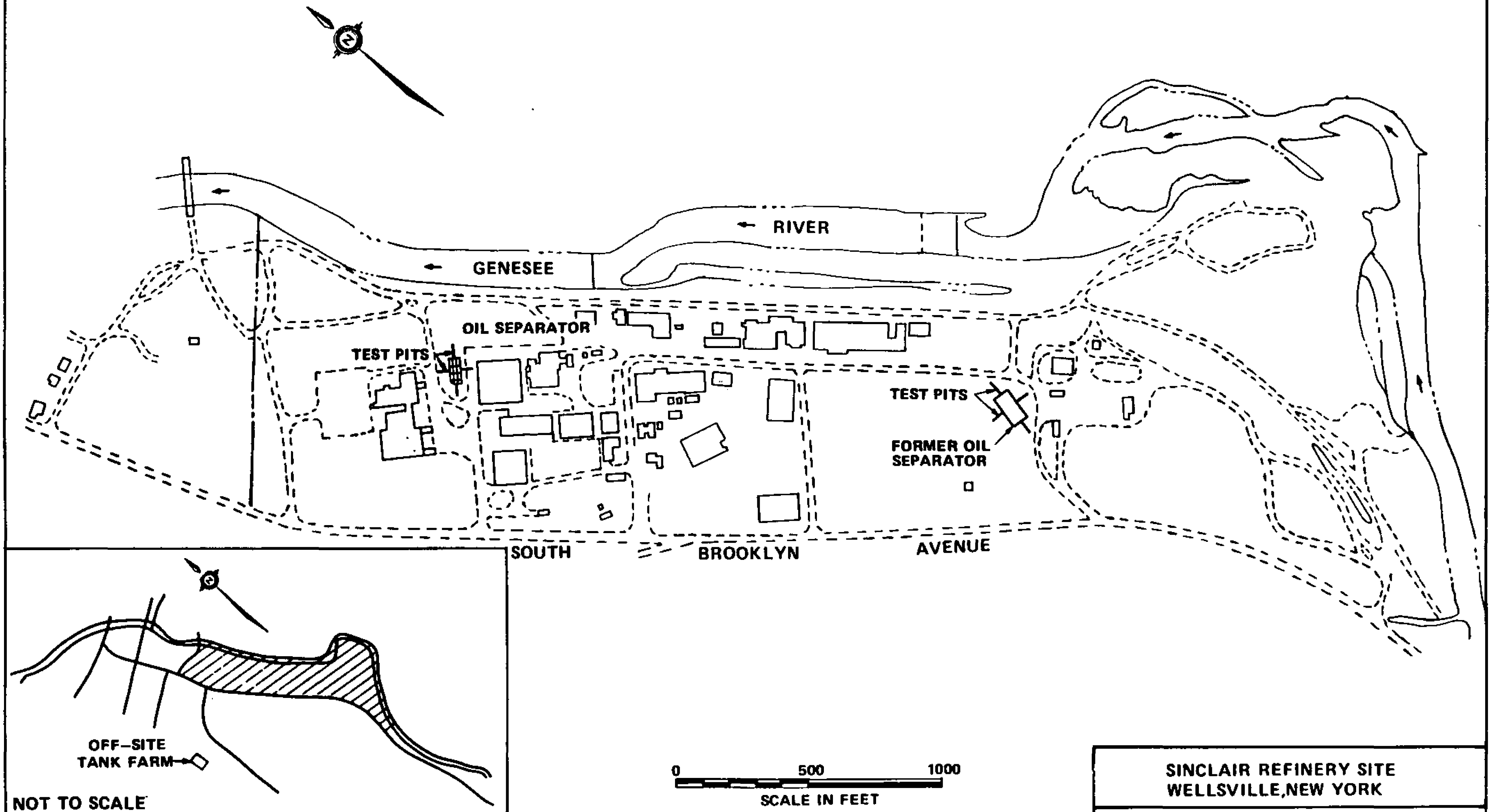
3.3.4 <u>Test Pit Sampling (SOP6)</u>

Test pits or trenches will be excavated in the areas of the existing and former oil separators. The test pits will be used to visually observe the extent of soil contamination surrounding the separators and to allow soil samples to be taken for analytical testing. The test pit locations are shown on Figure 3-4.

Sampling and test pit excavation near the existing oil separator will include at least four test pits, one near the centerline of each side of the separator. The excavations will start at the edge of the existing fence surrounding the separator. Each test pit will be dug to a depth of about five feet. If oil staining of the soil is clearly visible, the test pit will be extended outward to form a trench away from the separator, until the oil staining in the soil is negligible, as determined by the field geologist or for a distance of approximately 50 feet, whichever is less. If the trench extends to paved areas, or roadways, or crosses site utilities the trench may be stopped and restarted on the opposite side of the obstruction. During trenching, soil samples will be taken using the procedure described below. Depending on the size of the trench, two to six samples per trench will be obtained. The total number of soil samples to be taken near the existing separator is estimated to be 16 samples. Eight of the 16 samples will be analyzed for oil and grease and the remaining eight samples will be analyzed for oil and grease, and TCL BNAs, VOCs and metals.

Test pits will also be excavated in the vicinity of the former oil separator. This separator was apparently previously excavated and removed from the refinery area. It is not clear how much soil was removed from around the separator at that time. Test pits in this area will be excavated in a manner similar to the methods used for the existing separator. However, several small pits may need to be excavated to locate the boundary between the fill used to backfill the separator excavation and the surrounding soils before the test pitting and sampling begins. Once the approximate boundary is identified, test pits will again be excavated outward, away from the former separator for a distance of approximately 50 feet. A total of 16 samples, are anticipated from the four trenches to be excavated. These samples will be tested for the same parameters as those taken adjacent to the existing separator.

The following procedure will be used for test pit excavation and sampling:



ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3–4

TEST PIT LOCATIONS

EBASCO SERVICES INCORPORATED

1. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

2. Using a backhoe, remove the upper two feet of soil from an area approximately five feet by five feet square, and place to one side of the excavation on plastic sheeting.

3. Using a backhoe continue the excavation downward, placing these soils on plastic sheeting on the opposite side of the excavation. The hole should be excavated to a depth of approximately five to six feet.

4. If both a visibly oil stained and unstained layer are present, obtain a soil sample from each layer. A sample, from near the surface may be taken using SOP5. A sample from near the bottom of the excavation should be taken using the bucket of the backhoe to obtain a sample from the base of the excavation and then using SOP5 to obtain a sample from the bucket. Personnel should not enter an excavation if it is over 5 feet deep. If no staining is evident only a near surface sample needs to be taken.

5. If staining is present, the pit should be extended to a depth of about 10 feet and notes on the depth of contamination and layers present should be taken. If no staining is present, notes should be taken, then proceed to step 7.

6. If staining is present, the test pit should be extended out, away from the separator, to a distance of about 50 feet. Samples will be taken from the stained soil at a distance of about 25 and 50 feet from the start of the excavation. The sample from the middle of the trench will be tested for oil and grease, and the sample from the end of the trench for oil and grease, and TCL BNAs, VOCs and metals. If visibly contaminated soils stop, at a distance of less than 50 feet, the last sample should be from "clean" soil at the end of the excavation. The samples will be taken as described in step 4, and SOP5, above. More samples may be taken at the discretion of the field geologist.

7. A hand sketched map of the trench showing the stained soils and soil layers should be included in the field notebook.

8. After completion of the trench, or at the end of a day, whichever is more frequent, the test trenches will be backfilled. If a trench has not been completed and is backfilled at the end of a day, it may be restarted the next day from the point at which excavation ceased. The soils from the deeper portion of the trench will be returned to the trench first. The segregated upper two feet of soil will be added to the trench last, to form the cap.

9. Revegetation or patching of roadways will be performed as required. If excavation occurs in late fall, revegetation and patching may not begin until spring.

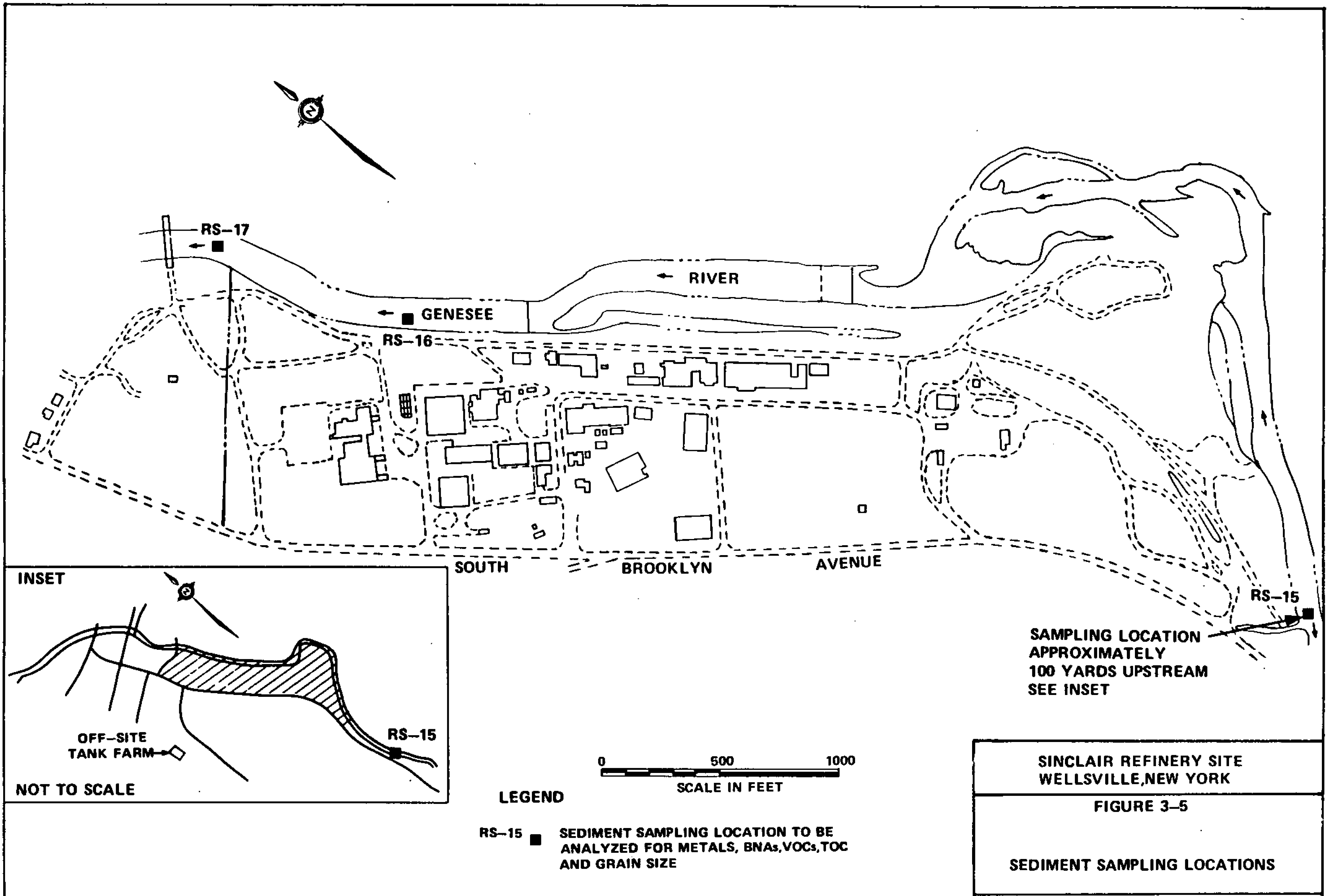
3.4 SEDIMENT SAMPLING (SOP7)

Sediment samples will be taken at three locations in the Genesee River. The approximate locations are shown on Figure 3-5. Each sediment sample will be analyzed for TCL BNAs, VOCs and metals.

The procedure for taking sediment samples is:

1. Wear protective equipment as specified in the Health and Safety Plan.

2. Obtain the sample using a decontaminated stainless steel scoop in an area where clay and silt sized particles are expected to accumulate. Pebbles, rocks or large pieces of trash or organic material should be removed from the scoop. If the bottom of the river is rocky, a stainless steel shovel may be used to obtain an adequate sample volume.



ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3–5

SEDIMENT SAMPLING LOCATIONS

EBASCO SERVICES INCORPORATED

3. Empty contents of scoop into a decontaminated stainless steel bucket.

4. Repeat steps 2 and 3 until enough sediment is collected to fill required containers.

5. Homogenize sediment in bucket using stainless steel trowel.

6. Transfer sample into appropriate sampling containers. Samples for VOC analysis should be collected first, directly from the scoop, prior to homogenization.

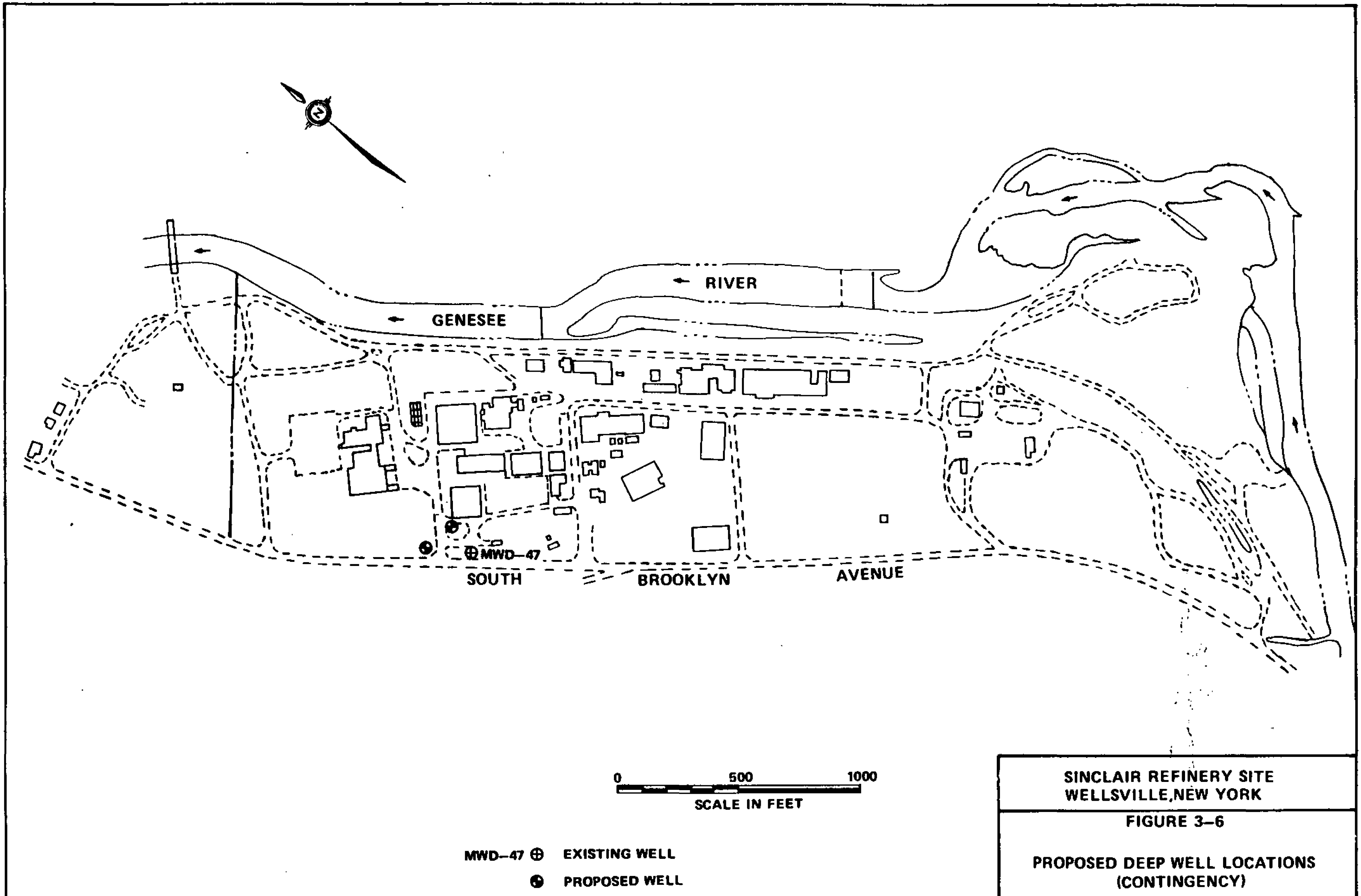
7. Fill out field notebook, labels, and Chain-of-Custody forms.

8. Keep samples cool on ice (4°C). Samples will be shipped to the laboratory within 24 hours.

3.5 WELL INSTALLATION (SOP8)

If water samples taken from well MWD-47 indicate significant levels of VOC contamination, two additional deep wells will be installed and sampled to evaluate the extent of contamination in the deep aquifer. Well MWD-47 and the proposed monitoring well locations of the two deep wells are shown in Figure 3-6. If installed, the wells will be developed and sampled as described in Sections 3.1.1 and 3.1.2.

Four soil samples will be collected for analytical testing during the installation of the two monitoring wells, two samples from each well. Samples for geologic classification will be taken at five foot intervals. The samples will be taken using the procedure in SOP3. The samples for analytical testing will be taken from a selected interval in the shallow aquifer, below the water table (one sample) and the interval to be screened in the deep aquifer (one sample). Both samples will be analyzed for TCL VOCs.



ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3–6

PROPOSED DEEP WELL LOCATIONS
(CONTINGENCY)

EBASCO SERVICES INCORPORATED

Monitoring wells will be 2 inches outer diameter and will be constructed of type 304 stainless steel screen and riser. Monitoring well borings will be advanced to a maximum estimated depth of 120 feet in the deep aquifer below the clay layer.

A screen, 5 to 15 feet in length, as determined by the field geologist, based on the thickness of the lower aquifer, will be set to intercept the deep aquifer. Eight (8) inch O.D. hollow stem augers will be used for drilling, unless problems such as running sands are encountered.

A gravel pack will be installed around and approximately two feet above the well screen. A two foot bentonite seal will be placed on top of the gravel pack. The remainder of the borehole annulus will be grouted to the surface with a bentonite slurry. A locking steel cap will be installed. Figure 3-7 shows a typical well installation.

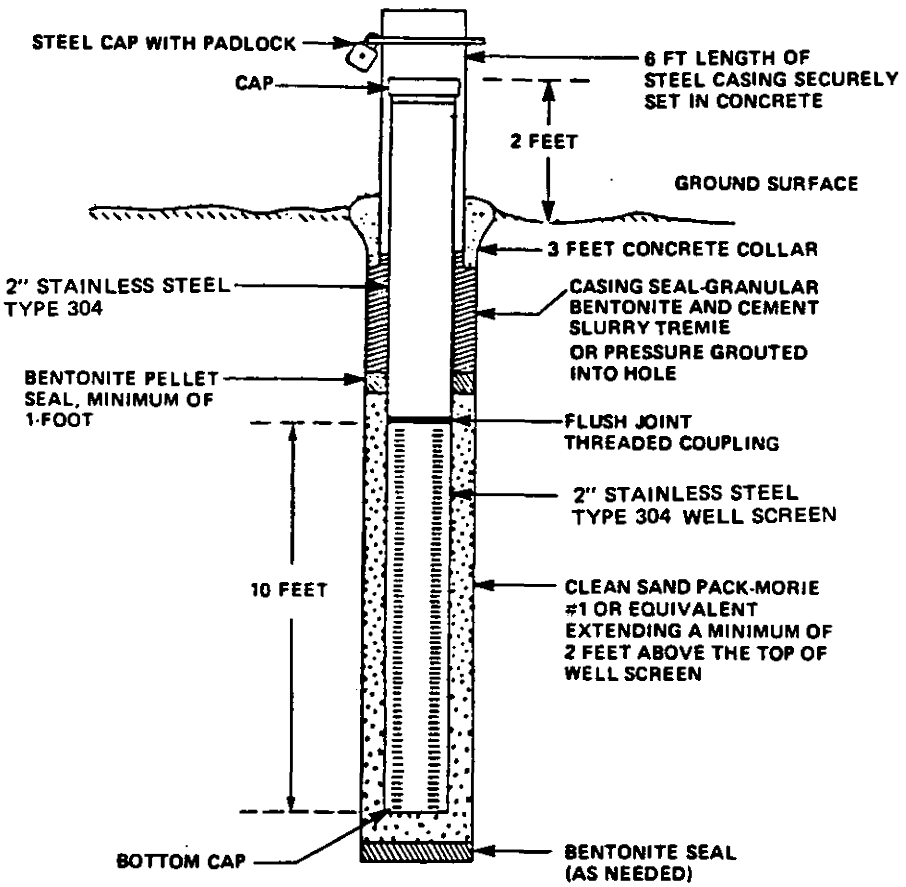
3.6 WELL DECOMMISSIONING (SOP9)

Twelve wells were completed in the clay confining layer at the Sinclair Refinery Site during the Phase II RI investigation. A review of the boring logs and well completion diagrams from those wells indicated that in some cases the sand pack in the wells may actually intercept the upper aquifer. Figure 3-8, the boring log from well MWC-37 shows an example of this. In the figure, the top of the sand pack is in a zone where no samples were obtained, and hence the depth of the bottom of the aquifer cannot be accurately determined. Since the data obtained from the clay wells may not reflect conditions in the aquitard, the clay wells will be removed, and the borings grouted. This will prevent the wells from acting as potential pathways for contaminant migration from the surface to the clay and prevent the wells from being resampled, which may result in data being misinterpreted as representing conditions within the clay. The clay well locations are shown on Figure 3-9.

The following decommissioning procedure will be followed:

1. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

TYPICAL GROUNDWATER MONITORING WELL



NO SCALE

SINCLAIR REFINERY SITE WELLSVILLE,NEW YORK
FIGURE 3–7 TYPICAL GROUNDWATER MONITORING WELL
EBASCO SERVICES INCORPORATED

BORING NO. : MWC-37

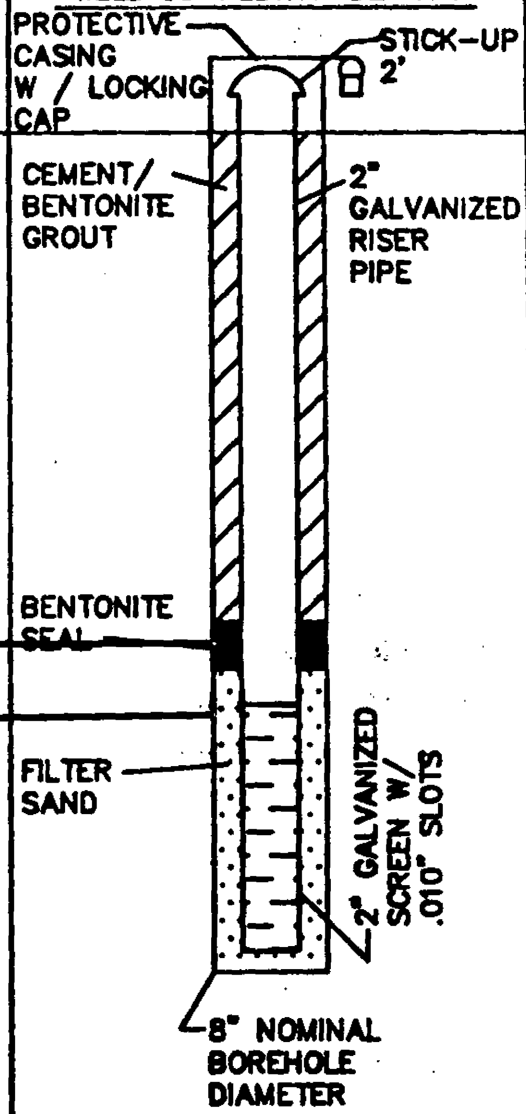
TYPE : 4.25" HOLLOW-STEM AUGER
2.25" SPLIT-SPOON SAMPLER

LOCATION : SINCLAIR REFINERY
WELLSVILLE, NEW YORK

GROUND SURFACE ELEVATION (ft. MSL): 1495.1

DEPTH, FT.	DESCRIPTION OF MATERIALS	BLOWS FOR 2' PENETRATION	OVM / OVA READING (PPM)
0–2	GRAVELY SAND WITH SOME FINES (GP) BLACK	–	0
5	SANDY CLAY (SC) GRAY – SAND IS FINE GRAINED – PETROCHEMICAL ODORS	19	0
10	SANDY GRAVEL (GW) BROWN – PETROCHEMICAL ODOR 8–23 FT. – MEDIUM SAND 8–23 FT. – 80% GRAVEL	92	20
15	POSSIBLE VARIATION IN DEPTH TO TOP OF CLAY. NOTE THAT CLAY IS BELOW TOP OF THE SAND PACK	113	0
20		159	1
25	SILTY CLAY (CL) GRAY – HIGH PLASTICITY – LAMINATED SILT LAYERS	31	0
30		20	0
35		15	0

WELL COMPLETION DETAILS



COMPLETION DEPTH : 35 FT.
DATE : 10 / 8 / 86

SMC MARTIN INC.

FIGURE 3–8
BORING LOG WELL MWC-37

2. Using the winches and pulleys on a drilling rig, remove the protective steel casing from the ground.

3. Using the winches and pulleys pull the inner casing. If the casing cannot be pulled, use a hollow stem auger to drill over the well, through the cement-bentonite grout seal, until the well can be removed. If the well casing breaks, or cannot be removed, cut the well casing off, 1 foot below ground surface and proceed to step 5.

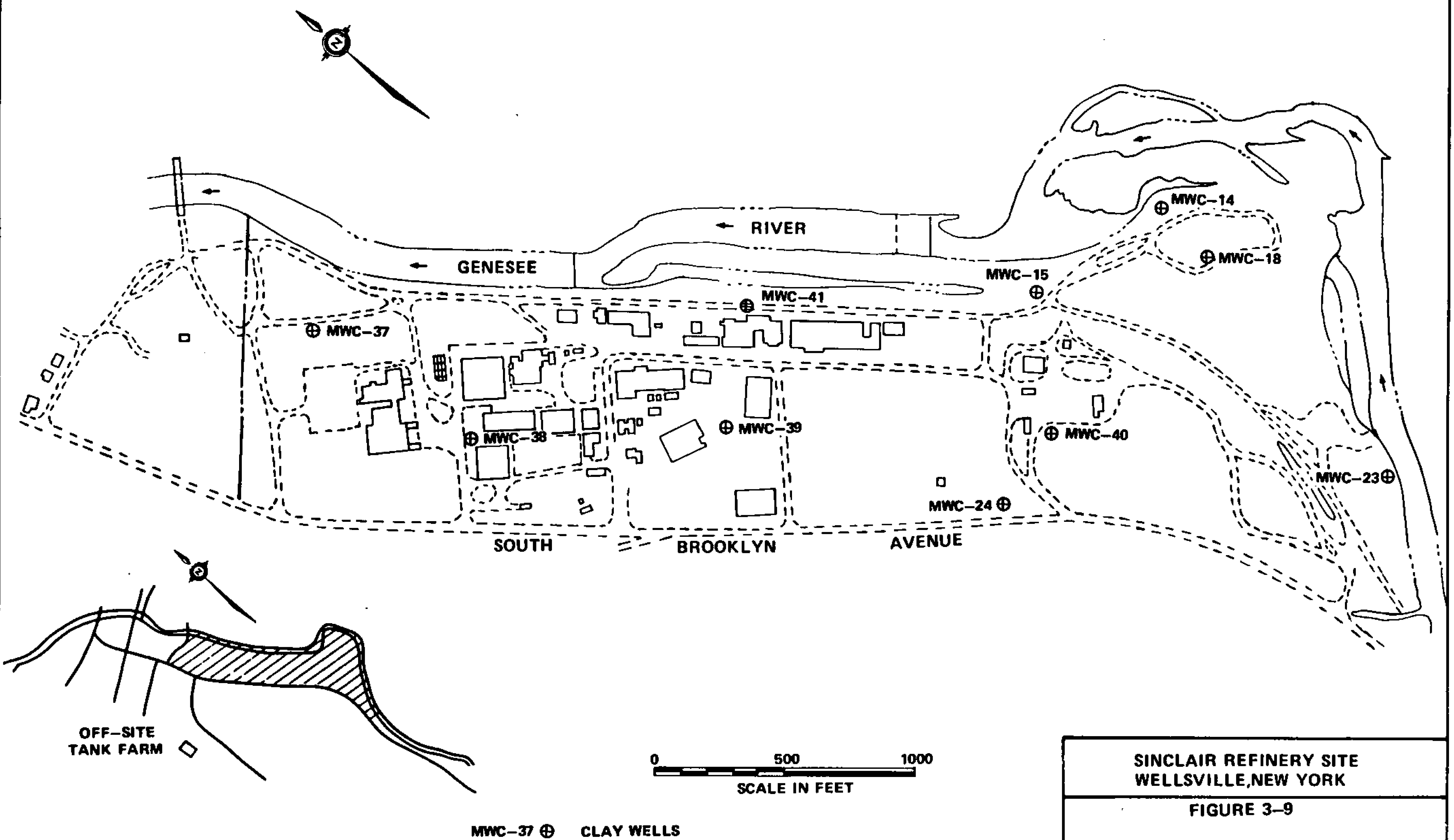
4. Use a 8 inch OD hollow stem auger to drill out the remaining seal and sand pack. The auger should continue to a depth of two feet below the base of the original boring as shown on the boring logs.

5. Use a cement-bentonite-potable water grout mix (ratio of one, 94 pound bag of Portland Type I cement: 3-5 pounds of bentonite: 6 gallons of water) to backfill the boring (or well) by the tremie method to within two feet of ground surface.

6. Fill the top two feet of the boring with clean soil or sand, with topsoil on the top 6 inches to promote revegetation.

7. Place all soils and cuttings removed from the boring in 55 gallon drums.

8. Steam clean well casings (both inner and outer) and dispose of as solid (non-hazardous) waste.



NOTE: THE LOCATION OF MWCB-42 AND 62 HAVE NOT BEEN IDENTIFIED. IF LOCATED, THEY WILL ALSO BE DECOMMISSIONED

ADAPTED FROM SMC MARTIN PHASE I SITE MAP

SINCLAIR REFINERY SITE
WELLSVILLE,NEW YORK

FIGURE 3-9

CLAY WELLS TO BE DECOMMISSIONED

EBASCO SERVICES INCORPORATED

3.7 FIELD BLANKS, DEIONIZED WATER BLANKS, TRIP BLANKS, AND DUPLICATE SAMPLES

Blanks are prepared and handled according to the following procedures.

3.7.1 Field Blank Procedure (SOP10)

A field blank is deionized, analyte free water that has been used to rinse the field sampling equipment after decontamination. Preservation of blanks will be the same as for environmental samples. One field blank per equipment type per decontamination event, not to exceed one per day, will be prepared. In this manner, any possible cross-contamination occurring among samples due to the repeated use of the same sampling equipment can be assessed. The procedure for taking field blanks is:

1. Decontaminate all sampling equipment following procedures specified in Section 3.8 of this plan.

2. Pour deionized water through the sampler and collect in the sample bottles, samples should be preserved using the same procedures as for environmental samples.

3. VOC field blanks should be collected before other TCL analyses. Field blanks should be analyzed for the same parameters as the samples taken with the sampling equipment.

4. Seal jars.

5. Fill out field notebook, labels and chain-of-custody forms.

6. Keep blanks cool on ice at about 4°C. The samples will be shipped to the laboratory within 24 hours.

3.7.2 Deionized Water Blank Procedure (SOP11)

A deionized water (DI) blank will be collected and analyzed initially or anytime a new source of deionized water is used. The analysis is to demonstrate that the water is deionized. The procedure is:

1. Fill sample containers with deionized water which was obtained from the same source as that used in the field blanks.

2. Preserve samples and seal jar. The samples will be analyzed for TCL metals, BNAs and VOCs.

3. Fill out field notebook, labels and chain-of-custody forms.

4. Keep the blank(s) cool on ice at about 4°C. The samples will be shipped to the laboratory within 24 hours.

3.7.3 Trip Blank Procedure (SOP12)

A trip blank is deionized analyte free water that is sealed in a sample bottle prior to initiation of each days field work on days when VOC samples will be taken. Glass vials (40 ml) will be used for VOC blanks. These sealed vials are subsequently placed within a cooler and accompany field personnel during the sampling activities. For each organic sample shipment, a trip blank will be sent for analysis. In this manner, any possible cross-contamination occurring among samples during shipment can be assessed. Trip blanks will be preserved at the time they are prepared.

3.7.4 Duplicate Samples (SOP13)

Duplicate/split samples will be analyzed to check laboratory reproducibility of analytical data. At least five percent (i.e., one out of every 20 samples) of the total samples will be duplicated to evaluate the precision of the methods used. The sampler must triple the normal sample volume for VOC and BNA analyses in at least one sample in twenty for the laboratory to perform matrix spike, and matrix spike duplicate analyses. At least one duplicate per matrix sampled will be taken. Duplicates of soil property tests (i.e. grain size) will not be taken.

3.8 DECONTAMINATION (SOP14)

As presented below, all equipment involved in field sampling activities will be decontaminated prior to sampling. Equipment leaving the site will also be decontaminated as called for in the HASP. All down-hole drilling equipment and buckets on backhoes will be steam-cleaned prior to use and between use at different boring (or test pit) locations.

Decontamination of the sampling equipment will be conducted according to this procedure:

1. Tap water/phosphate-free detergent scrub;

2. Tap water rinse;

3. When sampling for heavy metals 10% nitric acid rinse or 1% nitric acid for carbon steel split spoons;

4. Tap water rinse;

5. Acetone (pesticide grade) rinse or methanol followed by acetone rinse (only for equipment involved in sampling for organics);

6. DI water rinse;

7. Air dry;

8. Wrap in aluminum foil, shiny side out, until equipment is ready to be used for sampling.

Note: While sampling, cleaned equipment may rest on but never be wrapped in polyethylene sheeting.

Note: Do not drum acid rinsate with solvent rinsate.

Extraneous contamination and cross-contamination will be controlled by the decontamination procedure, wrapping the sampling equipment with aluminum foil when not in use, and changing and disposing of the sampler's gloves between samples.

Personnel directly involved in equipment decontamination will wear protective clothing, as specified in the HASP.

The pH, conductivity, and temperature measurements of water samples will be performed in the field. To avoid cross-contamination, the probes will be cleaned using deionized distilled water. Hoses and pumps used in well development, but not sampling, will be decontaminated with a potable water rinse followed by a distilled water rinse.

3.9 CONTROL OF CONTAMINATED MATERIALS

All contaminated materials generated during the field investigation including decontamination solutions, disposable equipment and clothing, and soil cuttings will be collected, packaged, stored and/or disposed of in 55 gallon drums. These drums will be stored on site in the decontamination area previously used during the Phase I and II investigations. They will be removed by an approved Subcontractor for off-site disposal, disposed of as part of any site remediation, or if determined to be uncontaminated disposed of as clean soil. Tyvek suits, plastic or aluminum foil used at sampling locations, and other potentially contaminated material such as paper towels, will be stored in 55 gallon drums for disposal in the on-site landfill during closure of the landfill.

4.0 QA/QC VERIFICATION OF FIELD SAMPLING AND PROCEDURES FOR FIELD CHANGES AND CORRECTIVE ACTION

4.1 QA/QC FIELD AUDIT

Quality Assurance and Quality Control (QA/QC) during the sampling program will be performed by an Ebasco QA/QC Officer. The QA/QC Officer will accompany sampling personnel into the field for one or two days to verify that sampling is being correctly implemented according to the FSAP.

4.2 FIELD CHANGES AND CORRECTIVE ACTION

The Site Manager, or his/her designee, is responsible for all site activities. The Site Manager may be required to modify site programs to accommodate site-specific needs or unforeseeable events. When it becomes necessary to modify a program the Field Operations Leader will notify the Site Manager of the anticipated change and implement these changes. The Project Officer will then be notified. If these changes are subsequently determined to be unacceptable the action taken during this period of deviation from the program will be evaluated for their significance.

The changes in the program are documented on a Field Change Request (FCR) form which is signed by both the initiator and Site Manager. A typical FCR form is shown in Figure 4-1. The FCRs for each document shall be numbered sequentially starting with the Number "1".

The Site Manager is responsible for the control, tracking and implementation of the identified changes. Completed FCRs are distributed to affected parties which will include, at a minimum, ARCO Project Coordinator, Site Manager, Field Operations Leader, Quality Assurance Manager and the EPA Project Officer.

FIGURE 4-1

EBASCO SERVICES INCORPORATED
FIELD CHANGE REQUEST

Project Name	Ebasco	Work Charge Number	Field Change No.

To____________________________Location___________________________Date__________

Description:

Recommended Disposition:

Field Operations Leader (Signature) Date

Disposition:

Site Manager Date

Distribution: EPA Project Officer
ARCO Project Coordinator
Quality Assurance Manager
Site Manager
Field Operations Leader

Others as Required__________

8310b

APPENDIX A

BROSSMAN SHORT FORM

Work/QA Plan Short Form

TITLE PAGE

SINCLAIR REFINERY SITE
(Project Name)

U.S. ENVIRONMENTAL PROTECTION AGENCY
(Responsible Agency)

(Project Officer's Signature)____________________

(Project Officer's Name) PAUL OLIVO

(Project Quality Assurance
Officer's Signature) ____________________

(Project Quality Assurance
Officer's Name) LISA GATTON-VIDULICH

8360b

1. Project Name: Sinclair Refinery Site

2. Project Requested By: ARCO

3. Date of Request: July 28, 1988

4. Date of Project Initiation: July 28, 1988

5. Project Officer: Paul Olivo

6. Quality Assurance Officer: Lisa Gatton-Vidulich

7. Project Description

A. Objective and Scope Statement: The purpose of this RI and landfill investigation is to collect site-specific data on soil, sediment, surface water and groundwater to define the nature and extent of contamination in areas where the Phase I and II programs indicated potentially significant levels and to collect data for landfill design.

B. Data Usage: The data will be used to better delineate the contamination in zones of potentially significant levels, confirm the results from the earlier efforts, and to design the landfill closure measures.

C. Monitoring Network Design and Rationale: Soils, sediments, groundwater (as monitoring wells and seepage) and surface water will be sampled in areas identified as having potentially significant levels of contamination following the Phase I and II sampling efforts. Landfil soils will be sampled to evaluate their physical properties and the physical extent of the SLA.

D. Monitoring Parameters and Their Frequency of Collection: Soils, sediments, groundwater and surface water will be sampled in single events. TCL metals, volatile organic compounds (VOCs) and base/neutral/acid extractable compounds (BNAs) will be analyzed. Lower detection units (1 or 2 ppb) will be required on the refinery area VOC analyses. Landfill samples will be analyzed for limited compounds in each class. (See Appendix B, FSAP) Landfill soils will be sampled to evaluate their physical properties and the physical extent of the SLA.

E. Parameter Table

Parameter	Number of Samples	Sample Matrix	Analytical Method Reference	Sample Preservation	Holding Time
TCL Metals[7]	25	aqueous	EPA-IFB-SOW (7/85)	Cool to 4°C HNO_3 to pH 2	(1)
TCL Metals[7]	57	soil/sed	EPA-IFB-SOW (7/85)	Cool to 4°C	(1)
TCL VOCs[7]	44	aqueous	EPA-IFB-SOW (8/87)	Cool to 4°C HCL to pH 2	(2)
TCL VOCs[7]	64	soil/sed	EPA-IFB-SOW (8/87)	Cool to 4°C	(2)

Parameter	Number of Samples	Sample Matrix	Analytical Method Reference	Sample Preservation	Holding Time
TCL BNAs[7]	24	aqueous	EPA-IFB-SOW (8/87)	Cool to 4°C	(3)
TCL BNAs[7]	64	soil/sed	EPA-IFB-SOW (8/87)	Cool to 4°C	(3)
Pesticides[7]	14	soil	EPA-1FB-SOW (8/87)	Cool to 4°C	(3)
Pb only	60	soil/sed	EPA-IFB-SOW (7/87)	Cool to 4°C	(1)
Oil and Grease	65	soil/sed	EPA Method 503	Cool to 4°C	(4)
TOC	12	soil/sed	EPA Reg. II Method	Cool to 4°C	(5)
Grain Size	27	soil/sed	ASTM-D422	None Required	(6)
Liquid Limit	26	soil	ASTM-D423	None	(6)
Plastic Limit	26	soil	ASTM-D424	None	(6)
Moisture Content	18	soil	ASTM-D2216	None	(6)
Soil Classification	26	soil	ASTM-2487	None	(6)
Consolidation	5	soil	ASTM-2435	None	(6)
U.U. Triaxial	11	soil	ASTM-D2850	None	(6)
C. U. Triaxial	2	soil	N.A.	None	(6)
Modified Proctor	3	soil	ASTM-D2216	None	(6)
Unconfined Compression	3	soil	ASTM-D2166	None	(6)
Density	10	soil	EM-1110-2-1906	None	(6)

(1) Hg - 26 days, all others - 6 months
(2) 10 days from verification time of sample receipt (VTSR)
(3) 10 days to extract, 4 days to analyze
(4) 7 days from VTSR
(5) 17 days from VTSR
(6) 6 months
(7) handfill samples analyzed for limited parameters only

8. Project Fiscal Information (Optional): Not Provided

A. Survey Costs

Salaries	________
Supplies	________
Equipment	________
Mileage	________

B. Laboratory Services	________
C. Administrative Overhead	________
D. Consultant Services	________
Total Project Cost	________

9. Schedule of Tasks and Products

Activity/Date

REFER TO SECTION 7 OF WORK PLAN AND/OR THE SITE MANAGEMENT PLAN (SMP)

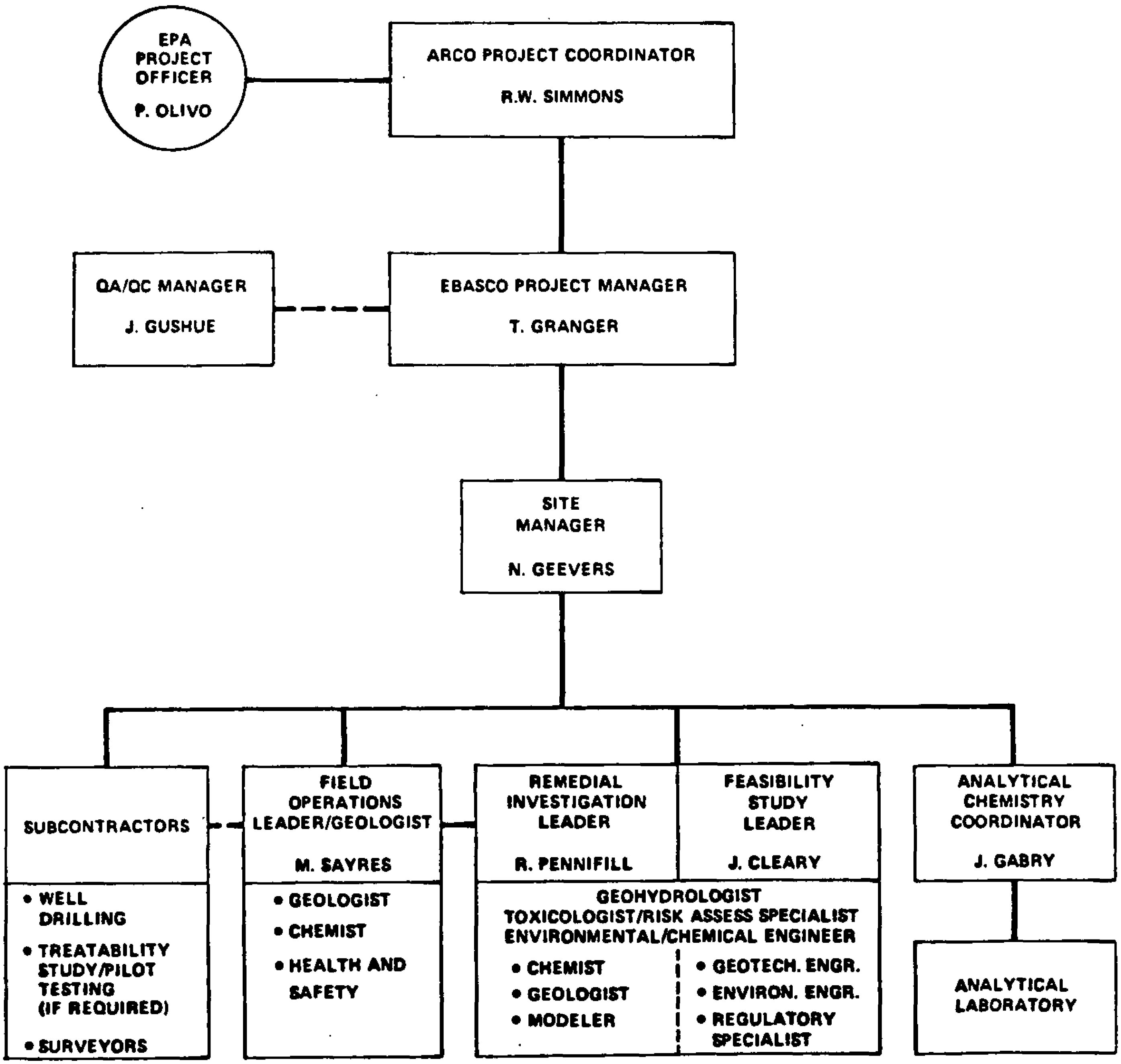
10. Project Organization and Responsibility

The following is a list of key project personnel and their corresponding responsibilities:

M. Sayres	- sampling operations
J. Gushue	- sampling QC
CompuChem, ETC, ENSECO, Versar and/or Aquatec (Chemical Tests)	- laboratory analysis
Goldberg/Zoino, Earth Technology, and/or Woodward Clyde (Physical Tests)	
J. Gabry	- laboratory QC
J. Gabry	- data processing activities
J. Gabry	- data processing QC
E. Garvey	- data quality review
J. Gushue	- performance auditing
J. Gushue	- systems auditing
J. Gushue	- overall QA
T. Granger	- overall project coordination

(Note: an organizational chart should be supplied with this plan) ENCLOSED (See next page.)

PROJECT ORGANIZATION



11. Data Quality Requirements and Assessments

Parameter	Sample Matrix	Detection Limit	Quantitation Limit	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
BNA	aq/soil	See CLP-IFB-SOW (vers. 8/87)					
VOCs	aq/soil	See CLP-IFB-SOW (vers. 8/87) (a)					
Pesticides	soil	See CLP-IFB-SOW (vers. 8/87)					
Metals	aq/soil	See CLP-IFB-SOW (vers. 7/85)					
Oil and Grease	soil	5-200 mg/kg*	5-200 mg/kg*	±10%	±10%	±10%	±10%
TOC	soil	100 mg/kg	100 mg/kg	±10%	±10%	±10%	±10%
Grain Size Analysis	soil	% levels	% levels	±25%	±25%	±25%	±25%
Plastic Limit	soil	% levels	% levels	±25%	±25%	±25%	±25%
Liquid Limit	soil	% levels	% levels	±25%	±25%	±25%	±25%
Moisture Content	soil	% levels	% levels	±25%	±25%	±25%	±25%
Modified Proctor	soil	% levels	% levels	±25%	±25%	±25%	±25%
Consolidation Test	soil	% levels	% levels	±25%	±25%	±25%	±25%
Triaxial Tests	soil	% levels	% levels	±25%	±25%	±25%	±25%
Unconfined Compression	soil	% levels	% levels	±25%	±25%	±25%	±25%

(a) Lower detection units (1 and 2 ppb) will be required - see Attachment A
* varies by method

Data Representativeness: Sampling program is designed to better define the contamination in areas of potentially significant levels. Analytical program is designed to complement existing data with emphasis on analyses (e.g., lead only) in areas indicated to be "hot spots" in the previous studies.

Data Comparability: Sampling results will complement the existing data base.

Data Completeness: Sampling program is designed to provide supplemental information to the existing data base. However, the results will be used to better define contamination in zones potentially requiring remediation and to assist in final design.

12. Sampling Procedures: (a) split-spoon or Shelby tube samples for soils, (b) stainless steel scoops for sediments, (c) teflon, glass or metal bailers for monitoring wells and other water samples. (See FSAP)

13. Sample Custody Procedures: Standard Ebasco Chain-of-Custody forms. (See FSAP)

14. Calibration Procedures and Preventive Maintenance: All field instruments will be calibrated on a daily basis or more frequently depending upon needs.

15. Documentation, Data Reduction, and Reporting

    A. Documentation: Ebasco will request complete QC documentation from the laboratory to expedite proper data validation.

    B. Data Reduction and Reporting: Data will be tabulated by analysis and matrix type, and will clearly identify the types of samples (e.g., shallow versus deep well water samples)

16. Data Validation: Data will be validated based upon the current EPA Region II data validation procedures. (EPA SOP NO's HW-1 and HW-2, and Ebasco's data validation guideline LS-4). Data shall be validated within three weeks of completion of the laboratory analyses of each round of samples collected during the RI, as specified in the Consent Order.

17. Performance and Systems Audits: Field activities will be audited by Ebasco QA personnel over a one or two day period. Laboratory procedures and QC will be evaluated during a single visit, unless these have already been evaluated for the particular laboratory during the past year.

18. Corrective Action: All activities which are identified during the QC audit will be corrected following proper documentation. Changes to the FSAP will be submitted to EPA using Ebasco "Field Change Request Forms".

19. Reports: An RI report will be generated following the sampling efforts and validation of chemical results. The soil properties data will be reported in final design.

ATTACHMENT A

Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)*

Volatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[a] ug/Kg
1. Chloromethane	74-87-3	2	2
2. Bromomethane	74-83-9	2	2
3. Vinyl Chloride	75-01-4	2	2
4. Chloroethane	75-00-3	2	2
5. Methylene Chloride	75-09-2	1	1
6. Acetone	67-64-1	2	2
7. Carbon Disulfide	75-15-0	1	1
8. 1,1-Dichloroethene	75-35-4	1	1
9. 1,1-Dichloroethane	75-34-3	1	1
10. 1,2-Dichloroethene (total)	540-59-0	1	1
11. Chloroform	67-66-3	1	1
12. 1,2-Dichloroethane	107-06-2	1	1
13. 2-Butanone	78-93-3	2	2
14. 1,1,1-Trichloroethane	71-55-6	1	1
15. Carbon Tetrachloride	56-23-5	1	1
16. Vinyl Acetate	108-05-4	2	2
17. Bromodichloromethane	75-27-4	1	1
18. 1,2-Dichloropropane	78-87-5	1	1
19. cis-1,3-Dichloropropene	10061-01-5	1	1
20. Trichloroethene	79-01-6	1	1
21. Dibromochloromethane	124-48-1	1	1
22. 1,1,2-Trichloroethane	79-00-5	1	1
23. Benzene	71-43-2	1	1
24. trans-1,3-Dichloropropene	10061-02-6	1	1
25. Bromoform	75-25-2	1	1
26. 4-Methyl-2-pentanone	108-10-1	2	2
27. 2-Hexanone	591-78-6	2	2
28. Tetrachloroethene	127-18-4	1	1
29. Toluene	108-88-3	1	1
30. 1,1,2,2-Tetrachloroethane	79-34-5	1	1

ATTACHMENT A (Cont'd)

Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)*

Volatiles	CAS Number	Quantitation Limits** Water ug/L	Low Soil/Sediment[a] ug/Kg
31. Chlorobenzene	108-90-7	1	1
32. Ethyl Benzene	100-41-4	1	1
33. Styrene	100-42-5	1	1
34. Xylenes (Total)	1330-20-7	1	1

a Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Volatile TCL Compounds are 125 times the individual Low Soil/Sediment CRQL.

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

** Quantitation limits listed for soil/sediment are based on net weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

APPENDIX B

LANDFILL SAMPLING

APPENDIX B

LANDFILL SAMPLING PROCEDURES

1.0 INTRODUCTION

This document presents the changes and additions to the refinery area Field Sampling and Analysis Plan (FSAP) needed to perform design related investigations in the landfill area. The health and safety related measures for landfill investigations are described in the site specific Health and Safety Plan (HASP).

This appendix defines the procedures to be followed during all field investigation activities in the landfill area. Specifically, it addresses:

- o Standard Operating Procedures (SOPs) for Field Investigations including Sampling, Monitoring, and Field Instrument Calibration;
- o Number, Location and Types of Samples and,
- o Parameters to be Analyzed and Test Methods.

Some other procedures, relevant to sampling in the landfill area, are the same as those discussed in the refinery area FSAP. This appendix to the FSAP refers of those procedures in the FSAP which are applicable to the landfill area. Procedures applicable to both field programs include:

- o Chain-of-Custody Procedures;
- o Decontamination Procedures;
- o QA/QC of Field Sampling;
- o Procedures for Field Changes and Corrective Actions, and
- o Responsibilities of Site Personnel.

The landfill area is composed of a Central Elevated Landfill Area (CELA) approximately 9.2 acres in size and a Southern Landfill Area (SLA) approximately 2.3 acres in size. The main purpose of this investigation is to quantify the areal extent and depth of the SLA and the areal extent of the CELA, in order to close and consolidate the landfills, and to evaluate the physical properties of the materials in the CELA and the SLA. The sampling and analysis results in the SLA will also indicate if and to what degree contamination is present below the waste material and provide additional data on waste characteristics. The results of this investigation study will also be used to select chemicals of potential concern to be used as indicator compounds to determine which materials will be excavated. An additional objective of this investigation is to provide information on the water in the pond between the CELA and the existing dike. This information is needed to design the water treatment system to be installed during remediation of the landfill.

The field investigation program can generally be divided into two interrelated programs, one geotechnical, and one chemical. The geotechnical field investigation program will accomplish two objectives: (1) An investigation of the properties of the SLA material, which will be excavated and then consolidated in the CELA. This information will help define the excavation method(s) to be used in the removal of SLA landfill, and to determine the compactive effort required for the placement of this landfill material in the CELA. (2) To investigate the physical properties of the soil and waste in and below the CELA, to evaluate the bearing capacity and settlement characteristics of the CELA and to evaluate the actual areal extent of the CELA along its western and southern boundaries.

The chemical field investigation program is divided into four parts. Sampling and testing to define 1) the perimeter of the waste/soil interface in the SLA and CELA. 2) the vertical location of the waste/soil interface in the SLA. 3) the design of a water treatment system. This will include sampling of surface water in the pond between the CELA and the existing dike. 4) the pool of oil (sludge like material) in the CELA to obtain information that may be needed to define treatability tests on that material. If needed, the treatability tests will provide data on solidifying the pool of oil in order to complete the closure of the landfill.

2.0 FIELD GEOTECHNICAL INVESTIGATION AND SAMPLING

2.1 BRIEF DESCRIPTION OF SAMPLING PROGRAM

2.1.1 Geotechnical Sampling Program

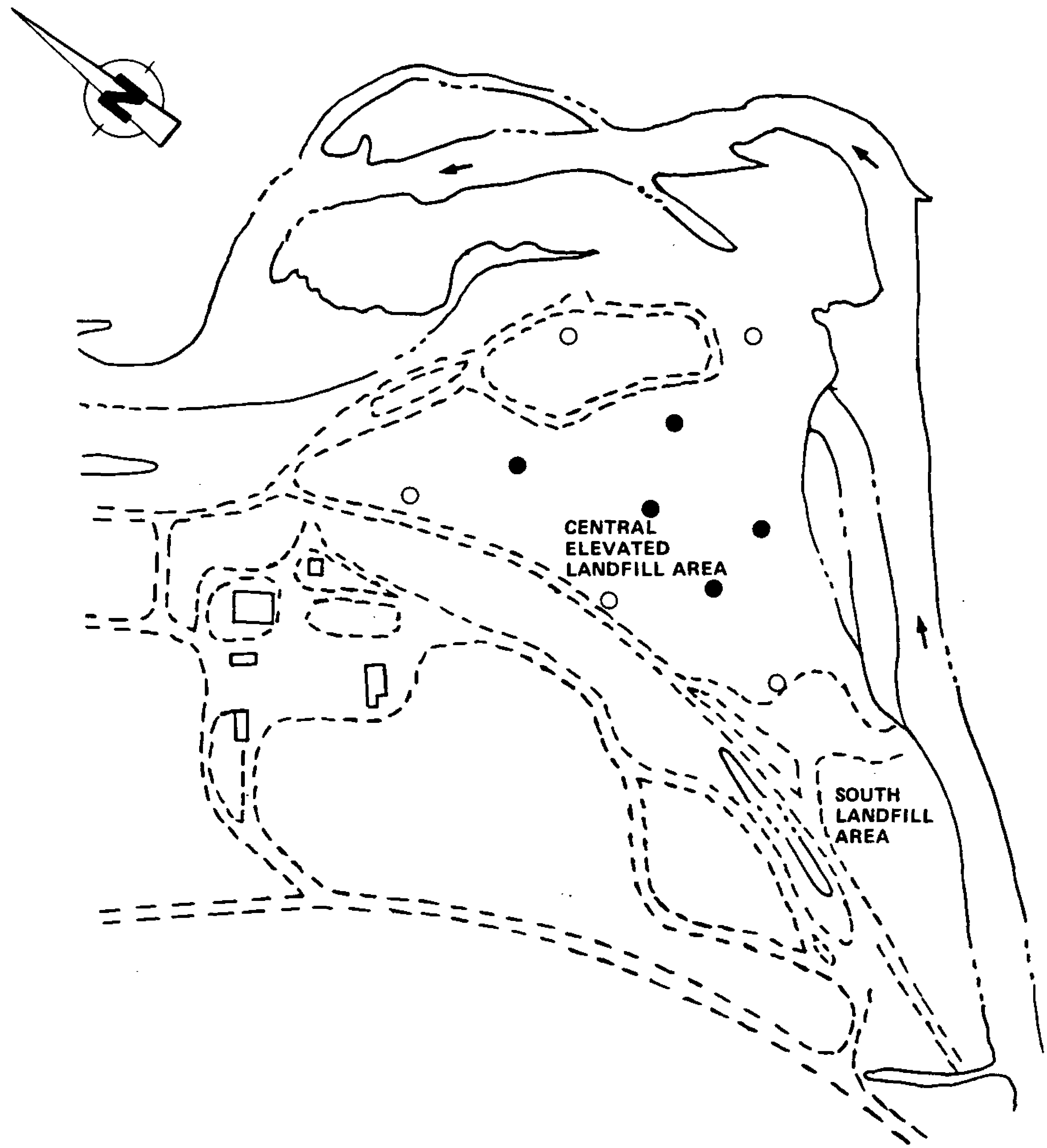
The field geotechnical investigation and sampling program will include performing soil borings and soil sampling at both the SLA and CELA. A total of 10 geotechnical soil borings are to be drilled at the CELA. The location of these soil borings are shown on Figure 2B-1. Five of these soil borings will be drilled to an approximate depth of 40 feet and five borings will be drilled to an approximate depth of 20 feet. The proposed boring depths will provide subsurface information to approximately 10 feet below the bottom of the CELA. In the SLA, 14 soil borings (Figure 2B-2) will be drilled to depths of approximately 20 feet. Table 2B-1 summarizes the number and type of geotechnical tests to be performed on the soil samples taken from the CELA and SLA.

Soil samples will be collected from bulk samples, standard split spoon sampling and undisturbed soil sampling methods described in Section 3.

2.1.2 Chemical Sampling Program

The chemical field program to evaluate the limits of the CELA and SLA will be conducted in three parts. A summary of the number of samples and analyses to be performed are shown in Table 2B-1.

The first part of the field program, in the SLA, consists of excavating a series of trenches (up to 5 feet deep), perpendicular to the perimeter of the SLA. These trenches would be located approximately 50 feet apart (depending on the judgement of the field geologist). Approximately 40 trenches will be excavated. The waste/soil interface (i.e., boundary limit of the perimeter) in each trench will be detected by visible observation of unconsolidated fill material or heavily stained soils, which may help define the boundary between the SLA and natural soil, and analysis by an OVA to detect the presence of



LEGEND

● 40ft SOIL BORING AND SAMPLING HOLE

○ 20ft SOIL BORING AND SAMPLING HOLE

0 500 1000

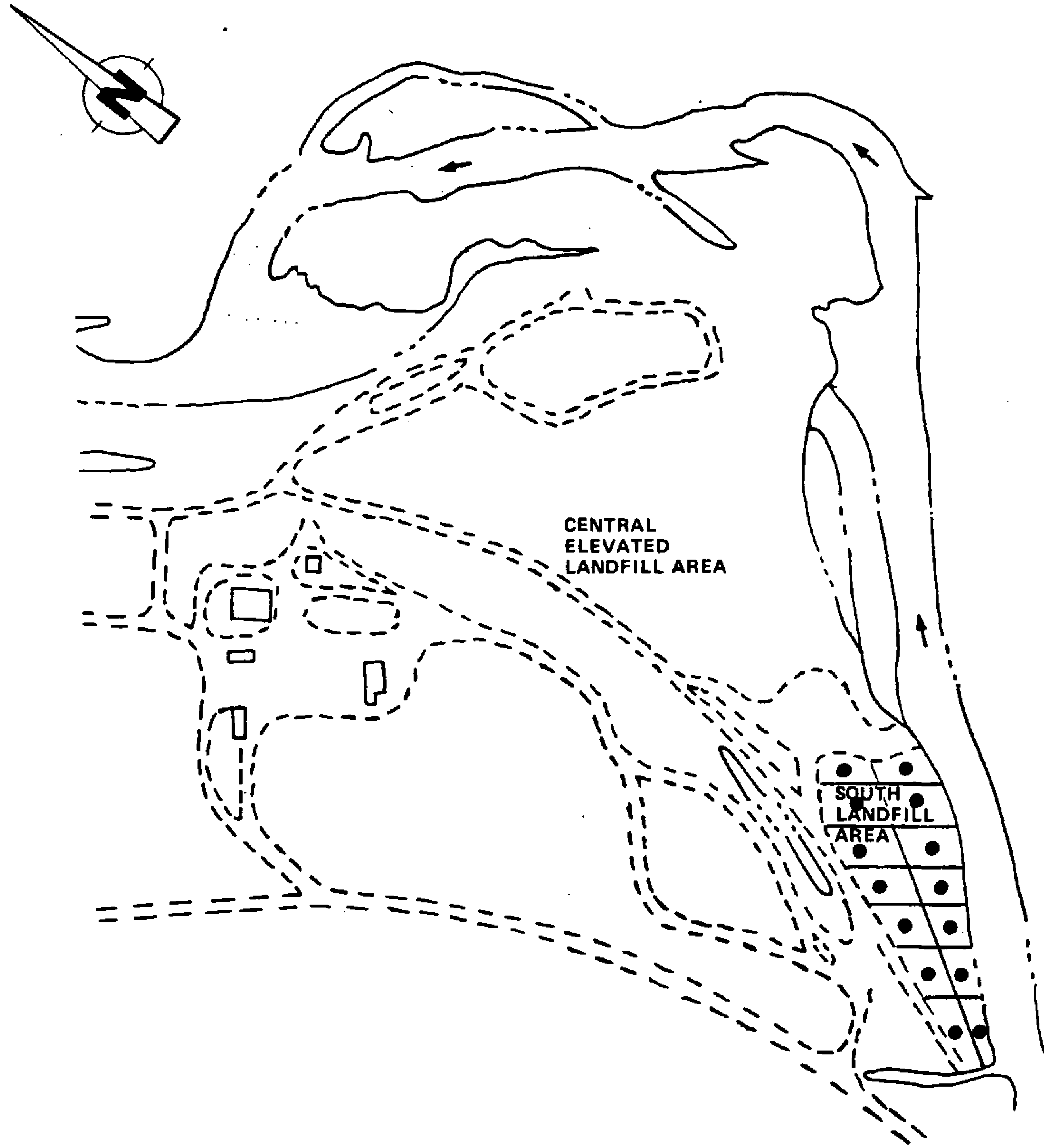
SCALE IN FEET

SINCLAIR LANDFILL SITE
WELLSVILLE, NEW YORK

FIGURE 2B–1

GEOTECHNICAL SOIL BORING
LOCATION PLAN

EBASCO SERVICES INCORPORATED



LEGEND

● SOIL BORING AND SAMPLING HOLE

0 500 1000

SCALE IN FEET

SINCLAIR LANDFILL SITE
WELLSVILLE, NEW YORK

FIGURE 2B–2
PRELIMINARY
SOIL BORING
LOCATIONS IN SLA

EBASCO SERVICES INCORPORATED

TABLE 2B-1

SUMMARY OF NUMBER OF SAMPLES AND ANALYSES
FOR THE LANDFILL INVESTIGATION

Sample	Matrix	Number of Samples	Analysis
SLA	Soil	8	Grain Size
		8	Liquid Limit
		8	Plastic Limit
		8	Classification of Soils
		3	Modified Proctor Compaction
		3	Unconfined Compression Tests
		36	VOCs[1]
		36	BNAs[1]
		22	Oil and Grease
		14	Metals[2]
		14	Pesticides[2]
		108	OVA GC Analysis
CELA	Soil	13	Grain Size
		21	Liquid Limit
		21	Plastic Limit
		21	Moisture Content
		21	Classification of Soils
		10	Density
		5	Consolidation Tests
		11 sets	Unconsolidated Undrained Triaxial
		2 sets	Consolidated Undrained Triaxial (including pore pressure measurements)
		8	Oil and Grease
	Pool of oil	3	Percent Moisture
		3	Percent Solids
		3	Oil and Grease
POND	Aqueous	3	TCL VOCs
		3	TCL BNAs
		3	TCL Metals

1 See Table 2B-2
2 See Clean-up criteria in the ROD

volatile organic chemicals. Some samples for analytical testing will also be obtained to help select chemicals of potential concern to be used as indicator compounds during post excavation sampling, and to help define the extent of contamination. The post excavation sampling will be limited to indicator compounds identified during this sampling.

A similar trenching program will be implemented on the southern and western boundaries of the CELA. However, as explained in Section 3.2 the sampling and testing programs will be somewhat different, since in the CELA, the areal extent of the waste is to be evaluated, while in the SLA, the areal extent of the contaminated soils as well as the extent of the waste is to be evaluated. Samples from the CELA will be tested for geotechnical parameters and oil and grease. Trenches in the CELA will be excavated at intervals of approximately 100 feet.

The second part of the field investigation is to establish the depth to the waste/soil interface below the SLA. This will be performed by establishing a grid over the SLA and drilling 14 borings. The borings will be located at the center of each grid (at the same location as for geotechnical observation). The locations of the borings may be revised in the field based on the results of the test pits or other field observations. The determination of the waste/soil interface will be based on noting visible contamination, whether the soil is compacted or uncompacted, and OVA analysis, with off-site laboratory analysis, of soil samples for the priority and nonpriority VOCs and BNAs listed on Table 2B-2 as well as tests for oil and grease, metals and pesticides on selected samples. Landfill samples will be analyzed for a subset of the Table 2B-2 compounds. This will provide data needed to help define the indicator compound(s) to be used in post excavation sampling.

The third part of the program includes taking three surface water samples taken from the locations in the pond shown on Figure 2B-3. Each sample will be analyzed for the complete TCL.

2.2 FIELD TEAM AND RESPONSIBILITIES

The field team and responsibilities described in Section 2.2 of the FSAP for the refinery area are also applicable to the landfill.

TABLE 2B-2

ANALYTICAL PARAMETERS

PRIORITY POLLUTANT COMPOUNDS

<u>VOLATILE ORGANICS</u>

Benzene
Bromomethane
Bromodichloromethane
Bromoform
Chlorobenzene
Chloroform
Dibromochloromethane
1,1-Dichloroethene
1,2-Dichloroethene
1,1-Dichloroethane
Trans-1,2,-dichloroethene
Ethylbenzene
1,1,2,2-Tetrachloroethane
Tetrachloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Toluene
Vinyl chloride
Methylene Chloride
Trans-1,2-Dichloroethene
1,2-Dichloropropane
Cis-1,3-Dichloropropene
Trans-1,3-Dichloropropene

<u>BASE/NEUTRAL EXTRACTABLES</u>

Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(k)fluoranthene
Benzo(a)pyrene
Bis(2-ethylhexyl)phthalate
Chrysene
Di-n-butylphthalate
1,3-dichlorobenzene
1,4-dichlorobenzene
Diethylphthalate
1,2-diphenyl hydrazine
Fluorenthane
Fluorene
Hexachlorobutadiene
Naphthalene
Nitrobenzene
N-Nitrosodimethylamine
Phenanthrene
Pyrene
Di-n-octylphthalate
2-methylnaphthalene

<u>ACID EXTRACTABLES</u>

2,4-Dimethylphenol
Phenol

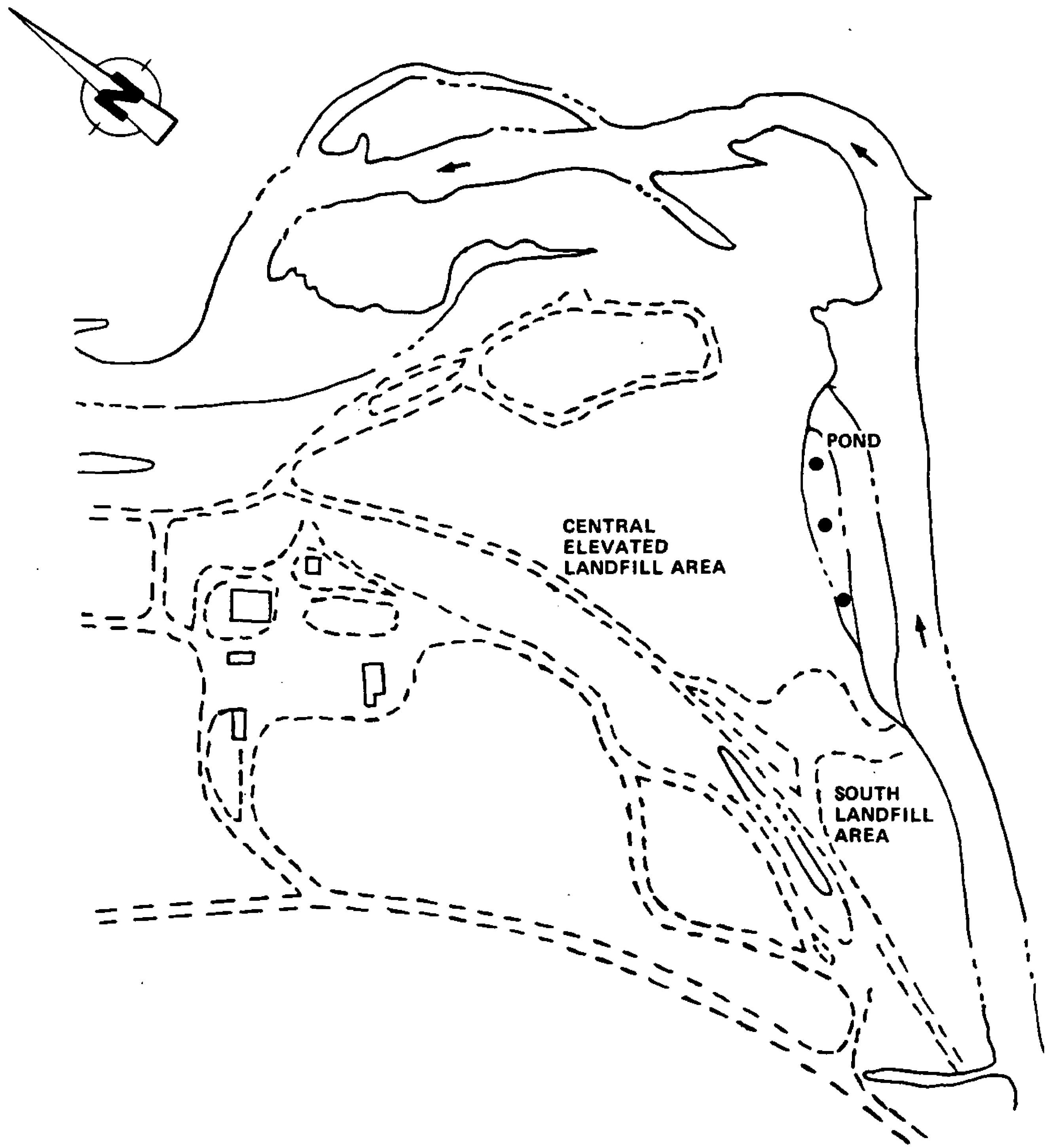
NON-PRIORITY POLLUTANT COMPOUNDS

<u>VOLATILE COMPOUNDS</u>

Cyclohexane
methylcyclohexene
methy ethyl ketone
4-methyl-1-pentanol
3,4,4-trimethyl-4-pentene
1,2,4-trimethylbenzene
1,2,3-trimethlycyclohexane
1-ethyl-4-methylcyclohexane
1,1,3-trimethylcyclohexane
2,2-dimethyl-3-hexene
Total Xylenes

<u>BASE/NEUTRAL EXTRACTABLE COMPOUNDS</u>

Docosane
Eicosane
Heptadecane
Hexadecane
4-methylbenzaldehyde
Octadecane
Pentadecane
1,3,5-trimethylbenzene
4-methyl-4-hydroxyl-2-Pentanone



LEGEND

● SURFACE WATER SAMPLE

0 500 1000

SCALE IN FEET

SINCLAIR LANDFILL SITE
WELLSVILLE, NEW YORK

FIGURE 2B–3

SURFACE WATER SAMPLE LOCATIONS
LOCATIONS IN POND

EBASCO SERVICES INCORPORATED

2.3 SAMPLE IDENTIFICATION SYSTEM

The sample identification system will be the same as the one described in Section 2.3 of the FSAP for the refinery area, except that in place of project code SR for the refinery area, the project code SL is to be used to designate samples from the landfill. Landfill sample numbers will start with 01.

2.4 SAMPLE CONTAINER REQUIREMENTS AND HOLDING TIMES

Sample containers and holding times are specified in Table 3B-1 of Section 3. These requirements are in accordance with EPA Contract Laboratory Protocol (CLP) guidelines, for chemical analyses or standard industrial practice, for geotechnical parameters.

2.5 SAMPLE PACKAGING AND SHIPPING

The Sample Packaging and Shipping requirements in Section 2.5 of the refinery area FSAP are applicable to the landfill sampling.

2.6 SAMPLE DOCUMENTATION

The Sample Documentation requirements in Section 2.6 of the refinery area FSAP are applicable to the landfill sampling.

2.7 DATA QUALITY OBJECTIVES (DQOs)

Geotechnical data for construction purposes will be obtained with a DQO of level 1. Chemical data will be level 1, 2 and 3 data depending on its ultimate use, and method of data acquisition.

3.0 FIELD INVESTIGATION AND SAMPLING

This section describes the sample locations and sampling procedures to be used in the landfill area including:

- o Soil sampling procedures;
- o Surface water sampling procedures; and
- o Decontamination procedures.

A summary of samples to be taken and analyses to be performed is given in Table 3B-1.

3.1 SOIL BORING SAMPLING

3.1.1 Soil Borings - CELA

A total of 10 proposed borings (Figure 2B-1) are to be performed at the CELA. Five of these soil borings will be drilled to an approximate depth of 40 feet. These bore holes are located in the areas where the waste thickness is expected to be 20 feet or more based on the Phase I and Phase II RI. The remaining five borings will be drilled to a depth of approximately 20 feet in areas where the waste is expected to be on the order of 10 feet thick. Soil borings will be performed using the hollow stem auger drilling method as described in SOP-B1. The hollow stem auger will be of sufficient size to accommodate a 2 inch OD split-barrel sampler and a 3 inch thin wall tube sampler (Shelby Tube) (SOP-B3). Soil borings will be performed in accordance with ASTM D1452. Subsequent to the drilling and sampling, the bore holes will be backfilled with a cement-bentonite grout.

If clay layers or soft materials are encountered in the soil borings, Shelby Tube samples will be taken, as directed by the field geologist. Approximately 13 Shelby tubes (at least one at each boring) will be taken. If multiple clay layers are encountered, the field geologist should obtain Shelby tube samples from different strata including 3 samples from deep borings which may encounter the clay aquitard below the landfill. The Shelby tube samples will

TABLE 3B-1 (FSAP) SUMMARY OF ANALYTICAL METHODS, PRESERVATION, AND HOLDING TIMES FOR ALL SAMPLES

SAMPLES	MATRIX	SAMPLES	ANALYSIS	SAMPLE CONTAINERS	PRESERVATION	METHOD	HOLDING TIME
Central Elevated Landfill Area	Soils	13	Particle Size	Shelby Tube	None	ASTM D422/D1140	6 months
		21	Liquid Limit	Shelby Tube	None	ASTM D423	6 months
		21	Plastic Limit	Shelby Tube	None	ASTM D424	6 months
		21	Moisture Content	Shelby Tube	None	ASTM D2216	6 months
		21	Classification of Soils	Shelby Tube	None	ASTM D2487	6 months
		10	Density	Shelby Tube	None	EM-1110-2-1906[5]	6 months
		5	Consolidation Tests	Shelby Tube	None	ASTM D2435	6 months
		11	Unconsolidation Undrained Triaxial	Shelby Tube	None	ASTM D2850	6 months
		2	Consolidated Undrained Triaxial (including pore pressure measurements)	Shelby Tube	None	Accepted Industry Practice	6 months
		8	Oil and Grease	1-8 oz glass	Cool to 4°C	EPA Method 503	7 days from VTSR
Southern Landfill Area	Soils	8	Particle Size	1-8 oz glass	None	ASTM D422/D1140	6 months
		8	Liquid Limit	1-8 oz glass	None	ASTM D423	6 months
		8	Plastic Limit	1-8 oz glass	None	ASTM D424	6 months
		8	Classification of Soils	1-8 oz glass	None	ASTM D2487	6 months
		3	Modified Proctor Compaction	1 Plastic Bag[2]	None	ASTM D1557	6 months
		3	Unconfined Compression	1 Plastic Bag[2]	None	ASTM D2166	6 months
		36	VOCs[3]	3-40 ml VOA vials with teflon cap	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days from VTSR
		36	BNAs[3]	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days from VTSR
		22	Oil and Grease	1-8 oz glass	Cool to 4°C	EPA Method 503	7 days from VTSR
		14	Metals[4]	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	6 months
		14	Pesticides[4]	1-8 oz glass	Cool to 4°C	CLP-IFB-SOW (7/85)	
		108	Volatilized Organics	1-4 oz glass with teflon septa cap	None	OVA	8 hours
	Pool of Oil	3	Oil and Grease	1-8 oz glass	Cool to 4 C	EPA Method 503	7 days from VTSR
Pond	Aqueous	3	TCL VOCs	3-40 ml VOA	Cool to 4°C pH<2 with HCl	CLP-IFB-SOW (8/87)	10 days from VTSR
		3	TCL BNAs	2-1 liter amber	Cool to 4°C	CLP-IFB-SOW (8/87)	10 days to extract 40 days to analyze
		3	TCL metal	1-1 liter poly-ethylene	Cool to 4°C pH<2 with HNO_3	CLP-IFB-SOW (7/85)	Hg-26 days All other 6 month

1 Ends of Shelby Tube will be sealed with wax to maintain the moisture content of the soil
2 Plastic bag should be tightly closed. Approximately 30 pounds of soil is required
3 See Table 2B-2 for list of parameters
4 See clean soil criterion landfill ROD
5 U.S. Army Corps of Engineers

be analyzed for particle size, liquid limit, plastic limit, moisture content, soils classification, and density. The density tests will be performed on waste material and not the clay from the aquitard. In addition, five of the Shelby tube samples will be subjected to a consolidation test, three to unconsolidated undrained triaxial tests and two to consolidated undrained triaxial tests. At least one of each type of the three strength tests will be from the clay aquitard (if encountered) below the landfill.

If an oily sludge layer is encountered in any of the borings, an attempt will be made to recover a sufficient sample to test the sludge for oil and grease, moisture and percent solids. A field pH measurement would also be obtained. The method to be used to collect the sample will be dependent on the consistency and depth at which the sludge is encountered.

Samples from sandy layers will not be analyzed since blow counts from the standard penetration test (SOP-B1) provides data on soil strength. At two of the boring locations, to be selected by the field geologist, cuttings will be collected and sent to a laboratory for analysis using the procedure described in Section 3.5.

3.1.2 Soil Borings - SLA

During the pre-excavation sampling at the SLA a total of 14 soil borings will be drilled to a depth of 10 feet below visible contamination or 5 feet below the water table, whichever is less. Approximate boring locations are shown on Figure 2B-2. These may be changed based on the results of the test pit sampling program. The borings will be sampled continuously to evaluate if the samples are landfill material or natural soil. The waste/soil interface will be determined visually in the field, and will be defined as that point in the excavation at which loose, unconsolidated solids have been removed, leaving behind consolidated, previously undisturbed soils which are defined in the RI as "tan sandy silt with clay pockets, gray gravelly sand with clay pockets, and gray sandy silt with gravel and brown and red mottling."

The last (deepest) sample from the landfill material, and the first sample from below the landfill will be sent to a laboratory for analysis. The soil samples will be tested for Table 2B-2 parameters and the landfill samples for a subset of those compounds.. In addition, the first sample below the fill will be tested using an OVA-128 in the GC mode to test for the presence of volatile compounds and a portion of the sample sent to the laboratory for analysis of oil and grease. In approximately six of the borings, the samples will also be analyzed for metals and pesticides. These samples will be selected at the discretion of the field geologist, based on visible soil staining. PCB's will not be analyzed in these samples or in post excavation sampling due to the low levels previously detected. If volatiles are detected using the OVA, a second sample from 5 feet below the waste/soil interface will also be tested using the OVA, but not sent to the laboratory for analysis. If the OVA-128 detects volatile compounds in the second sample, another split spoon test and OVA test will be performed five feet deeper. If the waste/soil interface cannot be identified from the split spoon samples, the OVA may be used to screen samples and one clean and one contaminated sample selected for analysis.

In five borings, at a depth of 2-4 feet, a sample of the landfill materials will be selected for analyses of their, physical properties. Each of the five will be analyzed for grain size, liquid and plastic limit (if cohesive) and classified as to soil type. The borings to be sampled will be at the discretion of the field geologist.

3.1.3 Split Spoon Sampling Procedure for Soil Borings (SOP-B1)

The following procedure will be used for the soil boring split-spoon sampling:

1. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

2. Drill borehole to the desired sampling depth. Continuous samples will be taken to a depth of 10 feet in the CELA and then at five foot intervals. Additional samples may be taken at the discretion of the field geologist. In the SLA samples will be taken continuously to

immediately below the waste/soil interface, and at 5 foot intervals below the interface. Drilling will be by use of a hollow stem auger. Drive decontaminated split-spoon into the undisturbed soil which is to be sampled.

3. A decontaminated carbon steel two inch outside diameter split-spoon sampler will be driven with blows from a 140 lb hammer falling 30 inches until either approximately 2 feet of soil has been penetrated or 100 blows within a six (6) inch interval have been applied. This process is referred to as the Standard Penetration Test (ASTM D-1586).

4. Record the number of blows required for each 6 inches of penetration or fraction thereof. The first 6 inches is considered to be a seating drive. The sum of the number of blows required for the second and third 6 inches of penetration is termed the penetration resistance. If the sampler is driven less than 2 feet, the penetration resistance is that for the last 1 foot of penetration. (If less than 1 foot is penetrated, the logs shall state the number of blows and the fraction of 1 foot penetrated).

5. Bring the sampler to the surface and remove both ends and one half of the split-spoon so that the soil recovered rests in the remaining half of the barrel. Describe carefully the approximate recovery (length), composition, color, moisture, etc. of the recovered soil; then put into jars using stainless steel spatulas. Upon opening the split-spoon, the sample will be screened using OVA monitors.

6. All solid samples for chemical or OVA-GC analyses, will be taken as discrete grab samples. These should be taken directly from the split-spoon, and properly packaged. In the SLA, one sample from above, and one from below the apparent waste/soil interface will be selected for analytical testing.

7. Samples, to be selected at the discretion of the field geologist, will be field analyzed for pH by mixing equal parts of soil and deionized water in a glass jar, a pH reading of the slurry will then be taken. At least one reading per boring will be made.

8. Fill out field notebook, labels and Chain-of-Custody forms for analytical samples

9. Cool analytical samples on ice (4°C). Samples will be shipped to the laboratory within 24 hours.

10. A decontaminated split-spoon will be used for each sample collected for chemical analyses.

11. Upon completion of sampling, drill cuttings will be returned to the borehole and the borehole will be grouted with a cement-based grout mixed with potable water in a ratio of approximately one, 94 pound bag of Portland Type I cement to 3-5 pounds of flake or pellet bentonite and six gallons of water.

3.1.4 OVA Headspace Screening Procedure (SOP-B2)

Headspace analyses will be used to help define the landfill/natural soils interface. The samples to be tested are described in Section 3.1.3. The method that will be used is only meant as a qualitative comparison between samples and cannot be used as a means of quantifying contaminants in soil. Each soil sample will be collected in a 4 oz. jar with a teflon septa cap. The sample will be heated for 30 minutes at 80-90°C. A 0.25 ml aliquot of headspace will then be drawn from the sample jar using an air-tight syringe and injected into the OVA-128GC. The injection will be allowed to run until the last standard peak has eluted. The backflush flow will then be activated to clean out the column. Detailed headspace screening methodology is described below.

3.1.4.1 Instrument Setup

Follow standard startup procedures for OVA-128. The OVA will be calibrated to ethyl benzene or 2-methylnapthene.

Recommended Conditions:

- Initial Backflush @70°-80°C for 1 hour.

- o Analysis Column Temp. 38°-42°C.

- o H_2 Supply Pressure - 10 psig.

- o Instrument Zero set to 1 on all scales.

- o Recorder Zero set to 1 on all scales and run on high.

- o Span Setting 3.00.

3.1.4.2 Calibration

- o Assure steady baseline.

- o Fill Tedlar gas bag with standards (i.e. vinyl chloride, Perchloroethylene, Trichloroethylene, Dichloromethane).

- o Withdraw 0.25 ml and inject to OVA-128.

- o Allow last peak to elute and backflush for 1.5x the run time.

- o Continue when steady baseline is reestablished.

3.1.4.3 Sample Analyses

- o Collect a screening sample in the 4 oz. bottle, while collecting a laboratory sample from the core. The screening bottle should be at least 1/4 full. However, available sample amounts are dependent on split-spoon recovery.

- o Allow sample to equilibrate for 30 minutes in an 80°-90°C water bath. Agitate the sample for 1 minute. Note amount and consistency of screening sample.

- o Assure steady baseline conditions.

- o Allow bottle to equilibrate for 1 minute, then withdraw 0.25 ml. of headspace. Note if there is a pressure buildup in the bottle. If not, check for poor septum seal or broken bottle neck.

- o Inject the aliquot to the OVA-128. Allow sample to run for approximately 5 minutes, or until last standard peak retention time has passed. Note column and water bath temperature at this time.

- o Backflush for 1.5x the run time or until steady baseline is obtained.

- o Attenuation settings will be dependent on the degree of contamination. Generally it is desirable to keep all peaks on scale; however, heavily contaminated samples should be analyzed on high and low attenuations to assure low-level constituents are also being seen.

3.1.4.4 QA/QC

In addition to the daily standard calibration, the following controls should be initiated as indicated:

- o Syringe Blanks - after standards or heavily contaminated samples.

- o Bottle Blanks - daily.

- o Replicate Analyses - 1 per day.

3.1.5 Undisturbed Soil Sampling (SOP B3)

Undisturbed soil sampling of cohesive materials (clays or soft fill layers) will be performed using a thin-walled tube samplers (ASTM D1557), with an outside diameter of 3 inches, a maximum wall thickness of 1/16 inch, and a length of 36 inches. Approximately thirteen undisturbed samples will be taken from the clay layers or soft materials in or beneath the CELA. Undisturbed samples will not be taken from borings in the SLA.

Three samples of the waste will be tested for grain size, liquid and plastic limit, moisture content, classification of soils and density. Seven other samples from the waste will be analyzed for the same parameters plus one strength related test per sample. The last three samples will be from the clay aquitard (if encountered) and will be tested for the same parameters plus a strength test, but excluding the density test.

Sealing of sample will be with wax (parafin). Sample tubes will be clearly marked indicating the project identification, date of sampling, boring number, depth, sample number and recovery length. The collected samples will be stored and protected from freezing or excessive heat. The collected soil samples will be shipped to the laboratory for testing and analysis.

3.2 TEST PIT SAMPLING (SOP B4)

Test pits or trenches will be excavated, perpendicular to the perimeter of the CELA and SLA. The test pits will be used to visually observe the soil/waste interface.

Sampling and test pit excavation near the perimeter of the SLA will include approximately 40 test pits spaced approximately 50 feet apart. In the CELA, the test pits will extend around the south and west sides and will be spaced approximately 100 feet apart. Each test pit will be dug to a depth of up to five feet. If waste or unconsolidated landfill deposits are visible, the test pit will be extended outward to form a trench away from the CELA or SLA, until the edge of the landfill is detected. If the trench extends to paved areas, or roadways, or crosses site utilities the trench may be stopped and restarted on the opposite side of the obstruction. During trenching, soil samples will be taken using the procedure described below. In the CELA, some samples from the test pits may be taken using SOP B3.

The following procedure will be used for test pit excavation and sampling:

1. Wear appropriate health and safety equipment as outlined in the Health and Safety Plan.

2. Using a backhoe, remove the upper two feet of soil from an area approximately five feet by five feet square, and place, on plastic sheeting, to one side of the excavation.

3. Using a backhoe continue the excavation downward, placing these soils or plastic sheeting on the opposite side of the excavation. The hole should be excavated to a depth of up to five feet or to the base of the landfill, whichever is less.

4. If landfill materials are present the trench should be extended away from the CELA or SLA (If no waste is present extend the trench towards the landfill). After natural and landfill soils have each been observed for a length of 6 feet, the following samples will be taken and their locations noted in the log book.

For the SLA:

- One sample of the landfill material.
- One sample of natural soil 2 to 3 feet from the landfill/soil interface.
- One sample of natural soil 4 to 5 feet from the landfill/soil interface.

The sampling procedure is the same as in Section 3.3.4 SOP6 of the FSAP for the refinery area.

The landfill sample will be screened by the OVA in the GC mode for organic contamination. The natural soils will also be screened. The analysis of the natural soil samples will be done in order of their increasing distance from the SLA. The second soil sample will only be analyzed if volatiles are detected in the first sample. From the natural soils, a total of 8 samples will be taken from the 40 trenches and analyzed for VOC's, BNA's, metals, pesticides, and oil and grease. The trenches to be sampled will be selected based on OVA readings or visual observation of staining.

For the CELA:

- o The waste/soil interface will be identified visually

- o Approximately eight samples to be selected at the discretion of the field geologist will be collected using the procedure in Section 3.3.4 SOP 6 in FSAP for the refinery area and tested for oil and grease

- o Approximately eight samples will be analyzed to determine soil classification, liquid limit, plastic limit, moisture content, and unconsolidated, undrained triaxial strength.

The purpose of the above sampling is a accurately define the actual boundary of the waste material requiring capping.

5. Representative bulk soil samples will be collected from landfill material in three of the test pits at the SLA. The locations will be selected in the field by the geologist. These bulk samples will be shipped to the laboratory for Modified Proctor tests to determine the grain size, liquid and plastic limits, soil classification and Proctor density for landfill placement. These three samples will also be subjected to unconfined compression testing after remolding in the laboratory.

6. A hand sketched map of the trench showing the stained soils, landfill/soil interface, and soil layers should be included in the field notebook.

7. After completion of the trench, or at the end of a day, whichever is more frequent, the test trenches will be backfilled. If a trench has not been completed and is backfilled at the end of a day, it may be restarted the next day from the point at which excavation ceased. The soils from the deeper portion of the trench will be returned to the trench first. The segregated upper two feet of soil will be added to the trench last, to form the cap. Soils from the landfill portion of the trench should be returned to the landfill portion of the trench and natural soils to natural areas.

3.3 SURFACE WATER SAMPLING

Surface water samples will be taken from three locations in the pond area between the CELA and the existing dike. The samples will be tested for the complete TCL compounds. The procedures will be the same as described in Section 3.2, SOP2 of the FSAP for the refinery area.

3.4 POOL OIL SAMPLING

Three surface samples from the pool of oil in the CELA will be sampled according to the procedure in Section 3.2 SOP2 of the FSAP for the refinery area. The locations for the samples will be determined in the field by the geologist. The samples will be retested based on obtaining sampling from visibly different colored material or texture. The samples will be field tested for pH and sent to an off-site laboratory for analysis of percent moisture, percent solids, oil and grease.

3.5 FIELD BLANKS, DEIONIZED WATER BLANKS, TRIP BLANKS AND DUPLICATE SAMPLES

These procedures are the same as in Section 3.7 of the FSAP for the refinery area.

3.6 DECONTAMINATION

These procedures are the same as in Section 3.8 of the FSAP for the refinery area.

4.0 QA/QC VERIFICATION OF FIELD SAMPLING PROCEDURES FOR FIELD CHANGES AND CORRECTIVE ACTION

These procedures are the same as in Section 4.0 of the FSAP for the refinery area.