Prepared for

Atlantic Richfield Company
515 South Flower Street
Los Angeles, California 90071

FINAL COMPLETION REPORT

REMEDIAL ACTIVITIES FOR SEPARATOR AND POWERHOUSE

SINCLAIR REFINERY SITE WELLSVILLE, NEW YORK

VOLUME I

Prepared by

GeoSyntec Consultants
5775 Peachtree Dunwoody Road
Atlanta, Georgia 30342

Project Number GQ3201

April 1994

ARCO

515 South Flower Street
Los Angeles, California 90071
Telephone 213 486 3622
Fax 213 486 1740

David A. Christensen
Project Manager
Environmental Remediation

April 28, 1994

U.S. Environmental Protection Agency
Removal Action Brunch
Emergency and Remedial Response Division
2890 Woodbridge Avenue
Edison, NJ 08837-3679

Attention: Mr. Louis DiGuardia
On-Scene Coordinator

Subject: **Sinclair Refinery Site - Wellsville, NY**
Administrative Order on Consent #II CERCLA 10212
Powerhouse and Separator Remediation
Final Completion Report Submittal

Ladies and Gentlemen:

Pursuant to paragraph 72 of the subject Order, ARCO hereby transmits four (4) copies of the "Final Completion Report" documenting implementation and completion of the Powerhouse and Separator Remediation as set forth in the Order.

Very truly yours,

David A. Christensen

DAC:jc/MSW/JULIE/MISC/DAC.LTR
Attachments

cc:
C.Y. Berns	EOA w/o attachments
N.S. Brody	ARCO w/o attachments
J. Drumm	NYSDEC w/2 copies
J.K. Kimura	ARCO w/1 copy
M.J. Negrelli	EPA w/2 copies
R.W. Simmons	ARCO w/o attachments

ARCO

515 South Flower Street
Los Angeles, California 90071
Telephone 213 486 3622
Fax 213 486 1740

David A. Christensen
Project Manager
Environmental Remediation

RE: Sinclair Refinery Site -- Wellsville, NY
Administrative Order on Consent #II CERCLA 10212
Powerhouse and Separator Remediation
Final Report Certification

Certification Statement

"I certify that the information contained in or accompanying this submission to the United States Environmental Protection Agency is true, accurate and complete."

David A. Christensen
ARCO Project Manager

Prepared for

Atlantic Richfield Company
515 South Flower Street
Los Angeles, California 90071

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EXECUTIVE SUMMARY

The Atlantic Richfield Company (ARCO) agreed to perform a Remedial Investigation/Feasibility Study (RI/FS) for the refinery area, Operable Unit 2, of the Sinclair Refinery Site in Wellsville, New York. The U.S. Environmental Protection Agency (USEPA) issued an *Administrative Order on Consent* on 3 August 1988 for ARCO to perform this work. Operable Unit 2 contained an oil/water separator, near the north end of the refinery area, and the former refinery powerhouse and smokestack, adjacent to the Genesee River on the east side of the site.

The contents of the oil/water separator were sampled during the RI/FS and elevated levels of several metals and volatile organic compounds were detected. In addition, asbestos containing material was found in the powerhouse.

ARCO recommended that the removal of the contents of the separator and the asbestos from the powerhouse would contribute to the efficient performance of long-term remedial actions at the site. USEPA agreed and on 27 June 1991, the USEPA issued *Administrative Order on Consent No. II CERCLA - 10212* which directed ARCO to develop Work Plans and implement such Work Plans to: (i) remove and dispose of the contents of the oil/water separator; and (ii) remove and dispose of the asbestos containing material from the powerhouse.

ARCO's Work Plan for the separator specified the removal and disposal of the contents and subsequent closure of the structure. Removal and treatment of the contents of the oil/water separator began in August 1992. Closure of the separator was completed in June 1993.

ARCO's Work Plan for the powerhouse addressed the removal and disposal of the asbestos containing material. Prior to commencing work, structural surveys were conducted in October and November 1992 to

determine the integrity of the building. Based on the surveys, it was determined that the asbestos containing material could not be removed safely in accordance with the approved Work Plan. A subsequent Work Plan which included the demolition of the powerhouse and the adjacent smokestack and the removal and disposal of the asbestos containing material was approved by USEPA in June 1993. Removal of the asbestos containing material and demolition of the powerhouse commenced in August 1993 and was completed in November 1993.

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1. INTRODUCTION

1.1 Terms of Reference

This Final Completion Report (FCR) summarizes the construction activities, and the construction quality control (CQC) and construction quality assurance (CQA) activities performed for the remediation of an oil/water separator (separator) and powerhouse at the Sinclair Refinery Site, Wellsville, New York. The CQC and CQA activities were performed to confirm that the remediation materials and procedures complied with the project plans and specifications, and appropriate regulations.

This report was prepared for the Atlantic Richfield Company (ARCO) by Mr. Roger B. North, P.E., and was reviewed by Dr. John F. Beech, P.E., both of GeoSyntec Consultants (GeoSyntec) and registered professional engineers in the State of New York. The report was prepared in compliance with the requirements of the *Administrative Order on Consent (Order), Index Number II-CERCLA-10212* issued by the United States Environmental Protection Agency (USEPA), effective 27 June 1991.

1.2 Notice of Completion

The intent of this report is to demonstrate that ARCO completed the remediation of the separator and powerhouse in compliance with the requirements set forth in the Order.

1.3 Organization

The report organization follows.

- The project background, including the site location and history, the remedial history, and the remedy implemented, are described in Section 2.

- The parties involved in the remediation activities are presented in Section 3.

- The separator remedial design, including the remedial design objectives, the remedial design documents, and construction design changes are presented in Section 4.

- The powerhouse remedial design, including the remedial design objectives, and the remedial design documents are presented in Section 5.

- The details of the separator remediation, including the pre-construction and construction activities are discussed in Section 6.

- The details of the powerhouse remediation, including the pre-construction and construction activities are discussed in Section 7.

The record drawings and the documentation which relate to the activities described in this report are contained in the Appendices to this report. Volume I of this report contains the report and Appendices A and B. Volume II contains Appendices C to E, Volume III contains Appendices F to I, and Volume IV contains Appendices J to L. The documentation included in the appendices is summarized below (and is presented in greater detail in the Table of Contents):

- Appendix A: Separator Photographic Documentation;
- Appendix B: Powerhouse Photographic Documentation;
- Appendix C: GeoSyntec Consultants Weekly Field Reports;
- Appendix D: GeoSyntec Consultants Monthly Field Reports;
- Appendix E: Separator Inspection Report Forms;
- Appendix F: Separator Testing Data;
- Appendix G: Separator Waste Disposal Documentation;
- Appendix H: Separator Drawings;
- Appendix I: Separator Safety and Health Phase Out Report;
- Appendix J: Powerhouse Drawing;
- Appendix K: Powerhouse Documentation; and
- Appendix L: Powerhouse Health and Safety Reports.

2. PROJECT BACKGROUND

2.1 Site Location and History

The Sinclair Refinery site is located in the Town and Village of Wellsville, Allegany County, New York, approximately 10 miles (16 km) north of the New York-Pennsylvania border. The site, which covers approximately 110 acres (44 hectares), is irregularly shaped and is bounded to the west by South Brooklyn Avenue, and to the east and south by the northerly flowing Genesee River.

The northern, larger portion of the site covers approximately 90 acres (36 hectares) and contains the refinery area. This portion of the site is also referred to as Operable Unit 2 (OU2). The southern, smaller portion of the site covers approximately 13 acres (5.2 hectares) and contains the landfill area. This portion of the site is also referred to as Operable Unit 1 (OU1).

Oil was refined at the site between the late 1800's and 1958, when operations were curtailed because of a fire at the refinery. The Wellsville Refining Company owned and operated the refinery until 1924. Sinclair Oil Corporation (Sinclair) bought the refinery in 1924 and operated the refinery until the operations were curtailed in 1958. Subsequently, ownership of the site has been passed to various companies and entities. Most of the buildings and structures in the refinery area were dismantled and removed by 1964. The structures that remained included an oil/water separator (separator) in the northern portion of the refinery site[1], on land owned by the Ford Hazlett and Harris

[1] More than one oil/water separator existed at the Sinclair Refinery site. The separator which has been remediated, being the northernmost of such structures, is referred to by some authors as the northern oil/water separator.

Partnership, and a powerhouse and smokestack on land owned by The Educational Foundation of Alfred and leased to the State University of New York (SUNY).

The separator consisted of a reinforced concrete, in-ground, multi-cell structure which measured approximately 117 ft (35.6 m) in the east-west direction, 48 ft (14.6 m) in the north-south direction and 14-ft (4.36-m) deep. The separator contained 27 cells in three trains of nine cells. The cells were all open. The top of the separator walls extended approximately 1 ft (0.3 m) above the ground surface. The concrete that was visible was showing signs of deterioration, which was advanced in some locations. At the time of the remediation, the separator contained oily waste, aqueous phase and miscellaneous debris. The active storm sewer system at the site connected into the west end of the separator, and discharged from the east end of the separator into the Genesee River. In addition, two small brick pumphouses were located at the east end of the separator.

The powerhouse consisted of an "L"-shaped steel-framed and brick building sited adjacent to the Genesee River. The building was approximately 175-ft (53-m) long, 100-ft (30-m) wide overall, covered a plan area of 11,650 ft^2 (1,080 m^2), and had a maximum height of approximately 70 ft (21 m). All power generating equipment had been removed from the building following the cessation of refining operations at the site. A smokestack, which was approximately 250-ft (76-m) high, was located on the west side of the powerhouse. The smokestack was constructed of reinforced concrete and was brick-lined over part of its height. In addition, three small buildings and an "L" shaped concrete pedestal were located adjacent to the powerhouse. Two of the buildings were located at the north end of the powerhouse, one building was at the south end of the powerhouse and the concrete pedestal was on the west side of the powerhouse close to the smokestack. The powerhouse and the three small buildings contained asbestos materials.

2.2 Regulatory Actions

The New York State Department of Environmental Conservation (NYSDEC) retained SMC Martin (Martin) to perform a Remedial Investigation/ Feasibility Study (RI/FS) for the refinery area. Martin submitted a report titled "*Phase I Remedial Investigation Sinclair Refinery Site*", dated 14 March 1985. Based on this RI/FS, USEPA issued a Record of Decision (ROD) for OU1 on 30 September 1985. However, this RI/FS had not adequately characterized OU2. Therefore, the USEPA authorized a second RI/FS (OU2 RI/FS) in 1985. This was initially performed by NYSDEC, but was suspended due to disputes between NYSDEC and its contractor. Therefore, ARCO agreed to perform the OU2 RI/FS and the USEPA issued an Administrative Order of Consent for this work on 3 August 1988.

ARCO submitted the draft final RI and FS reports to the USEPA in March 1991. USEPA approved the reports in May 1991, and the respective addenda in June 1991. The USEPA issued an Administrative Order on Consent (Order) (Index Number II - CERCLA-10212) for the asbestos (in the powerhouse) and for the separator, effective 3 July 1991. The USEPA released the RI/FS and the proposed plan for OU2 to the public for comment on 26 July 1991. A public comment period on the documents was held from 26 July to 6 September 1991. The USEPA issued its Record of Decision (ROD) for OU2 on 30 September 1991; however, this ROD did not address the separator or the powerhouse; it only addressed refinery surface soils and ground water.

The Order required the following with respect to the separator:

- a sampling program to characterize the contaminants present in the aqueous phase and the sludge;
- removal and disposal of the contents of the separator, in accordance with the EPA-approved work plan; and

- the decontamination and decommissioning of the separator after proper removal of its contents, in accordance with the USEPA-approved work plan.

The Order required the following with respect to the powerhouse:

- a sampling program to define the locations of asbestos-containing material (ACM) in and around the powerhouse; and

- removal and disposal of any ACM identified in accordance with federal and state regulations.

2.3 Separator Studies

2.3.1 Site Drainage Study Report

Ebasco Services Inc. (Ebasco) performed a site drainage study to identify the sources of material entering the separator via the storm sewer system. Ebasco issued a report titled "*Site Discharge Study Report for Northern Oil/Water Separator System*", dated 28 October 1991. The reported was based on historical documentation, interview information and analytical data, which in Ebasco's opinion was sufficient "*to adequately define the nature of the influent sources and sewer system configuration.*" The report concluded that "*some of the active influent sources to the northern oil/water separator sewer system contribute to the oily waste contents of the separator. Runoff from parking areas and roadways may also contribute to materials present in the oil/water separator. Hurricane Agnes flooded the entire site in 1972 probably resulting in a near total purge of the contents of the oil/water separator. This implies that the floating material within the oil/water separator has accumulated as a result of the influent sources active since 1972. This is consistent with the previous sampling results which*

detected volatile organic compounds within the oil/water separator contents even though the refinery has been closed for over 30 years."

2.3.2 Waste Characterization Report

Ebasco performed a waste characterization program at the separator to characterize the constituents of the sludge and aqueous phase and hence to determine remedial treatment and disposal requirements. Ebasco conducted the sampling program during the week of 11 November 1991, and issued a report titled *"Waste Characterization Report for the Northern Oil/Water Separator, Sinclair Refinery Site, Wellsville, New York,"* dated July 1992. The report concluded that pretreatment of the aqueous phase and sludge would be required prior to disposal.

The expectations were that: (i) the aqueous phase and sludge filtrate could be pretreated using conventional mobile units to meet the pretreatment criteria of the Village of Wellsville and NYSDEC prior to discharge to the Publicly Owned Treatment Works (POTW) in Wellsville; and (ii) the sludge would require treatment (incineration) prior to land disposal since hazardous constituents were identified at concentrations above the treatment standards for the Resource Conservation and Recovery Act (RCRA) listed K051 waste criteria.

2.4 Separator Remedy Implemented

The remedy agreed to between ARCO and the USEPA for the separator included the following:

- installation of a permanent by-pass storm water sewer around the separator;

- removal and pretreatment of the aqueous phase with disposal to the Wellsville POTW;
- removal, dewatering and off-site disposal of the sludge;
- pretreatment of the filtrate from the sludge dewatering with disposal to the POTW;
- removal of gross contamination from the separator structure;
- demolition of the two small brick pumphouses with disposal of the debris into the decontaminated separator structure;
- demolition of the top of the separator structure to a depth of 2 ft (0.6 m) below the ground level with disposal of the debris into the decontaminated separator structure;
- backfilling the separator and grading of the area; and
- paving the separator area with asphalt.

2.5 Powerhouse Studies

Ebasco collected samples from material present at the floor level within the powerhouse during the OU2 RI. The analyses of these samples indicated the presence of chrysotile, a friable form of asbestos. In addition, material was visible on suspended piping and hoppers which was suspected of being ACM. Ebasco estimated the volume of ACM in the powerhouse to be approximately 330 yd^3 (250 m^3).

ARCO awarded a contract to remove the asbestos from the powerhouse to OHM Remediation Services Corporation (OHM), of Princeton, New Jersey, on 25 August 1992. However, after the award of the contract, OHM

expressed its concern about the condition of the powerhouse roof and parapets, and the risk that the roof and parapets would pose to the safety of personnel engaged in remediation activities.

E&M Engineers and Surveyors pc., (E&M) of Bradford, Pennsylvania, was contracted by OHM to assess the integrity of the roof and parapets. E&M inspected and load tested the roof and inspected the roof parapets on 14 October 1992 and between 9 and 11 November 1992. E&M concluded that while areas of the roof were in acceptable condition, other areas of the roof and portions of the parapet were unsafe.

Asbestos Control Management, Inc. (ACM) of Olean, New York, was also retained by OHM to conduct an asbestos inspection of the powerhouse roof. Samples had not previously been obtained from the roof to determine if the roofing materials contained asbestos. ACM obtained seven samples of the roofing material from three different areas of the roof on 26 October 1992. All the samples were found to contain chrysotile asbestos.

Following the roof survey, ARCO decided to re-evaluate the scope of the project. This reassessment led to a decision to combine the removal of ACM with demolition of the powerhouse and smokestack. ARCO elected to cancel its contract with OHM and rebid the amended remediation activities. However, before demobilizing from the site OHM erected a security fence around the powerhouse area and removed some external steel attached to the outside of the powerhouse.

A further asbestos identification survey was performed by Accredited Environmental Technologies, Inc. (AET) for GeoSyntec to address the possibility of ACM in demolition debris. AET collected samples from the turbine room, exterior pipe insulation, brick mortar and the inside of the smokestack. AET submitted a report titled "*Environmental Health Survey Report, GeoSyntec Consultants, Wellsville, New York*", and dated 26 March 1993. The report noted that all the materials tested were non-ACM except for some loose floor tiles in the turbine room and some

exterior pipe insulation which contained 5 and 20 percent chrysotile asbestos, respectively, and non-fibrous material. In addition, AET anticipated that material observed, but not tested, on the roofs of three small external storage buildings contained asbestos.

The Town of Wellsville made a formal inspection of the powerhouse and smokestack on 25 June 1993. As a result of this inspection, the Town of Wellsville officially condemned the structures and issued an order to the Alfred Education Foundation and ARCO to demolish the structures.

2.6 Powerhouse Remedy Implemented

The final remedy agreed to between ARCO and the USEPA for the powerhouse included the following:

- removal of asbestos from the roofs of the turbine room and small external storage buildings;
- demolition of the small external storage buildings, if necessary to facilitate the safe demolition of the powerhouse;
- partial demolition of the powerhouse to permit safe entry within the structure;
- removal of ACM material from inside the powerhouse;
- complete demolition of the powerhouse with removal of external walls to the ground-floor slab-on-grade or to a depth of 1 ft (0.3 m) below the ground level, in those areas where the ground-floor slab-on-grade was below the ground surface;
- demolition of the smokestack;

- removal of all building debris from the site; and
- backfilling and grading the powerhouse footprint to the ground surface with clean granular fill.

3. PARTIES TO REMEDIATION ACTIVITIES

The key organizations which were involved in the remediation of the separator and powerhouse are listed below, in alphabetical order, together with a brief statement of the role of each organization, and if appropriate, the key personnel who were involved with the construction activities. Additional organizations that were involved for specific activities are introduced in the body of the text.

3.1 AET

Accredited Environmental Technologies, Inc. (AET), Danbury, Connecticut, was retained by GeoSyntec to provide on site monitoring and testing services during the asbestos abatement phase of the powerhouse remediation. GeoSyntec also retained AET to assist in the preparation of the work plan for the powerhouse remediation. AET in turn retained Brad Associates to assist in the preparation of the work plan. The following key individuals were involved:

- Mr. J. Murphy, Project Manager; and
- Mr. G. Brego, Project Monitor.

3.2 ARCO

Atlantic Richfield Company (ARCO) was legally responsible for the remediation of the separator and powerhouse and provided project management and control functions. The following key individuals were involved:

- Mr. R.W. Simmons, Operations Manager;
- Mr. D.A. Christensen, P.E., Project Manager;
- Mr. N.S. Brody, Senior Attorney;
- Mr. R.E. Ivy, Construction Supervisor; and
- Mr. D.E. Grooms, Project Controls (separator).

ARCO prepared daily field reports throughout the period of construction, which were distributed to USEPA. Copies of these reports are not reproduced in this report.

3.3 Brad Associates

Brad Associates, Lake Ronkonkoma, New York, was retained by AET to assist in the preparation of the work plan for the asbestos abatement and demolition of the powerhouse. Mr. B. San Pedro, P.E. was the key individual involved.

3.4 CDI

Controlled Demolition Incorporated (CDI), Phoenix, Maryland, was retained by Kimmins to demolish the smokestack. Mr. D.K. Loizeaux was the key individual involved.

3.5 Ebasco

Ebasco Services, Inc. (Ebasco), Lyndhurst, New York, was retained by ARCO to prepare construction documents for both the separator and the powerhouse. Some of the documents prepared by Ebasco were replaced when the scope of the powerhouse remediation was changed from asbestos removal to asbestos removal coupled with the demolition of the structure.

3.6 GeoSyntec

GeoSyntec Consultants (GeoSyntec), Atlanta, Georgia, was retained by ARCO to provide resident engineering and field engineering and inspection services. GeoSyntec provided these services on a full time basis during the remediation of the separator and on a part time basis during the remediation of powerhouse in 1993. The following key personnel were involved:

- Dr. J.F. Beech, P.E., Principal-in-Charge;
- Mr. R.B. North, P.E., Resident Engineer; and
- Mr. J.E. Brandes, Engineering Technician (separator).

GeoSyntec retained AET to provide full time asbestos monitoring services while the activities associated with the removal of the asbestos from the powerhouse were performed. In addition, GeoSyntec was retained by ARCO to prepare a work plan for the removal of asbestos from the powerhouse and demolition of the powerhouse. GeoSyntec performed this task in conjunction with AET and Brad Associates.

During the remediation activities, GeoSyntec's and AET's personnel photographed different aspects of the work. Photographs which depict key activities of the separator and powerhouse remediations are presented in Appendices A and B, respectively. In addition, GeoSyntec's personnel prepared daily, weekly, and monthly field reports as appropriate to summarize the remediation activities performed. These reports also summarize the remediation activities performed for the CELA and the refinery surface soils. Copies of the weekly and monthly field reports are presented in Appendices C and D for the period of 10 August 1992 to 9 June 1993.

3.7 Kimmins

ThermoCor Kimmins (Kimmins), Niagara Falls, New York, was awarded the contract for the remediation, including demolition, of the powerhouse and smokestack. The following key individuals were involved:

- Mr. D. Hoffner, Project Manager;
- Mr. J. Callahan, Project Supervisor;
- Ms. S. Mancini, Project Supervisor; and
- Mr. G. Schenk, Asbestos Supervisor.

3.8 Myers

Douglas C. Myers (Myers), Arcade, New York, a registered land surveyor in the state of New York, was retained by Sevenson to provide surveying services for the separator.

3.9 NYSDEC

The New York State Department of Environmental Conservation (NYSDEC), Albany, New York, assisted the USEPA with regulatory oversight of the project. Mr. J. Drumm was the key individual involved with the project.

3.10 NYSDOL

The New York State Department of Labor (NYSDOL), Syracuse, New York, routinely visited the site during the asbestos abatement phase of the powerhouse remediation. Mr. J. Emmerling, Safety and Health Inspector, Asbestos Control Bureau, was the key individual involved with the project.

3.11 On-Site

On-Site Health and Safety Services, Inc. (On-Site), Wellsville, New York, provided health and safety related services for both the separator and powerhouse. For the separator these services included: (i) perimeter air monitoring; (ii) perimeter air sampling; (iii) OSHA 1910.120 compliance information; and (iv) site security. For the powerhouse, On-Site was retained by ARCO to provide health and safety advice and document review.

3.12 Sevenson

Sevenson Environmental Services, Inc. (Sevenson), Niagara Falls, New York, was awarded the contract for the separator remediation. The following key individuals were involved:

- Paul Thompson, Vice President and Corporate Project Manager;
- Paul Hitcho, Ph.D., CIH, Vice President and Director of Occupational Health and Safety;
- Kim Lickfield, Quality Control Manager;
- Jack Brueckl, Project Manager; and
- Earl Kostuk, Superintendent.

3.13 USCOE

The U.S. Corps of Engineers (USCOE), Niagara Falls, New York, assisted the USEPA with regulatory oversight of the project. Mr. M. Hrywnak, Project Monitor, was the key individual involved with the project during construction.

3.14 USEPA

The U.S. Environmental Protection Agency (USEPA), Region II, New York, New York, was responsible for regulatory oversight of the separator and powerhouse projects. The USEPA was assisted in this task by personnel from the New York State Department of Environmental Conservation (NYSDEC), and the U.S. Corps of Engineers (USCOE). The following key individuals were involved:

- Ms. C. Berns, Superfund Site Attorney; and
- Mr. L. DiGuardia, On-Scene Coordinator.

3.14 Weston/TAT

The Roy F. Weston, Inc. (Weston), Technical Assistance Team (TAT), Edison, New Jersey, provided on-site project oversight on behalf of USEPA for both the separator and the powerhouse.

4. SEPARATOR REMEDIAL DESIGN

4.1 Remedial Design Objectives

The objectives of the separator remediation were to:

- remove constituents of concern from the separator; and
- decontaminate and demolish the separator and associated facilities to a depth of 2 ft (0.6 m) below the existing ground surface.

4.2 Remedial Design Documents

The remedial design of the separator was performed by Ebasco. Ebasco prepared the following project documents for the remediation:

- "*Work Plan*", dated July 1992, and approved by the USEPA on 5 August 1992.
- "*Health and Safety Plan, Including Contingency Plan*", dated July 1992, and approved by the USEPA on 5 August 1992.
- "*Quality Assurance Project Plan*", dated July 1992, and was approved by the USEPA on 5 August 1992.
- "*Sampling and Analysis Plan*", dated July 1992, and approved by the USEPA on 5 August 1992.

4.3 Construction Design Changes

Design changes were made during construction in response to field conditions which differed from those which were anticipated. The design changes that were approved are listed below, by increasing Field Change Order (FCO) number.

- **Field Change Order 001-003-02.**
  Size of manhole MH-1 increased from a circular 4-ft (1.2-m) diameter section to a rectangular 4.5 ft (1.4 m) by 8 ft (2.4 m) section. This change was made to accommodate the existing inlet pipes, which are more widely spaced than the design anticipated.

- **Field Change Order 002-003-02.**
  Additional pipework required to replace crushed sections of the existing 10-in. (250-mm) and 24-in. (600-mm) diameter clay pipes with PVC pipes of the same diameters at the inlet of manhole MH-1.

- **Field Change Order 004-003-02.**
  Rental of roll-off boxes for protracted storage of filter cake on-site while filter cake characterization testing (K051 and toxicity characteristic leaching potential (TCLP)) was being performed.

- **Field Change Order 005-003-02.**
  Additional filter cake sampling and laboratory testing to determine whether the filter cake in the roll-off boxes met K051 criteria. A total of 35 roll-off boxes were sampled and tested.

- **Field Change Order 006-003-02.**
  Approval to install 4-ft (1.2-m) high temporary orange barricade fencing around the perimeter of the site instead of a temporary 6-ft (1.8-m) high chain link fence.

- **Field Change Order 007-003-02.**
  Installation of approximately 70 linear ft (21.3 linear m) of 15-in. (380-mm) diameter corrugated metal pipe (CMP) from a drainage ditch on the north side of the separator to manhole MH-3 of the by-pass sewer system.

- **Field Change Order 008-003-02.**
  Extended the rental period of the roll-off boxes covered by FCO 004-003-02.

- **Field Change Order 009-003-02.**
  Additional sampling of 12 roll-off boxes with laboratory testing for three K051 compounds and TCLP analysis.

- **Field Change Order 010-003-02.**
  Reduction in cost of incineration of sludge filter cake.

- **Field Change Order 011-003-02.**
  Reduction in cost of disposal of filtrate; effective 1 January 1993.

- **Field Change Order 012-003-02.**
  Removal of topsoil, seeding and mulching activities from contract due to prevailing cold weather conditions.

- **Field Change Order 013-003-02.**
  Additional support costs.

- **Field Change Order 014-003-02.**
  Install pipe bollards around catch basin, and manholes MH-1 and MH-2.

- **Field Change Order 015-003-02.**
  Install asphalt paving over separator area.

5. POWERHOUSE REMEDIAL DESIGN

5.1 Remedial Design Objectives

The objectives of the powerhouse remediation were to:

- remove ACM from the powerhouse and associated structures; and
- demolish the powerhouse, smokestack and concrete pedestal and if necessary, the small buildings adjacent to the powerhouse.

5.2 Remedial Design Documents

The initial remedial design of the powerhouse, which addressed only the removal of ACM from the powerhouse, was performed by Ebasco. Ebasco prepared the following project documents for the remediation:

- "*Work Plan, Sinclair Refinery Site, Powerhouse Remediation, Wellsville, New York*", dated July 1992.
- "*Health and Safety Plan, Including Contingency Plan, Sinclair Refinery Site, Powerhouse Remediation, Wellsville, New York*", dated July 1992.
- "*Quality Assurance Project Plan, Sinclair Refinery Site, Powerhouse Remediation, Wellsville, New York*", dated July 1992.
- "*Sampling and Analysis Plan, Sinclair Refinery Site, Powerhouse Remediation, Wellsville, New York*", dated 1992.

GeoSyntec, AET, and Brad Associates subsequently prepared a new work plan, which addressed both asbestos abatement and demolition, titled *"Work Plan, Sinclair Refinery Site, Powerhouse Remediation, Wellsville, New York"*, dated 13 May 1993 and revised 18 June 1993.

6. SEPARATOR REMEDIATION

6.1 Introduction

The following subsections provide a chronological and narrative description of the major tasks and events associated with the remediation of the separator.

6.2 Pre-Construction Activities

6.2.1 Bid Documents

Ebasco developed a Request for Proposal (RFP) package for the separator, which was submitted to ARCO and issued to qualified contractors on 19 June 1992.

6.2.2 Pre-Bid Meeting

ARCO held a pre-bid meeting for qualified contractors in Wellsville on the afternoon of 25 June 1992. The contractors visited the separator as part of the pre-bid meeting.

6.2.3 Bid Award

ARCO awarded the contract for the remediation of the separator to Sevenson on 7 August 1992.

6.2.4 Pre-Construction Meetings

After award of the contract and before the start of field activities Sevenson attended two meetings at the site. A pre-site mobilization meeting was held on 14 August 1992 and a pre-construction meeting was held on 20 August 1992.

6.3 Construction Activities

6.3.1 Work Area Security

In accordance with FCO 006-003-02, Sevenson erected temporary 4-ft (1.2-m) high orange barricade fencing around the whole site instead of the 6-ft (1.8-m) high chain link fence described in the work plan. Sevenson completed installing the fence on 9 September 1992 and completed dismantling the fence on 9 February 1993. In addition, Sevenson provided on-site security during working hours from 31 August to 2 September 1992 and on a 24-hour basis from 3 September 1992 to 21 January 1993. Sevenson subcontracted this activity to On-Site. Sevenson completed Inspection Report Form A-1, Work Area Security (Appendix E), following completion of the fence and initiation of 24-hour security.

6.3.2 Mobilization

Sevenson started to mobilize temporary facilities equipment and personnel to the site on 26 August 1992. Mobilization activities included: (i) delivery of site trailer on 27 August; (ii) delivery of equipment trailer on 28 August; (iii) delivery of ARCO trailer on 3 September; (iv) establishment of telephone and electricity services by 16 September; (v) establishment of perimeter air monitoring stations on 9 September; (vi) preparation of a decontamination pad on 14 September;

(vii) establishment of exclusion zone around separator structure on 14 September; (viii) assembly of two rectangular 100,000 gal (375,000 l) temporary holding tanks and two circular 30,000 gal (112,500 l) temporary holding tanks, all with dual polyvinyl chloride (PVC) liners, completed on 23 September; and (ix) a visit by the utility companies to the site to check for the presence of underground utilities (gas and water lines are present in the vicinity of the separator). Sevenson completed Inspection Report Form A-2, Mobilization (Appendix E), on 10 September prior to completion of all the mobilization activities. In addition, although some activities had already been started a "kick-off meeting" was held on site on 14 September 1992.

6.3.3 Clearing and Grubbing

Monroe Tree Service (Monroe) of Rochester, New York, cleared and grubbed the majority of the site around the separator on 16 July 1992 while it was performing work on the CELA contract. Trees and underbrush were transported to Monroe's wood chipper stationed at the CELA and chipped. Other surface debris was moved away from the separator. Sevenson performed additional grading and clearing on 26 August 1992 and between 2 and 4 September 1992. Inspection Report Form A-3, Clear and Grubb/Strip Topsoil (Appendix E), details an inspection made on 10 September 1992 after the clearing and grubbing had been completed. Sevenson stockpiled the debris at the east end of the site. The debris was hauled to a local landfill by LaForge K.S. Excavating Inc. (LaForge), Wellsville, New York, on 12 September 1992.

6.3.4 Construct Separator Stormwater By-Pass Sewer

A permanent stormwater by-pass sewer system (by-pass sewer) was constructed around the northern side of the separator. The upgradient and downgradient ends of the by-pass sewer connected with the separator

influent and effluent lines, respectively. The stormwater, therefore, has been permanently routed around the separator, whereas it used to flow through the separator.

6.3.4.1 Soil Sampling

The soils along the proposed alignment of the by-pass sewer were sampled and analyzed prior to excavating, in accordance with the Sampling and Analysis Plan (SAP) to determine the disposal requirements of the soil. The SAP requires that one composite sample be collected for every 100 yd^3 (75 m^3) of material excavated. The alignment of the by-pass sewer was divided into six grids, which typically measured approximately 40 ft (12.2 m) by 8 ft (2.4 m), as shown on a figure in Appendix H. Based on an excavation depth of 8 ft (2.4 m), the typical grid volume was approximately 95 yd^3 (71 m^3). Five borings were drilled in each grid, according to the layout shown on a figure in Appendix H, for a total of 30 borings.

The borings were drilled by SJB Services, Inc., Buffalo, New York, on 1 and 2 September 1992. Two TAT representatives, Mr. Hemendra Moradia and Mr. Jose Abraham were present to provide oversight and to take split samples. Each boring was advanced to a depth of 8 ft (2.4 m), the maximum excavation depth anticipated for the construction of the by-pass sewer. Soil samples were collected from each boring by split-spoon sampling, as the borings were advanced, at the following intervals: 0 to 2 ft (0 to 0.6 m), 2 to 4 ft (0.6 to 1.2 m), 4 to 6 ft (1.2 to 1.8 m), and 6 to 8 ft (1.8 to 2.1 m), for a total of 20 samples within each grid and 120 samples along the alignment of the by-pass sewer. Each sample was scanned for volatiles using a photoionization detector (PID) immediately after the split-spoon sampler was opened. The PID data is presented in Appendix F. The 20 samples obtained from each grid were combined to create one representative composite sample.

The six composite samples were packed and transported on ice with chain of custody documentation, in accordance with the SAP, to RECRA Environmental, Inc., New York, for testing. The following tests were performed on each of the composite samples:

- TCLP of base neutral/acid extractable;
- polychlorinated biphenyls;
- wet chemistry analysis;
- TCLP of volatiles;
- TCLP of metals; and
- TCLP of herbicides.

The laboratory data, which is presented in Appendix F, indicated that all the soil to be excavated along the by-pass sewer alignment could be disposed in the CELA.

6.2.4.2 Construction of By-pass Sewer

On 16 September 1992, Sevenson began diverting the storm water around the separator by pumping the storm water from existing manhole SM-8, at the influent end of the separator, to a hole made in the crown of the 42-in. (1.07-m) diameter effluent pipe down gradient from new manhole MH-4. This pumping operation was continued until construction of the by-pass sewer was complete.

Sevenson plugged the following pipes with 4,000 psi (30 N/mm^2) concrete on 16 and 17 September: (i) the two 24-in. (0.6-m) diameter influent pipes leading from manhole SM-8 into the separator; (ii) the 42-in. (1.05-m) diameter effluent pipe at the east end of the separator; (iii) a 2-in. (50-mm) diameter pipe of unknown source on the south wall of the separator; and (iv) a corrugated metal pipe (CMP) on the north wall of the separator which drained land to the north of the separator.

Sevenson started to excavate the by-pass sewer alignment on 29 September following the completion of the tests on the composite soil samples and subsequent approval by the USEPA to start excavating. The excavation and construction of the bypass sewer progressed up gradient from manhole MH-4 to MH-3 to MH-2 and MH-1. The by-pass sewer also included a section between an existing catch basin, near the northwest corner of the separator, and manhole MH-2. Sevenson constructed this section concurrently with the section between manholes MH-1 and MH-2. The excavation of the alignment was completed on 10 October. All excavated soil was taken to the CELA for disposal as the excavation progressed.

The positions of manholes MH-3 and MH-4 and the by-pass sewer section between these two manholes were constructed approximately 20-ft (6-m) west of the design locations because of the presence of below grade concrete structures. It was necessary to demolish the eastern brick separator pump-house structure to accommodate the adjustment. This structure was demolished on 30 September 1992 following: (i) an asbestos survey (including sample testing), by Asbestos Control Management, Inc., (ACMI) of Olean, New York, on 28 July 1992, which revealed the presence of a total of approximately 620 ft^2 (58 m^2) of roofing felt, which contained non-friable chrysotile asbestos, on both pumphouse structures; (ii) the removal and bagging, by ACMI, of the roofing felt from both structures using material methods on 1 September 1992; (iii) air sampling during the asbestos removal activities by Industrial Hygiene and Environmental Consultants, Inc., Olean, New York; and (iv) the transport,

by NHD, Inc., of White Haven, Pennsylvania, of the asbestos material from the site to S & S Landfill, Clarksburg, West Virginia on 8 September 1992. Documentation relating to the asbestos sampling and testing is presented in Appendix F and the asbestos manifest documentation is presented in Appendix G.

The by-pass sewer consists of Class II precast reinforced concrete pipe (RCP) sections conforming to ASTM C76 "Reinforced Concrete Culvert, Storm Drains and Sewer Pipe" with bell and rubberized spigot joints. The by-pass sewer has diameters of 42 in. (1.05 m) between manholes MH-2 and MH-4 and 18 in. (0.45 m) between manholes MH-1 and MH-2 and between the existing catch basin, near the northwest corner of the separator, and manhole MH-2. All RCP sections were laid on a 4-in. (100-mm) thick bed of screened gravel. Each manhole base and the manhole sides, to a height of approximately 6-in. (150-mm) above the top of the highest pipe entering or leaving the manhole, were cast-in-place using 4,000 psi (30 N/mm^2) concrete. Precast reinforced concrete manhole sections were used above the cast-in place sections. The manhole bases were cast on a 6-in. (150-mm) thick bed of screened gravel.

The design anticipated that the two existing influent lines at manhole MH-1 would be 10-in. (250-mm) diameter, closely spaced and parallel steel pipes. The actual influent pipes are a 24-in. (600-mm) diameter clay pipe and a 10-in. (250-mm) clay pipe, which diverge, as shown on the As-Built Plan in Appendix H. Both pipes were partially crushed and leaking into the surrounding soils. In addition, the 10-in. (250-mm) diameter pipe contained sediment across its full cross section and the 24-in. (600-mm) diameter pipe had approximately 3 to 5 in. (75 to 125 mm) of sediment in its invert. Both pipes did flow following precipitation. The crushed sections of the pipes were removed and replaced with new PVC, grade SDR 35, pipe, as detailed in FCO 002-003-02. The new PVC pipe sections were joined to the existing clay sections using furnco connections.

The by-pass sewer was leak tested with water in two sections. The 42-in. (1.05-m) diameter section between manholes MH-2 and MH-4 was tested on 15 and 16 October 1992, and the 18-in. (0.45-m) diameter section between manholes MH-1 and MH-2 was tested between 26 and 28 October 1992. Both tests were conducted by filling the appropriate by-pass sewer section with water and applying a 2-ft (0.6-m) head of water to the manhole at the upgradient end of the section being tested. The test on the 42-in. (1.05-m) diameter section resulted in an average leakage rate, during a 24-hour period, of 166 gal/in. diameter/mile/day (1,415 l/m diameter/km/day). The test on the 18-in. (0.45-m) diameter section resulted in a leakage rate, over the last 17 hours of the test, of 88 gal/in. diameter/mile/day (750 l/m diameter/km/day). Both results were less than the maximum acceptable criterium established in the Work Plan of 250 gal/in. diameter/mile/day (2,130 l/m diameter/km/day).

The by-pass sewer line was backfilled with clean gravel from Skuba Construction Materials (Skuba) of Almond, New York, (see Appendix F for chemical test data) to the spring line, before leak testing, and with clean common fill from Skuba to the ground surface, after leak testing. The gravel and common fill were placed in maximum 12-in. (0.3-m) thick loose lifts and compacted around and above the pipe sections using a hand operated vibrating plate compactor. Sevenson completed backfilling the by-pass sewer on 3 November 1992.

Sevenson subsequently decommissioned existing manhole SMH-8, a rectangular concrete chamber with a flat concrete top, by: (i) plugging the pipe inlets with 4,000 psi (30 N/mm^2) concrete; (ii) filling the chamber with gravel; and (iii) filling the top opening with 4,000 psi (30 N/mm^2) reinforced concrete dowelled into the existing concrete manhole top.

Sevenson installed approximately 70 ft (21.4 m) of 15-in. (380-mm) diameter CMP from a ditch, to the north of the separator, to manhole MH-3 on 7 January 1993, in accordance with FCO 007-003-02.

All concrete used in the construction of the by-pass sewer system was pre-mixed and obtained from L.C. Whitford Materials Company, Inc.'s (Whitford's) plant in Wellsville, New York. Copies of the batch/delivery tickets are presented in Appendix F. Sevenson typically made a set of three test cylinders on each day that concrete was delivered to the site. The cylinders were field cured and sent to Empire Soils Investigations, Inc., Hamburg, New York, for testing. The concrete test reports are also presented in Appendix F. The data indicates that all the concrete attained a strength in excess of 4,000 psi (30 N/mm^2), although the concrete delivered on 8 October 1992 required more than 28 days to reach a strength of 4,000 psi (30 N/mm^2).

6.2.5 Erect Temporary Separator Access and Cover

On 1 September 1992, Sevenson started to construct: (i) two access stairways to the top of the cell walls; (ii) walkways along the top of the cell walls in the longitudinal direction (i.e., two walkways between the three trains); and (iii) a cover, consisting of wooden trusses covered with polyethylene, over the separator. This work was completed on 15 September 1992. The cover was constructed to protect the separator from precipitation while activities relating to the removal of hazardous materials from the separator and the documentation of the separator were in progress. The temporary facilities were constructed and installed to comply with applicable OSHA regulations. Sevenson submitted Inspection Report Form A-7, Install Access and Cover (Appendix E), following completion of the installation.

6.2.6 Aqueous Phase Removal

Sevenson erected four temporary holding tanks (ModuTanks) manufactured by ModuTank Inc., Long Island City, New York, at the east end of the site. Two of the tanks were rectangular and each had a capacity of approximately 100,000 gal (375,000 l). The other two tanks were circular and each and a capacity of approximately 30,000 gal (112,500 l). The ground beneath the tanks was graded and lined with an 8 oz/yd^2 needlepunched non-woven geotextile to provide a cushion beneath the tanks. Two continuous PVC liners were placed in each tank. Sevenson started to assemble the ModuTanks on 16 September and completed the assembly on 23 September 1992.

Sevenson pumped the aqueous phase from the separator directly to one of the 100,000 gal (375,000 l) ModuTanks between 29 September and 13 October 1992. The total quantity of aqueous phase removed from the separator was approximately 82,000 gal (307,500 l); approximately 96,500 gal (361,875 l) less than the 178,500 gal (669,375 l) estimated by Ebasco in its RI report. The pumping activities are summarized in the following table.

DATE	VOLUME AQUEOUS PHASE REMOVED (gal)	CUMULATIVE VOLUME (gal)
29 Sep 1992	49,500	49,500
12 Oct 1992	23,400	72,900
13 Oct 1992	9,100	82,000

Sevenson prepared Inspection Report A-6, Remove Aqueous Phase (Appendix E), to document the aqueous phase which was pumped from the separator to the Modutank.

6.2.7 Free Oil Removal

Free oil was floating on the aqueous phase in several of the southwest cells of the southern train of cells. Sevenson obtained a sample of this oil on 14 September 1992 and submitted the sample to Noco Energy Corp. (Noco), Tonawanda, New York, for testing. Noco completed the tests on 6 October 1992 which established that the oil was non-hazardous and could be recycled (Appendix F). Noco Oil Recovery, a division of Noco, removed approximately 900 gal (3,375 l) of oil from the separator on 12 October 1992 for transport to and processing at its facility.

6.2.8 Treatment of Aqueous Phase

The work plan requires that the aqueous phase be pretreated on-site to meet the pretreatment requirements to permit discharge to the POTW. Sevenson mobilized a multipurpose aqueous treatment plant manufactured by Purification Industries, Inc. (PII), Kansas City, Missouri, with a minimum filter size of five microns and a nominal treatment capacity of 10 gpm (37.5 l/min) to pretreat the aqueous phase and sludge filtrate.

Sevenson pumped the aqueous phase from the 100,000 gal (375,000 l) Modutank through the treatment plant into the 30,000 gal (112,500 l) Modutanks. Pumping and pretreatment of the aqueous phase was started on 29 September and completed on 2 November 1992. Sevenson completed Inspection Report Form A-8, Treatment of Aqueous Phase (Appendix E), to document the pretreatment of the aqueous phase. A total of four separate tank loads of treated aqueous phase were produced.

Sevenson sampled each tank load of the pretreated aqueous phase, in accordance with the SAP, at four locations to make one composite sample. Each composite sample was packaged on ice and sent to General Testing

Corporation (General Testing), Rochester, New York, for chemical analysis to confirm that the impurities in the treated aqueous phase were below the concentrations established to permit discharge to the POTW. Copies of the analytical data are presented in Appendix F. The tank loads were discharged to the POTW following acceptable analytical results. The table below summarizes the pretreatment, sampling and disposal of the aqueous phase.

TANK LOAD NUMBER	DATE SAMPLED	DATE ANALYTICAL RESULTS RECEIVED	DATE DISPOSED TO POTW	VOLUME AQUEOUS PHASE DISPOSED (gal)	TOTAL VOLUME DISPOSED (gal)
1	15 Oct 1992	27 Oct 1992	27 Oct 1992	23,362	23,362
2	22 Oct 1992	2 Nov 1992	2 Nov 1992	26,248	49,610
3	29 Oct 1992	9 Nov 1992	9 Nov 1992	26,954	76,564
4[1]	5 Nov 1992	13 Nov 1992	13 Nov 1992	5,436	82,000

Note: (1) Tank load number 4 contained treated aqueous phase and treated filtrate (see Section 6.2.10, below), the quantity shown in the table represents the quantity of treated aqueous phase.

As noted, four tank loads of pretreated aqueous phase were produced. Tank loads 1 and 2 were transported to the POTW by Busy Bee Disposal Service (Busy Bee), Alfred Station, New York, in a tanker truck. A copy of Busy Bee's waste transporter permit is presented in Appendix G. Tank loads 3 and 4 were discharged into a manhole, west of the separator, which leads directly to the POTW. This method of discharge was approved by Mr. Robert Chaffee, P.E., Director of Public Works for the Village of Wellsville and Mr. William Ford, the property owner of the land where the manhole is located. Copies of the correspondence documenting the acceptance is presented in Appendix G.

Sevenson completed Inspection Report Form A-9, Storage of Aqueous Phase (Appendix E), on each day that aqueous phase was stored in the Modutanks, and Inspection Report Form A-10, Disposal of Aqueous Phase (Appendix E), on each day that the pretreated aqueous phase was disposed from the site.

6.2.9 Sludge Removal and Processing

The majority of the sludge was removed from the separator, using an air operated double diaphragm pump and a "Muffin Monster" grinder, to break down small debris. The sludge was placed in a tank, in loads of 3,456 gal (12,960 l), and treated with ferric chloride and lime to assist with the subsequent dewatering phase. After treatment the sludge was processed through a 100 ft^3 (2.8 m^3) low-pressure, recessed-chamber, plate and frame filter press with a six micron filter, to separate the sludge liquid and solid phases. The resulting sludge filter cake (the solid phase) was placed in 32 polyethylene lined roll-off boxes for off-site disposal. A portion of the filtrate (the liquid fraction) was recirculated into the separator to assist with sludge removal and the remainder was pumped into a 100,000 gal (375,000 l) Modutank for subsequent treatment and disposal.

Sludge that could not be removed from the separator by pumping was removed using a vacuum truck. This sludge was not passed through the filter press. It was placed directly into one of the polyethylene lined roll-off boxes and stabilized with lime. Some of the sand from the decontamination activities (Section 6.2.12, below) was mixed with this unprocessed sludge. In addition, the separator contained debris that was too large to remove from the separator. This debris was decontaminated in situ by steam cleaning the debris during the sludge removal phase. All liquids generated by the debris cleaning activities were removed and processed as sludge.

Sludge removal was started on 8 October and processing was completed on 24 November 1992. Sevenson subcontracted the activities associated with the processing of the sludge to Central New York Industrial Services, Inc., Hannibal, New York. Ebasco estimated in the RI that approximately 106,500 gal (399,375 l) of sludge was present in the separator. The actual quantity of sludge treated, including the steam cleaning water used to remove sludge from large debris, was 282,212 gal (1,058,295 l), of which approximately 233,841 gal (876,904 l), 83 percent, was recovered as filtrate. Sevenson completed Inspection Report Form A-11, Remove and Dewater Sludge (Appendix E), on a daily basis.

The table below summarizes the sludge removal and processing activities.

DATE PROCESSED	NUMBER OF 3,456 gal LOADS PROCESSED	VOLUME OF SLUDGE PROCESSED (gal)	VOLUME OF FILTRATE RECIRCULATED (gal)	NET VOLUME OF SLUDGE PROCESSED (gal)	TOTAL VOLUME OF SLUDGE PROCESSED (gal)
8 Oct 1992	2	6,912	2,000	4,912	4,912
9 Oct 1992	4	13,824	4,000	9,824	14,736
10 Oct 1992	3	10,368	3,000	7,368	22,104
11 Oct 1992	3	10,368	3,000	7,368	29,472
12 Oct 1992	3	10,368	3,000	7,368	36,840
13 Oct 1992	3	10,368	3,000	7,368	44,208
14 Oct 1992	2	6,912	2,000	4,912	49,120
15 Oct 1992	3	10,368	3,000	7,368	56,488
16 Oct 1992	2	6,912	2,000	4,912	61,400
19 Oct 1992	2	6,912	2,000	4,912	66,312
20 Oct 1992	3	10,368	3,000	7,368	73,680

DATE PROCESSED	NUMBER OF 3,456 gal LOADS PROCESSED	VOLUME OF SLUDGE PROCESSED (gal)	VOLUME OF FILTRATE RECIRCULATED (gal)	NET VOLUME OF SLUDGE PROCESSED (gal)	TOTAL VOLUME OF SLUDGE PROCESSED (gal)
21 Oct 1992	3	10,368	3,000	7,368	81,048
22 Oct 1992	3	10,368	3,000	7,368	88,416
23 Oct 1992	3	10,368	3,000	7,368	95,785
24 Oct 1992	3	10,368	3,000	7,368	103,152
25 Oct 1992	4	13,824	4,000	9,824	112,976
26 Oct 1992	3	10,368	3,000	7,368	120,344
27 Oct 1992	3	10,368	3,000	7,368	127,712
28 Oct 1992	3	10,368	3,000	7,368	135,080
29 Oct 1992	3	10,368	3,000	7,368	142,448
30 Oct 1992	3	10,368	3,000	7,368	149,816
2 Nov 1992	3	10,368	3,000	7,368	157,184
3 Nov 1992	3	10,368	3,000	7,368	164,552
4 Nov 1992	3	10,368	3,000	7,368	171,920
5 Nov 1992	3	10,368	3,000	7,368	179,288
6 Nov 1992	3	10,368	3,000	7,368	186,656
7 Nov 1992	3	10,368	3,000	7,368	194,024
8 Nov 1992	2	6,912	2,000	4,912	198,936
9 Nov 1992	4	13,824	4,000	9,824	208,760
10 Nov 1992	4	13,824	4,000	9,824	218,584
11 Nov 1992	3	10,368	3,000	7,368	225,952
12 Nov 1992	4	13,824	4,000	9,824	235,776
13 Nov 1992	2	6,912	2,000	4,912	240,688
17 Nov 1992	2	6,912	2,000	4,912	245,600

DATE PROCESSED	NUMBER OF 3,456 gal LOADS PROCESSED	VOLUME OF SLUDGE PROCESSED (gal)	VOLUME OF FILTRATE RECIRCULATED (gal)	NET VOLUME OF SLUDGE PROCESSED (gal)	TOTAL VOLUME OF SLUDGE PROCESSED (gal)
18 Nov 1992	2	6,912	2,000	4,912	250,512
19 Nov 1992	4	13,824	4,000	9,824	260,336
20 Nov 1992	2	6,912	2,000	4,912	265,248
21 Nov 1992	3	10,368	3,000	7,368	272,616
22 Nov 1992	2.5	8,640	2,500	6,140	278,756
23 Nov 1992	1	3,456	1,000	2,456	281,212
24 Nov 1992	1	3,456	0	3,456	284,668

6.2.10 Treatment and Disposal of Filtrate

The filtrate was pretreated on-site using the multipurpose aqueous treatment plant (described in Section 6.2.8, Treatment of Aqueous Phase, above) which was initially used to pretreat the aqueous phase. Sevenson pumped the filtrate from the 100,000 gal (375,000 l) Modutank through the treatment plant into the 30,000 gal (112,500 l) Modutanks. A total of ten separate tank loads of pretreated filtrate were produced. Pretreatment of the filtrate was started on 2 November 1992 and completed on 3 February 1992.

Sevenson sampled each tank load of pretreated filtrate, in accordance with the SAP, at four locations to make one composite sample. Each composite sample was packaged on ice and sent to General Testing for chemical analysis to confirm that the impurities in the pretreated filtrate were below the concentrations established to permit discharge to the POTW. Copies of the analytical data are presented in Appendix F.

The table below summarizes the pretreatment, sampling and disposal of the filtrate.

TANK LOAD NUMBER	DATE SAMPLED	DATE ANALYTICAL RESULTS RECEIVED	DATE DISPOSED TO POTW	QUANTITY DISPOSED (gal)	TOTAL QUANTITY DISPOSED (gal)
4[1]	5 Nov 1992	13 Nov 1992	13 Nov 1992	8,276	8,276
5	17 Nov 1992	1 Dec 1992	1 Dec 1992	25,451	33,727
6	24 Nov 1992	4 Dec 1992	4 Dec 1992	25,451	59,178
7	4 Dec 1992	14 Dec 1992	14 Dec 1992	26,865	86,043
8	7 Dec 1992	14 Dec 1992	14 Dec 1992	26,158	112,201
9	16 Dec 1992	23 Dec 1992	23 Dec 1992	25,451	137,652
10	18 Dec 1992	28 Dec 1992	29 Dec 1992	25,451	163,103
11	4 Jan 1993	11 Jan 1993	11 Jan 1993	25,451	188,554
12	7 Jan 1993	14 Jan 1993	14 Jan 1993	25,451	214,005
13	14 Jan 1993	22 Jan 1993	22 Jan 1993	19,836	233,841
14	28 Jan 1993	2 Feb 1993	27 Jan to 3 Feb 1993	8,838	242,679

Note: (1) Tank load number 4 contained pretreated filtrate and pretreated aqueous phase (see Section 6.2.8, above). The quantity shown represents the quantity of pretreated filtrate.

Each tank load, except tank load number 14 was discharged, following receipt of acceptable analytical results, into the sanitary sewer line, to the west of the separator, which leads directly to the POTW. Tank load number 14 represented decontamination water generated during the demobilization of the Modutanks and filtrate that had been frozen in the bottom of the tank. This liquid was discharged as it was pretreated. Sevenson partially discharged the pretreated liquid from tank load number 14 into manhole MH-4 of the separator by-pass sewer which leads

directly to the Genesee River. An estimated 4,250 gal (15,938 l) of pretreated liquid were discharged into the Genesee River. The remainder of the load was discharged to the POTW. Sevenson completed Inspection Report Form A-12, Treat Sludge Liquid Friction, and Inspection Report Form A-13, Disposal of Sludge Liquid Fraction (Appendix E), as appropriate on the days that the filtrate was pretreated and disposed.

Some nonaqueous phase liquids (secondary oil) passed through the filter press with the filtrate. The secondary oil consisted of: (i) material was less dense than the filtrate and floated on the filtrate; and (ii) material that was denser than the filtrate and sank to the bottom of the Modutanks.

The portion of the secondary oil that was less dense than the filtrate was periodically skimmed from the surface of the Modutanks and placed in 55 gal (206 l) drums. A total of 29 drums of oil were collected. A sample of the oil was sent to General Testing for analysis. The analysis indicated that the oil would not pass the K051 criteria and would have to be incinerated. Copies of the analytical data are presented in Appendix F. The drums were sent to LWD, Calvert City, Kentucky, (the facility that was used to incinerate the filter cake sludge which did not pass the K051 criteria; see Section 6.2.11, below) for incineration on 11 January 1993. The manifest number and disposal quantity are presented as the last entry in Table A in Section 6.2.11, below, and a copy of the manifest is presented in Appendix G.

The portion of the oily material that was denser than the filtrate was cleaned from the bottom of the Modutanks, after disposal of the filtrate, stabilized with lime and placed in one of the 36 polyethylene lined roll-off boxes. The stabilized material was subsequently handled and tested in the same manner as the sludge filter cake.

6.2.11 Sludge Filter Cake Testing and Disposal

The sludge filter cake and other residuals from the Modutanks and from the decontamination sand blasting operations (see Section 6.2.12, below) were placed into 36 polyethylene lined roll-off boxes for temporary storage on-site and for transport to the off-site disposal facilities. Sevenson obtained a grab sample of the material in each roll off box and performed a paint filter liquids test (PFLT), using USEPA test method 9095, to confirm that the material did not contain free liquids. All the samples passed the PFLT. The PFLT test records are presented in Appendix F. The contents of the roll-off boxes were also sampled and tested, by Sevenson and the USEPA TAT, on several occasions to determine whether the sludge filter cake in each of the roll-off boxes was above or below the treatment standards for RCRA listed K051 waste under 40 CFR 268.41 and 268.43. The samples obtained by Sevenson were either sent to Law Environmental Inc. (Law), Pensacola, Florida, or to General Testing for analysis. Law's test data is presented as attachments to this report except for corrosivity, cyanide and sulfide data which is presented in Appendix F. General Testing's test data is presented in Appendix F. In addition, a summary of the data is presented in Appendix F.

Sevenson prepared a composite sample of the sludge filter cake on 15 October 1992. The composite was formed from samples taken from three roll-offs representing filter cake material from the west, center and east of the northernmost train of cells. The sample was sent to General Testing for analysis. The results are presented in Appendix F. The data indicated that disposal of the sludge filter cake in a landfill could be considered.

Members of the USEPA TAT obtained five samples from four of the roll-off boxes (boxes 135-25, 314-25, 196-25, and 210-25) on 4 November 1992. The USEPA submitted the analytical data to ARCO by letter from Mr. L. DiGuardia to Mr. D. Christensen, dated 7 December 1993. The data

indicated that the filter cake sludge in the four roll-off boxes sampled by USEPA TAT was all unsuitable for disposal in a landfill.

Sevenson sampled the sludge filter cake in 32 of the roll-off boxes on 10 December 1992. The samples were sent to Law for analysis. Law analyzed the samples using a gas chromatograph mass spectrometer (GCMS). The analyses indicated that the sludge filter cake in 22 of the roll-off boxes exceeded the KO51 criteria and therefore, would have to be incinerated. The analyses of the samples from the other ten roll-off boxes were inconclusive. Law was unable to attain minimum detection limits (MDLs) for three compounds on the KO51 analyte list at or below the KO51 criteria. Law did not detect di-n-butyl phthalate or phenol in any of the ten samples, but the MDL that Law was able to achieve was above the KO51 criterion of 3.6 ppm for both compounds. Similarly, Law flagged the data for bis(2-ethylhexyl)phthalate "J" estimated, although it reported concentrations less than the KO51 criterion of 7.3 ppm for four of the ten samples.

Sevenson sampled two additional roll-off boxes on 4 January 1993 (samples SL35 and SL36) and the final two roll-off boxes on 4 February 1993 (samples SL37 and SL38). These four roll-off boxes contained sludge filter cake, residual sludge from the bottom of the 100,000 gal (375,000 l) Modutank and sand from the sand blasting performed to decontaminate the walls and floor of the separator. All the samples were sent to Law for analysis. The test data from these last four roll-offs indicated that the filter cake sludge and other residuals could be disposed in a regulated landfill.

Sevenson obtained additional samples of the sludge filter cake on 11 February 1993 from the ten roll-off boxes which had indicated inconclusive data for the three compounds. The ten additional samples were sent to General Testing for analysis. These ten samples were tested using a gas chromatograph flame ionization detector (GCFID), which the laboratory considered: (i) would be able to achieve the MDLs of bis(2-

ethylhexyl) phthalate, di-n-butyl phthalate and phenol; and (ii) would provide conservative results. This testing indicated that the sludge filter cake in six of the ten roll-off boxes exceeded the K051 criteria and would require incineration, and that the sludge filter cake in the remaining four roll-off boxes met the K051 criteria and could be disposed in a regulated landfill.

The roll-off boxes which contained sludge filter cake that exceeded the K051 criteria were manifested, weighed in Wellsville, and taken to LWD, Calvert City, Kentucky, for incineration. The roll-off boxes that contained sludge filter cake that met the K051 criteria were manifested, weighed in Wellsville, and taken to Chemical Waste Management RCRA Landfill (CWM), Model City, New York, for landfill disposal. Tables A and B below summarize, for each destination, the date each roll-off box was shipped from the site, the manifest number, and the weight of the sludge filter cake in the roll-off box as measured in Wellsville and at the respective disposal facility. Copies of the manifests for each roll-off box and the scale weight tickets for each roll-off box, as determined at the site and at the respective disposal facility, are presented in Appendix G. The Certificates of Disposal which document that the contents of each roll-off box were incinerated at LWD and landfilled at CWM are also presented in Appendix G.

TABLE A
RECORD OF SHIPMENTS SENT TO LWD FOR INCINERATION

SHIPPING DATE	MANIFEST NUMBER	ROLL-OFF BOX NUMBER	IN WELLSVILLE		AT DISPOSAL FACILITY	
			WEIGHT (lb)	TOTAL WEIGHT (tons)	WEIGHT (lb)	TOTAL WEIGHT (tons)
28/Dec/92	NYB4775238	294-25	32,450	16.23	30,560	15.28
28/Dec/92	NYB4775247	196-25	27,500	29.98	26,540	28.55
28/Dec/92	NYB4775256	270-25	29,000	44.48	29,200	43.15
28/Dec/92	NYB4775265	314-25	26,500	57.81	25,080	55.69
28/Dec/92	NYB4775364	302-25	30,400	73.01	29,980	70.68
28/Dec/92	NYB4775346	341-25	29,170	87.60	29,240	85.30
30/Dec/92	NYB4775391	339-25	25,750	100.48	25,940	98.27
30/Dec/92	NYB4775319	102-25	33,650	117.31	32,940	114.74
30/Dec/92	NYB4775337	182-25	37,625	136.12	37,120	133.30
30/Dec/92	NYB4775463	257-25	27,100	149.67	27,900	147.74
30/Dec/92	NYB4775454	140-25	26,320	162.83	26,860	160.68
4/Jan/93	NYB4775445	136-25	27,550	176.61	27,240	174.30
4/Jan/93	NYB4775436	145-25	26,500	189.86	26,560	187.58
4/Jan/93	NYB4775427	268-25	26,630	203.18	26,440	200.80
5/Jan/93	NYB4775418	106-25	29,160	217.76	28,860	215.23
5/Jan/93	NYB4775301	308-25	35,900	235.71	36,240	233.35
5/Jan/93	NYB4775292	142-25	28,300	249.86	27,400	247.05
8/Jan/93	NYB4775283	181-25	30,455	265,09	29,760	261.93
8/Jan/93	NYB4775373	337-25	23,340	276.76	22,920	273.39

SHIPPING DATE	MANIFEST NUMBER	ROLL-OFF BOX NUMBER	IN WELLSVILLE		AT DISPOSAL FACILITY	
			WEIGHT (lb)	TOTAL WEIGHT (tons)	WEIGHT (lb)	TOTAL WEIGHT (tons)
8/Jan/93	NYB4775274	235-25	29,170	291.35	28,420	287.60
14/Jan/93	NYB4774851	316-25	31,250	306.98	31,445	303.32
14/Jan/93	NYB4774842	220-25	30,380	322.17	30,720	318.68
3/Mar/93	NYB4774833	206-25	30,680	337.51	30,500	333.93
3/Mar/93	NYB4774806	141-25	29,280	352.15	29,740	348.80
3/Mar/93	NYB4774824	200-25	28,970	366.64	28,820	363.21
3/Mar/93	NYB4774815	135-25	32,560	382.92	32,720	379.57
3/Mar/93	NYB4774797	198-25	30,360	398.10	29,740	394.44
3/Mar/93	NYB4774788	150-25	30,490	413.35	30,180	409.53
29/Jan/93[1]	NYB4774869	55 gal drums	14,100	420.40	14,100	416.58

Note: (1) This shipment represents the 29 drums of oil skimmed from the surface of the filtrate in the 100,000 gal (375,000 l) Modutanks (see Section 6.2.10, above).

TABLE B
RECORD OF SHIPMENTS SENT TO CWM FOR LANDFILL DISPOSAL

SHIPPING DATE	MANIFEST NUMBER	ROLL-OFF BOX NUMBER	IN WELLSVILLE		AT DISPOSAL FACILITY	
			QUANTITY (lb)	TOTAL QUANTITY (tons)	QUANTITY (lb)	TOTAL QUANTITY (tons)
5/Mar/93	NYB4774554	151-25	26,620	13.31	24,080	12.04
5/Mar/93	NYB4774563	527-25	24,020	25.32	20,440	22.26

SHIPPING DATE	MANIFEST NUMBER	ROLL-OFF BOX NUMBER	IN WELLSVILLE		AT DISPOSAL FACILITY	
			QUANTITY (lb)	TOTAL QUANTITY (tons)	QUANTITY (lb)	TOTAL QUANTITY (tons)
5/Mar/93	NYB4774545	528-25	29,870	40.26	28,920	36.72
8/Mar/93	NYB4774527	210-25	32,200	56.36	31,820	52.63
8/Mar/93	NYB4774635	229-25	31,530	72.13	31,040	68.15
8/Mar/93	NYB4774536	268-25	21,920	83.09	21,640	78.97
8/Mar/93	NYB4774644	184-25	25,180	95.68	25,300	91.62
8/Mar/93	NYB4774653	208-25	31,100	111.23	31,340	107.29

Sevenson completed Inspection Report Form A-14, Off-Site Disposal of Sludge (Appendix E) on each day that roll-off boxes were shipped from the site.

6.2.12 Separator Decontamination

After removal of the aqueous phase and the sludge from the separator cells, the debris remaining in the separator and the walls and floors of the separator cells were decontaminated. The goal of the decontamination was to remove gross contamination from the separator. The Work Plan specifies the use of a hydroblaster with a sand additive or a steam cleaner for the decontamination process. Sevenson used a steam cleaner from 20 October to 19 December 1992 to decontaminate the debris and remove surface sludge from the walls and floor of the separator. Sevenson performed a trial on 11 November 1992 to determine whether hydroblasting would be an effective means of removing contamination from the concrete. Sevenson determined from the trial that hydroblasting, even at a pressure of 8,000 to 10,000 psi (55 to 70 N/mm^2), was not an effective method of removing gross contamination from the concrete walls and floor of the separator. Sevenson tried sandblasting on 13 November

and found the method more effective than hydroblasting. Therefore, Sevenson used sandblasting, from 13 November until 30 December 1992, to decontaminate all the walls and floor of the separator. The sandblasting was continued in each cell until visual signs of contamination had been removed. The personnel involved in the sandblasting operations wore level "B" PPE. In addition, Sevenson used polyethylene sheeting and a vacuum truck to control dust during sandblasting. All the sand used to decontaminate the separator was collected, placed in the roll-off boxes and tested and disposed as discussed in Section 6.2.11, above.

Sevenson collected concrete chip samples during the progress of the work, in accordance with the Work Plan and the SAP, to check whether the sandblasting had achieved the objective of removing gross contamination from the separator. Gross contamination was defined in the Work Plan as a residual total petroleum hydrocarbon (TPH) concentration of less than 10,000 ppm. Sevenson collected a total of six chip samples from the locations indicated on a figure in Appendix H, as follows:

- Samples 1, 2 and 3 were collected from three different locations;
- Sample 3 "Dup" was a duplicate of Sample 3 (an additional duplicate of Sample 3 was also provided to the USEPA);
- Sample 4 was taken immediately above the location of Sample 1 after additional sandblasting had been performed in the area because Sample 1 had indicated a TPH value above the Work Plan desired limit of 10,000 ppm; and
- Sample 5 was taken from the location of Sample 2 after additional sandblasting had been performed in the area.

The concrete chip samples were sent to General Testing for total petroleum hydrocarbon (TPH) analysis. Sevenson completed Inspection Report Form A-15, Decontaminate Separator (Appendix E) on each occasion that it obtained a concrete ship sample.

The table below presents, for each sample, the sampling dates and times, the sample shipping dates and the TPH analytical results. The analytical data is presented in Appendix F.

SAMPLE NUMBER	SAMPLING DATE	SAMPLING START TIME	SAMPLING FINISH TIME	SAMPLE SHIPPING DATE	TPH RESULTS (ppm)
1	24 Nov 1992	10:30	11:00	24 Nov 1992	19,400
2	8 Dec 1992	10:30	11:00	8 Dec 1992	51,400
3	14 Dec 1992	13:45	16:00	14 Dec 1992	30,500
3 Dup	14 Dec 1992	13:45	16:00	14 Dec 1992	21,300
4	29 Dec 1992	14:30	15:00	29 Dec 1992	12,600
5	5 Jan 1993	8:45	9:15	5 Jan 1993	6,860

The TPH results of all the samples, except Sample 5, exceeded 10,000 ppm. Based on visual observation of the walls and floor, it appeared that the decontamination efforts had been successful, although the laboratory data indicated that the desired level of decontamination had not been achieved. The condition of the concrete was poor throughout the separator. Spalling and general deterioration of the concrete was common. It is likely that the hydrocarbons had impregnated deeply into the body of the concrete. ARCO considered that further decontamination efforts would not be worthwhile. Therefore, ARCO proposed, by letter from Mr. D. Christensen to Mr. L. DiGuardia, USEPA, dated 5 January 1993, to partially demolish and backfill the separator as planned and to

provide an asphalt cover over the separator to minimize the quantity of surface water entering the structure. This decision was consistent with the Record of Decision for Operable Unit 2 which determined that the subsurface soils were not a risk. Mr. L. DiGuardia, USEPA, verbally approved the change on 5 January 1993, and confirmed the decision by letter dated 27 January 1993 to Mr. D. Christensen, ARCO.

6.2.13 Remove Temporary Separator Access and Cover

The temporary access ways and cover over the separator were dismantled on 13 and 14 January 1993, following decontamination of the structure and USEPA's approval to proceed.

6.2.14 Install Bottom Drains

The Work Plan requires that a minimum of three 3-in. (75-mm) diameter holes be drilled in the floor of each intact cell floor to permit the movement of ground water into and out of the separator. Several of the cells were not intact. Ground water seeped into the cells through the floors and external walls during the remediation to a depth of several feet. Following the decontamination at least three holes were made in the floor of each cell, including the floors of the cells that leaked. The holes were made with a hydraulic concrete breaker attachment mounted on a backhoe between 13 and 15 January 1993. Sevenson completed Inspection Report Form A-16, Install Bottom Drains (Appendix E) on each day that the bottom drains were installed.

6.2.15 Demolish Structures and Backfill Separator

Sevenson performed the following activities associated with the demolition of the structures and backfilling the separator:

- removed pipes, valves and pumps which were present beneath the floor of the pumphouse structure on 11 and 12 January 1993;
- demolished the pumphouse and its foundations between 11 and 14 January 1993;
- demolished the walls of the separator to 2-ft (0.6-m) below grade between 13 and 15 January 1993;
- placed the materials from the pumphouse and the separator walls in the separator and broke up large pieces to prevent the creation of voids in the backfill;
- backfilled the separator with gravel between 13 and 20 January 1993;
- performed final site grading between 8 and 11 February 1993;
- preformed a topographic survey on 11 February 1993; and
- installed four bollards around manhole MH-1 and six bollards around manhole MH-2 and existing catch basin NCB-2 on 15 and 16 February 1993 to protect the manholes from future vehicular traffic; each bollard consisted of an 8-ft (2.4-m) long, 8-in. (200-mm) diameter steel pipe section inserted 4 ft (1.2 m) into the ground and surrounded with 4,000 psi (30 N/mm^2) concrete and filled internally with 4,000 psi (30 N/mm^2) concrete.

Sevenson completed Inspection Report Form A-17, Demolition and Installation of Appropriate Cover (Appendix E) on each day that it performed demolition and backfilling activities.

6.2.16 Final Inspection

A final inspection was held at the site on 11 February 1993.

6.2.17 Install Cover

The installation of an asphalt cover over the separator was authorized by FCO 015-003-02. The installation was delayed until May 1993 to allow the backfill material to settle and to enable the asphalt to be laid during warm weather. The asphalt cover consists of a 3-in. (75-mm) thick layer of NYS Department of Transport (NYSDOT) Type 3 blinder overlain by a 1-in. (25-mm) thick layer of NYSDOT Type 6 top course. The design paved area measures 126 ft (38.4 m) by 58 ft (17.7 m). A drawing which shows the limits of the asphalt cover is presented in Appendix H.

Sevenson subcontracted the paving to Lynch Paving and Contracting, Inc. (Lynch), Wellsville, New York. Lynch rolled the separator footprint with a smooth drum vibratory roller and paved the area between 27 May and 2 June 1993. The asphalt was supplied by L.C. Whitford Materials Company, Inc. (Whitford), Alfred Station, New York. Lynch used 110 tons (10,000 kg) of binder and 81 tons (73,635 kg) of top course. Copies of Whitford's delivery tickets are presented in Appendix F.

6.2.18 Health and Safety

The health and safety activities that were performed during the remediation activities are briefly outlined in this subsection.

During the remediation Sevenson performed real time air monitoring at the points of activity and On-Site performed air sampling and monitoring around the perimeter of the site. The former was performed downwind to protect the personnel. The latter was performed downwind to protect the general population outside the site and upwind to obtain background readings.

The monitoring indicated releases of volatile organic compounds (VOCs) at levels above 5 ppm during excavation and by-pass sewer construction activities. On these occasions, depending on the magnitude of the release and the activity being performed, Sevenson's personnel either used level C protection or ceased work in the region of the VOC release. All personnel who entered the separator enclosure to decontaminate the structure or to inspect the progress of the work were required to wear Level B PPE.

ARCO submitted sampling and monitoring data to the USEPA during the remediation. This documentation is not reproduced in this report. Sevenson prepared a Close Out Safety Report, a copy of which is presented in Appendix I, after demobilizing from the site.

6.3 Demobilization Activities

Sevenson progressively decontaminated and demobilized equipment as tasks were completed. With the exception of the contractor's trailer and a utility loader all construction equipment was removed from the site by

16 February 1993. The trailer and the utility loader were removed by 25 February 1993. Sevenson's Close Out Safety Report (Appendix I) includes Certificates of Decontamination for the equipment used in the remediation. In addition, Sevenson completed Inspection Report Form A-18, Demobilization/Topsoil, Seed and Mulch (Appendix E) on the days that the utilities were disconnected and the trailers were removed from the site.

7. POWERHOUSE REMEDIATION

7.1 Introduction

The following subsections provide a chronological and narrative description of the major tasks and events associated with the remediation of the powerhouse and associated structures. The drawing in Appendix J shows the powerhouse and other structures.

7.2 Pre-Construction Activities

7.2.1 Bid Documents

ARCO issued an RFP package to qualified contractors on 9 June 1993.

7.1.2 Pre-Bid Meeting

ARCO held a pre-bid meeting for the qualified contractors in Wellsville on 15 June 1993. The contractors visited the powerhouse as part of the pre-bid meeting.

7.2.3 Bid Award

ARCO awarded the contract for the remediation of the powerhouse to Kimmins on 28 July 1993.

7.2.4 Pre-Construction Meeting

Kimmins attended a pre-construction meeting on site on 30 July 1993 after the award of the contract.

7.3 Construction Activities

7.3.1 Mobilization

Kimmins began mobilizing personnel and equipment to the site on 9 August 1993. AET mobilized to the site on 10 August 1993 and was present on site during periods of asbestos removal until 20 October 1993.

7.3.2 Preparatory Activities

Kimmins performed the following preparatory activities before starting the asbestos removal and demolition activities:

- posted asbestos danger signs on the powerhouse and storage buildings S1, S2, and S3;
- removed loose parapet bricks from the top of the powerhouse to make the zone around the perimeter of the building safe for personnel working around the outside of the powerhouse;
- removed stored and movable materials from inside storage buildings S1, S2, and S3 and the turbine room;
- erected barriers, consisting of two layers of 6-mil thick plastic stapled to a wooden frame, over the openings in the powerhouse walls;

- established a traffic control system along the west side of the site and additional perimeter fencing;

- installed a security system inside the powerhouse building;

- prepared the asbestos decontamination trailer; and

- obtained the necessary medical examinations and license documentation for the asbestos abatement personnel.

AET performed the following activities during the preparatory phase of work:

- collected baseline air samples from:
  - around powerhouse,
  - around storage building S1, to the south of the powerhouse,
  - around storage buildings S2 and S3 to the north of the powerhouse,
  - the roof of storage building S1,
  - the roof of the turbine room,
  - the interior of the turbine room, and
  - the interior of the coal handling room and the boiler room.

- collected daily perimeter air samples;

- obtained and tested samples of suspected ACM from the following locations in the powerhouse:
  - cementitious insulating material around an elevated coal hopper on the east side of the powerhouse - this tested negative for ACM; and
  - insulation around an approximately 15-ft (4.6-m) long section of elevated pipe on the east side of the powerhouse - this tested positive for friable ACM.

7.3.3 First Phase of Asbestos Abatement

ARCO gave Kimmins approval to start asbestos removal operations on 19 August 1993 following verification by ARCO and NYSDOL that all personnel involved in asbestos removal had the correct licenses and medical certificates. The first phase of the asbestos abatement involved the removal of the following ACM:

- roofing and flashing materials from storage building S1 from 19 to 23 August 1993;
- roofing and flashing materials from storage building S2 on 23 and 24 August 1993;
- roofing and flashing materials from the turbine room from 24 August to 3 September 1993; and
- floor tiles from the second floor of the turbine room on 28 September 1993.

Kimmins used amended water (water containing a surfactant), as needed, to keep the roofing materials wet during the removal process.

All the roofing materials were placed in 6-mil thick plastic bags with amended water to keep the ACM wet during transport to the landfill. Each plastic bag was sealed with tape and placed inside another 6-mil thick plastic bag which was also sealed with tape. The double bags were labeled to indicate that they contained ACM and were moved from the work area and stored in first floor of the turbine room or in a dedicated asbestos storage trailer until the bags were removed from the site. The turbine room and the trailer were locked at the end of each day to prevent unauthorized access. Each bag was inspected for tears after being removed from the work area and prior to being stored. Damaged bags

were repaired with tape, placed inside another 6-mil thick plastic bag, and sealed. A waste generator label was attached to each bag prior to transport from the site.

After Kimmins completed the removal of ACM from each area, AET performed the following:

- visually inspected the area for signs of remaining ACM; and
- when it was satisfied that there were no visible signs of remaining ACM, collected final air samples to verify that the airborne fiber concentration was less than 0.01 fiber/cm^3.

The ACM roofing material was manifested and transported to S&S Landfill, Inc. (S&S), Clarksburg, West Virginia on 9 September 1993 for dispsoal. A total of 75 yd^3 (57 m^3) was transported. A copy of the manifest is presented in Appendix K.

7.3.4 Partial Demolition

The work plan stipulated that storage buildings S1, S2, and S3 would only be demolished if they inhibited work on the powerhouse or if they became unsound. Kimmins demolished all three of the buildings for both reasons. Kimmins demolished buildings S2 and S3 on 30 August 1993 and building S1 on 31 August 1993 while the removal of the ACM from the turbine roof was in progress. Some non-friable ACM, which was not visible until the structures were demolished, was noted in the rubble of buildings S2 and S3. This material was subsequently segregated and collected during the second phase of asbestos abatement.

Kimmins started partial demolition of the powerhouse structure after removing the ACM from the turbine room roof. The turbine building from which all ACM had been removed was completely demolished to provide

working access for the demolition equipment to the rest of the building. The boiler room and coal handling room areas of the powerhouse were then partially demolished in order to make these areas safe for personnel to remove ACM from these areas. Most of the roof panels over the boiler and coal handling rooms were covered with non-friable ACM. These panels were all knocked to the inside of the building for later segregation and disposal. Kimmins attempted to minimize the quantity of debris falling inside the boiler and coal handling rooms by knocking the walls to the outside when possible.

The demolition was performed using: a crane with a wrecking ball or clam shell, a front end loader and a bulldozer. In addition, Kimmins personnel selectively cut steel members. During the demolition of the boiler and coal handling rooms, the structure was continually sprayed with amended water to suppress the generation of asbestos dust. No visible emissions were noted during the demolition. AET visually inspected the steel, which had been selectively cut and removed from the building, for asbestos which would require additional cleaning. AET did not observe any asbestos on the steel.

7.2.5 Second Phase of Asbestos Abatement

Section 9 of the Work Plan, Sequence of Work, required Kimmins to have a New York State registered professional engineer inspect the powerhouse after it had been partially demolished to provide a document stating that it was safe for personnel to enter to remove the ACM from the boiler and coal handling rooms. Mr. Richard Hartman, P.E., of Hartman Engineering, Clarence, New York, visited the site on 24 September and 9 October 1993, at Kimmins' request, to assess the safety of the partially demolished building. Mr. Hartman provided site reports, copies of which are presented in Appendix K, which detailed the observations he made and provided recommended working practices.

The ACM on the precast concrete roof panels from above the coal handling and boiler rooms was a Category 1 non-friable roofing material. AET confirmed, on 27 September 1993 with Ms. Cheryl Webster of New York State Department of Environmental Conservation (NYSDEC), that: (i) non-friable ACM could be disposed in a landfill permitted to accept construction debris; (ii) a special permit was not required by the hauler of non-friable ACM waste; and (iii) Southern Tier Kleen Fill Inc. (Kleen Fill Landfill) in Wellsville, New York, was permitted to accept non-friable ACM. AET also confirmed with Ms. Webster on 4 October 1993 that no waste manifests were required for the transport of debris containing non-friable ACM.

The demolition debris was segregated into the following three waste streams: (i) debris containing friable ACM; (ii) debris containing non-friable ACM; and (iii) debris containing no ACM (clean debris). The segregation of non-friable ACM from friable ACM reduced the quantity of ACM that had to be sent to an asbestos landfill. Kimmins sequenced the segregation with the continuing partial demolition activities at the south end of the powerhouse.

Following the visit of Mr. Hartman on 24 September 1993, Kimmins started to segregate the demolition debris on 28 September 1993 at the north end of the powerhouse in the coal handling room area. The only ACM in the coal handling room area was non-friable material on the roof panels. Kimmins started to remove clean debris from this area on 29 September 1993 and removed all the non-friable ACM between 5 and 12 October 1993.

Following the visit of Mr. Hartman on 9 October 1993, Kimmins performed the following: (i) glove bagged the friable asbestos insulation from around the approximately 15-ft (4.6-m) long section of elevated pipe on the east side of the powerhouse on 12 October 1993; and (ii) removed the friable ACM from the boiler room area between 13 October and 16 October 1993. The majority of the ACM was removed using a front end

loader. The remainder of the ACM was either removed manually using glove bag procedures, or with small bobcat loaders. The ACM debris was placed into truck waste containers which were lined with two layers of 6-mil thick plastic sheeting. Each load of ACM debris was wetted down for transport.

On 15 October 1993 Kimmins requested permission to temporarily stockpile approximately 20 to 25 yd^3 (15 to 20 m^3) of debris containing friable ACM from the boiler room area outside the powerhouse structure to permit demolition work to continue. AET contacted Mr. Robert Vararo, a Senior Inspector with the NYSDOL to discuss the request. Mr. Vararo agreed to the request on 15 October 1993. The debris was wetted, placed on two layers of 6 mil thick plastic sheeting and covered with plastic sheeting. Warning tape was established around the debris pile and asbestos signs were placed on the pile. Kimmins maintained a temporary pile of debris containing ACM from 15 to 20 October 1993, when the last ACM was removed from the site.

The clean debris and the debris which contained non-friable ACM was hauled to Kleen Fill Landfill for disposal. The debris which contained friable ACM was manifested and transported to S&S Landfill, Inc. (S&S), Clarksburg, West Virginia, for disposal. Tables A and B below summarize the quantities of non-friable and friable ACM removed from the site. Copies of the manifests for the friable ACM are presented in Appendix K.

TABLE A

RECORD OF NON-FRIABLE ACM SENT TO KLEEN FILL LANDFILL FOR DISPOSAL

Date	Quantity of Non-Friable ACM Removed		Total Quantity of Non-Friable ACM Removed	
	yd^3	m^3	yd^3	m^3
30 Sep 93	56	43	56	43
5 Oct 93	28	21	84	64
12 Oct 93	14	11	98	75

TABLE B

RECORD OF FRIABLE ACM SENT TO S&S FOR DISPOSAL

Date	Quantity of Friable ACM Removed		Total Quantity of Friable ACM Removed	
	yd^3	m^3	yd^3	m^3
13 Oct 93	120	92	120	92
14 Oct 93	150	115	270	206
15 Oct 93	150	115	420	321
18 Oct 93	90	69	510	390
19 Oct 93	30	23	540	413
20 Oct 93	30	23	570	436

After Kimmins had completed the removal of ACM from each area, AET performed the following:

- visually inspected the area for signs of remaining ACM; and
- when it was satisfied that there were no visible signs of remaining ACM, collected final air samples to verify that the airborne fiber concentration was less than 0.01 fibers/cm^3.

7.2.6 Demolition Completion

Kimmins sequenced the final demolition of the powerhouse and the ... with the removal of ACM from the building. The final demolition was started in the coal handling room area (north end), after AET had collected and tested final air samples in that area, while ACM removal was being performed in the boiler room area (south end). The completion of the demolition and removal of debris from the site was completed after the smokestack had been demolished (Section 7.2.7, below). The ground floor slabs-on-grade in the powerhouse (including turbine, coal handling, and boiler rooms) were left in place and were not removed. The walls of the building were demolished to the lessor of (i) the level of the adjacent slab-on-grade, or (ii) a depth of 1 ft (0.3 m) below the existing ground level, where the adjacent slab-on-grade was more than 1 ft (0.3 m) below the ground surface.

7.2.7 Smokestack Demolition

The smokestack was demolished using explosives by Mr. Douglas Loizeaux of Controlled Demolition Incorporated (CDI), Phoenix, Maryland, on 30 October 1993. The demolition was coordinated with Town and Village of Wellsville officials, the local emergency organizations and the State University of New York.

Kimmins prepared the smokestack for demolition by: (i) predrilling a pattern of holes on the south side of the smokestack, within approximately 8 ft (2.4 m) of the ground surface, for the explosive charges; and (ii) removing small sections of the smokestack on the east, west, and north sides of the stack near the ground surface, to create a hinge to control the direction of fall of the smokestack.

CDI used 20 lb (9.1 kg) of ICI Powerditch 1500, nitroglycerine based dynamite, supplied in cartridges 8-in. (200-mm) long and 1.25-in. (32-mm) diameter. The explosives were set in 53 of the predrilled holes and were initiated with Atlas Rockmaster MS Electric Delays set at seven equal delay periods between 25 and 175 ms. The maximum explosive weight in a delay was 4 lb (1.8 kg). The smokestack fell in the planned direction to the south and towards the river away from other existing structures.

CDI established a seismograph adjacent to the nearest building to record the ground motions. CDI sent to seismograph tape to Vibra-Tech Engineers, Inc. (Vibra-Tech), Hazleton, Pennsylvania, for analysis. Vibra-Tech prepared a report which presents the recordings of the ground motions. A copy of Vibra-Tech's report is presented in Appendix K. This report shows ground velocities at two instances: (i) when the explosive charges were detonated; and (ii) when the smokestack impacted the ground. GeoSyntec spoke to Vibra-Tech about the findings of this report on 20 April 1994. Vibra-Tech considers that the ground motions recorded at the time of detonation are unreliable since the velocity traces in each direction (transverse, vertical and longitudinal) are almost identical. Vibra-Tech believes that the air blast probably vibrated the recording heads at this time. Vibra-Tech considers that the motions recorded when the smokestack impacted the ground are reliable. The maximum recorded velocity at this time was 0.55 in./s (14 mm/s) in the vertical direction.

The debris from the chimney was treated as clean construction debris and was taken to Kleen Fill Landfill for disposal.

7.3.8 Backfill

After the demolition debris had been removed from the site, the site was graded and the areas of the powerhouse footprint in which the slabs-on-grade were below the existing ground surface elevation were backfilled with granular material meeting NYS Type 1 subbase specification with a 3-in (75-mm) maximum diameter. Kimmins obtained the gravel from Walter Babbit Gravel Products, Route 19, south of Wellsville, New York.

The work plan required that the granular material be tested as follows:

- chemical testing for:
  - polychlorinated biphenyls (PCBs),
  - dioxins,
  - priority pollutants, and
  - past pH;

- physical testing as follows:
  - two gradation analyses according to ASTM C136-84, and
  - one exclusion of flat, elongated and soft aggregate test according to ASTM C136-84.

Copies of the chemical and physical tests results are presented in Appendix K.

7.3.9 Underground Storage Tanks

Bakers of Jericho Hill (Bakers), Alfred, New York, uncovered two underground storage tanks (USTs), at the locations shown on the drawing in Appendix K, on 4 August 1993, while removing the upper 12 in. (300 mm) of soil as part of the remediation of the refinery surface soils. The USTs were of different sizes and contained liquids. The USTs were not

damaged and no liquids were spilled. However, a metal plate over the bung of the larger tank was disturbed and a minor release of vapors occurred in the immediate vicinity of the exposed tank. Personnel were immediately cleared from the area.

On-Site completed an incident report and measured volatile organic compound (VOC) levels of 550 ppm with a photoionization detector (PID) immediately after the tanks were discovered. The VOC levels subsided quickly as the tanks vented. On-Site performed additional real time air monitoring of the tanks for VOCs and took Draeger tube samples on 9 August 1993. The Draeger tubes indicated the presence of petroleum hydrocarbons, o-xylene and toluene. Copies of the incident report and the VOC sampling data are presented in Appendix K. The liquids in the tanks were not sampled at that time. The tanks were subsequently covered with clean soil and protected by a fence for most of the powerhouse remediation activities.

On-Site sampled the liquids in both tanks on 4 November 1993 at ARCO's direction. The samples were sent to Advanced Environmental Services, Inc., Niagara Falls, New York, for analysis. The samples were combined by the laboratory to form a composite sample. The laboratory test data is presented in Appendix K. Naphthalene was the only compound detected above the laboratory's quantifiable limit. The reported naphthalene concentration was 360 ug/l (ppb).

Kimmins removed the tanks on 5 November 1993. The removal was performed in accordance with: (i) a site-specific work plan developed by Kimmins; (ii) a site specific Health and Safety Plan prepared by On-Site; (iii) American Petroleum Institute guidance on the cleaning of petroleum storage tanks; (iv) NYSDEC guidance on permanent closure of petroleum storage tanks and sampling and analysis requirements for tank removal; and (v) Federal notification requirements for USTs. The removal was approved in a letter from USEPA to ARCO dated 28 October 1993. The tanks were emptied prior to removal and the water from the tanks was taken to

the POTW for treatment. The empty tanks were checked with a PID and no VOCs were detected. Therefore, the empty tanks were not purged prior to excavation. The tanks were excavated and cut up by Kimmins on site. The material was removed from the site as scrap metal with the other steel from the powerhouse.

On-Site collected one soil sample from the area under each tank on 5 November 1993 and sent the samples to Science and Engineering Technology International Ltd. (SETI), Alfred, New York, for analysis. The laboratory test results are presented in Appendix K, for both of the samples, referred to as Tank N (tank north) and Tank S (tank south). The samples were tested for: (i) target compound list (TCL) volatile organic aromatics (VOAs); (ii) phenol; and (iii) polynuclear aromatic hydrocarbons. Chloroethene (xylene) was the only compound detected at concentrations above the minimum detection limits (MDLs). The reported chloroethene (xylene) concentrations were 105.3 and 11,068 ug/l (ppb) in the soil samples from under the north and south tanks, respectively.

7.3.10 Health and Safety

Kimmins prepared a Close Out Safety Report, a copy of which is included in Appendix L, after demobilizing from the site. This provides brief details of the activities it performed and the health and safety related issues.

AET performed personal monitoring for Kimmins' employees. A copy of AET's report "*Environmental Health Survey Report - Thermocor Kimmins*" and dated 12 January 1994 which summarizes the monitoring program is presented in Appendix L. The results indicate that the exposure of Kimmins asbestos abatement personnel ranged from 0.003 to 0.045 fibers/cm^3. This range is below the current OSHA standard of 0.2 fibers/cm^3 and below the action limit of 0.1 fibers/cm^3 at which level medical surveillance must be started.

In addition, AET prepared a report titled "*Environmental Health Survey Report - GeoSyntec Consultants*" and dated 30 November 1993 after the completion of the asbestos remediation. A copy of this report is presented in Appendix L. This report contains the following:

- a narrative of the services provided by AET;
- copies of AET's air sampling data;
- copies of AET's Daily Field Reports, which detail the work performed by both Kimmins and AET;
- copies of AET's Daily Site Logs;
- copies of AET's Certificates of Visual Inspection;
- copies of AET's Pre-Commencement Inspection Checklist; and
- copies of OSHA personal air sampling tests performed on Kimmins employees.

7.4 Demobilization

Kimmins demobilized from the site by 12 November 1993. At ARCO's request, Kimmins did not remove the fence which partially encloses the powerhouse area.

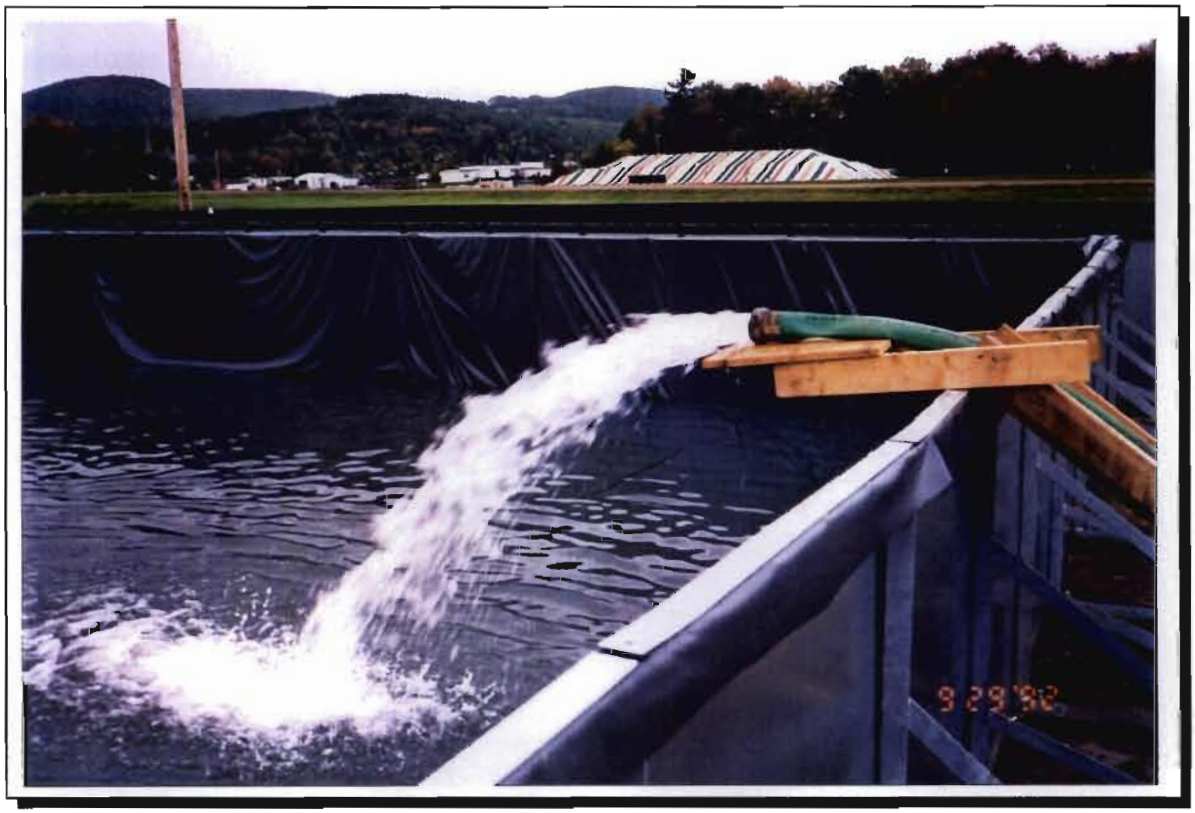
APPENDIX A

SEPARATOR PHOTOGRAPHS

Photograph 1. Soil sampling along by-pass sewer alignment.

Photograph 2. Sampling contents of separator.

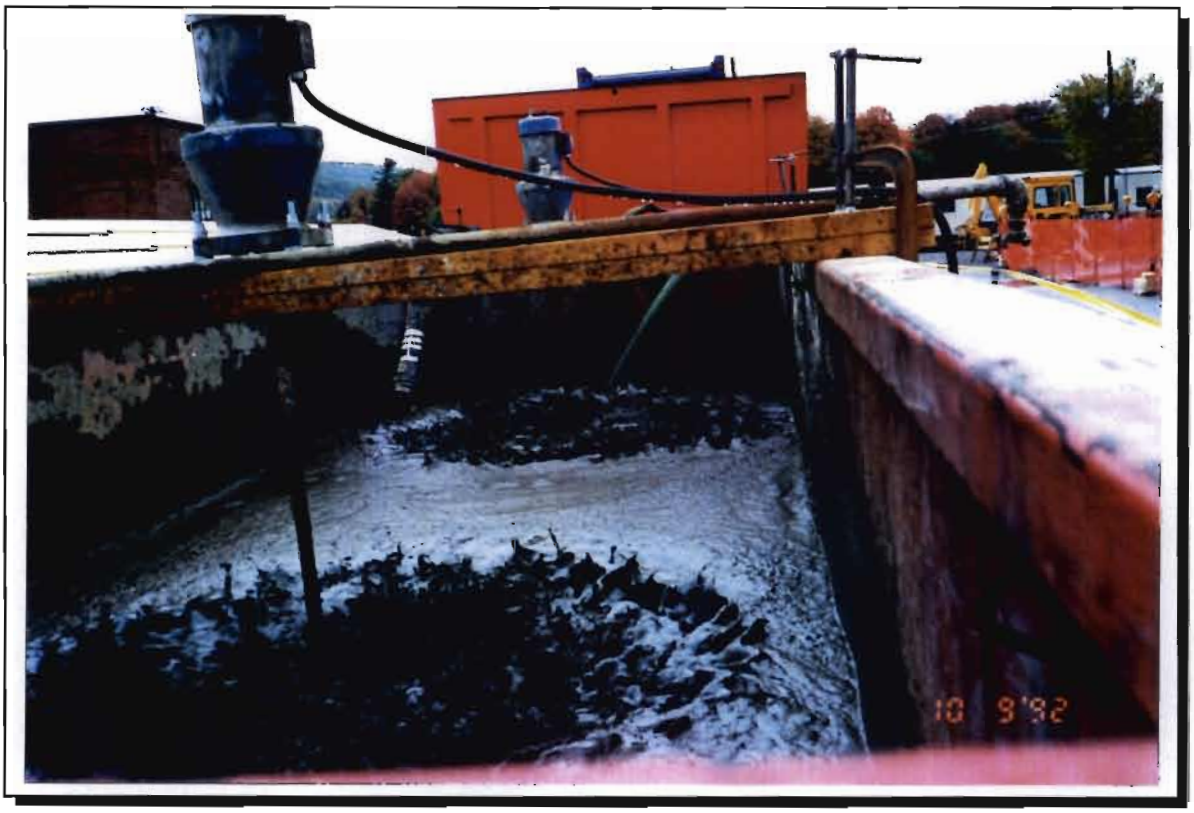
Photograph 3. Temporary access walkways and cover.



Photograph 4. Discharge of aqueous phase to 100,000 gal (375,000 l) Modutank.

Photograph 5. Construction of by-pass sewer, showing construction of manhole MH-4 in foreground, on existing effluent line from separator, and manhole MH-3 in background.

Photograph 6. Filter press.



Photograph 7. Unprocessed sludge from separator.

Photograph 8. Filter cake.

Photograph 9. General site layout showing: (i) Genesee River; (ii) temporarily covered separator; (iii) completed by-pass sewer; (iv) covered roll-off boxes containing filter cake; (v) large Modutanks with untreated filtrate; and (vi) small Modutanks with pretreated filtrate.

Photograph 10. Example of debris to be cleaned and left in separator.

Photograph 11. Concrete chip sample.

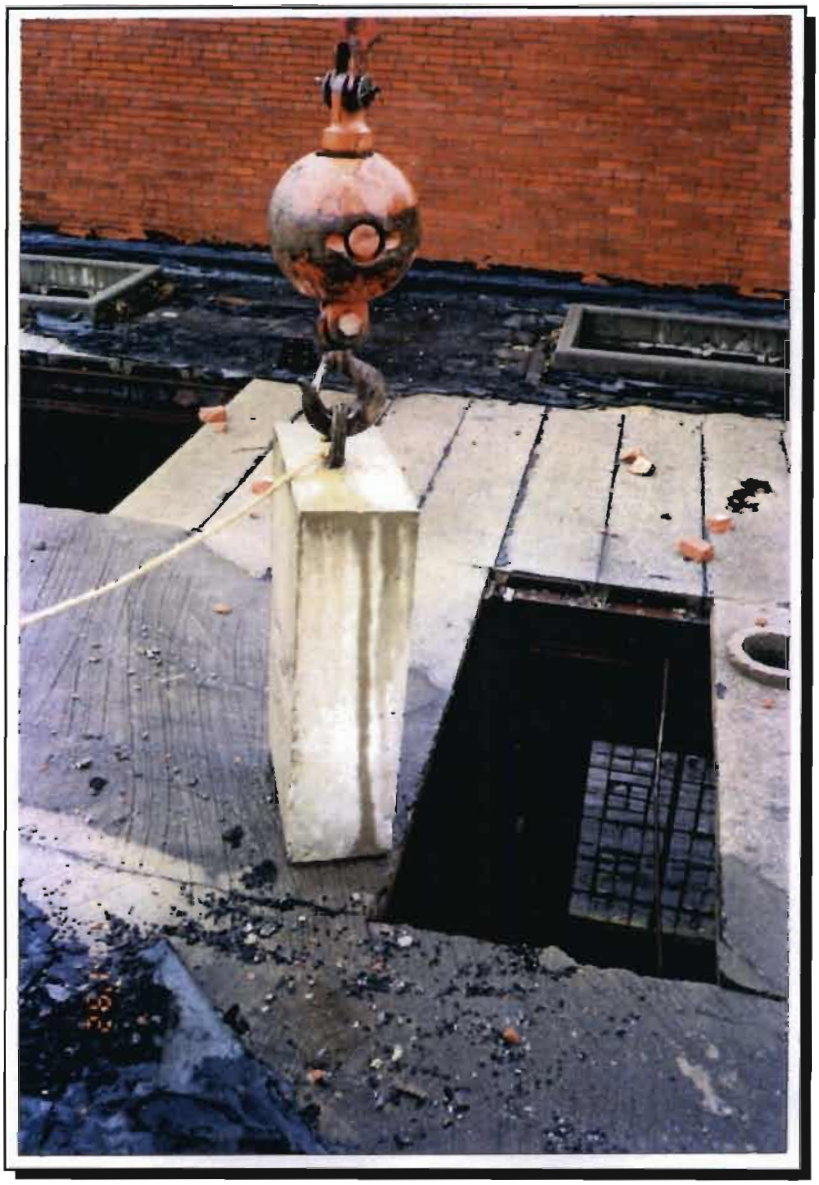
Photograph 12. Backfilling of separator with cell walls demolished below grade.

APPENDIX B

POWERHOUSE PHOTOGRAPHS

Photograph 1. General view of powerhouse, smokestack and small storage buildings.

Photograph 2. Powerhouse roof on west side of building showing; (i) poor condition of roof; (ii) bricks from parapets; and (iii) non-friable asbestos material on some roof panels.



Photograph 3. Load testing roof.

Photograph 4. Erecting plastic barriers over openings.

Photograph 5. ACM removal from turbine room roof.

Photograph 6. Partial demolition of powerhouse.

Photograph 7. Use of amended water to control dust.

Photograph 8. Non-friable ACM mixed with clean debris at north end powerhouse.

Photograph 9. Loading debris containing friable ACM into plastic lined units for transport to S&S Landfill.

Photograph 10. Pattern of holes drilled on south side of smokestack for explosive charges.