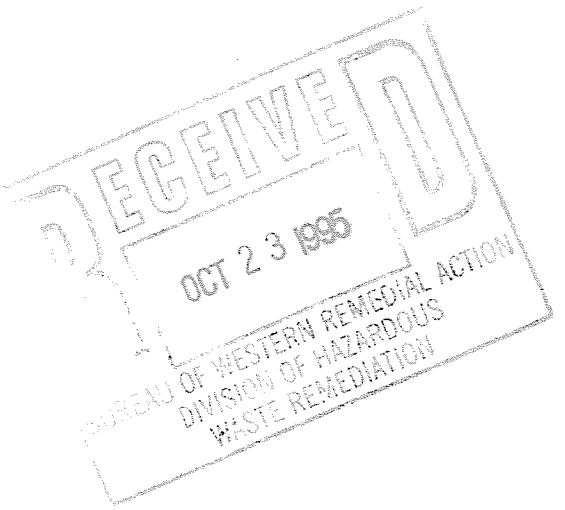
PHASE I DRUM REMOVAL ACTION COMPLETION REPORT

Volume I - Text

Frontier Chemical Site
Niagara Falls, New York



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Frontier Chemical Site
Niagara Falls, New York

AUGUST 1995
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CONESTOGA-ROVERS & ASSOCIATES

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EXECUTIVE SUMMARY

This Phase I Drum Removal Action Completion Report for the Frontier Chemical Waste Process Inc. Site in Niagara Falls, New York is being submitted pursuant to the Administrative Order on Consent for Removal Action, Index No. II - CERCLA-93-0207. This report has been prepared by Conestoga-Rovers & Associates on behalf of the Respondents to the above Administrative Order.

The objective of the Phase I Drum Removal Action was to remove and appropriately dispose of drums, lab packs and laboratory chemicals that were present at the Site. The effective date of the Administrative Order was September 30, 1993. The final drum shipment from the Site occurred on May 13, 1994. The last certificate of disposal/destruction for wastes shipped from the Site was received on May 1, 1995.

The objective of the Phase I Drum Removal Action was achieved by the following:

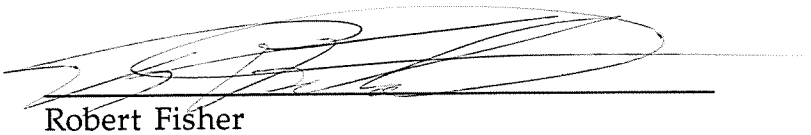
i) the removal and off-Site disposal of 527 lab packs;
ii) the removal and off-Site disposal of 3,982 drums;
iii) the removal and off-Site disposal of two roll-offs of personal protective equipment generated during the Phase I Drum Removal Action;
iv) the removal and off-Site shipment of 314 empty metal drums for recycling; and
v) the removal and off-Site shipment of ten 50-pound bags of sodium sulfide for re-use.

All disposal facilities used for wastes from the Site were approved by the USEPA On-Scene Coordinator.

Approval of this report by USEPA will complete all Phase I Drum Removal Action activities required by the Administrative Order.

CERTIFICATION

I certify that the information contained in and accompanying this certification is true, accurate, and complete.



Robert Fisher
Designated Coordinator

10/10/95

Date

1.0 INTRODUCTION

This Phase I Drum Removal Action Completion Report (Report) for the Frontier Chemical Waste Process Inc. Site (Frontier Site) in Niagara Falls, New York is being submitted pursuant to the Administrative Order on Consent for Removal Action, Index No. II - CERCLA-93-0207 (Administrative Order). A copy of the Administrative Order is presented in Appendix A. This report has been prepared by Conestoga-Rovers & Associates (CRA) on behalf of the Respondents to the above Administrative Order (Respondents).

The objective of the Phase I Drum Removal Action was to remove and appropriately dispose of drums, lab packs and laboratory chemicals that were present at the Site. The effective date of the Administrative Order was September 30, 1993. The final drum shipment from the Site occurred on May 13, 1995. The last certificate of disposal/destruction for wastes shipped from the Site was received on May 1, 1995.

This report concludes the Phase I Drum Removal Action at the Site and serves as the final report to the United States Environmental Protection Agency (USEPA) to fulfill Paragraph 50 of the Administrative Order.

1.1 SITE LOCATION

The Frontier Site is located at 4626 Royal Avenue in Niagara Falls, Niagara County, New York. The location of the Site is presented on Figure 1.1 and a plan of the Site is presented on Figure 1.2.

The Site is located within a heavily industrialized section of Niagara Falls, New York. The Site is bounded by Royal Avenue to the south, 47th Street to the east and other industrial sites to the north and west. Access to the Site, through the main gate, is provided from Royal Avenue. The Site encompasses approximately 9.7 acres of land.

1.2 SITE HISTORY

The Site was originally owned and developed by International Minerals and Chemical Corporation as a chlorine caustic plant. The Site is currently owned by Francis Williams, James H. Williams, and Lawrence Reger, formerly doing business under the name of Niagara Industrial Warehousing and currently doing business under the name of Marc Equity Realty Associates.

The Site was leased and operated by Frontier from 1974 until 1992. The Site was primarily used by Frontier conducting its business engaged in hazardous waste processing/management, including wastewater treatment, fuels blending and bulking for off-Site disposal. During the course of its operations, Frontier was the subject of numerous consent orders issued by the New York State Department of Environmental Conservation (NYSDEC) for regulatory violations.

On or about August 13, 1991, Eagle Vision Environmental Inc. (Eagle Vision) assumed responsibility for the day-to-day management of operations at the Site.

On December 4, 1992, the NYSDEC issued a "Modification to Summary Abatement of Order and Notice of Hearing" (NYSDEC Order) requiring Frontier and Eagle Vision to submit a schedule for removal of all waste from the Site and to submit Demolition and Closure Plans for particular buildings. The NYSDEC Order stipulated a time limit for compliance or closure of the facility. The NYSDEC Order also enabled NYSDEC to initiate an emergency removal action conducted by either NYSDEC or USEPA in the event that the parties failed to meet the terms of the NYSDEC Order. Frontier waived its rights to a hearing and Eagle Vision subsequently notified NYSDEC that it was unable to comply with the NYSDEC Order. As a result of Frontier's and Eagle Vision's non-compliance, the NYSDEC issued a Right to Invoke Action (RIA) which stated that NYSDEC and USEPA where invoking their right to enter the facility and

initiate appropriate emergency removal actions. Frontier personnel at the Site were told by USEPA to vacate the premises.

USEPA entered the Site to initiate the emergency actions. USEPA conducted an inventory of the waste on Site including waste drums and lab packs (see Section 2.1) and performed activities at the Site which were essential to Site maintenance. During its time on Site, USEPA documented leaks from certain drums and subsequently overpacked these drums.

As a result of the above Site history and NYSDEC's and USEPA's analysis of the Site, it was determined that actions were required to protect the public health or welfare or the environment. Therefore, on September 30, 1993, USEPA issued the Administrative Order which provided for the performance of a removal action by the Respondents and the reimbursement of certain costs incurred by USEPA.

1.3 PRP GROUP STRUCTURE

In order to carry out the purposes of the Administrative Order, the Respondents established four committees: Steering, Executive, Technical and Allocation. Except for issues related to allocation of costs among the members, the Group acted through the Steering Committee. Allocation issues were determined by the entire group of Respondents. The Steering Committee hired Clean Sites, Inc. to assist with the administrative aspects of the Group.

The Steering Committee appointed an Executive Committee to handle administrative and financial matters and to negotiate with USEPA and NYSDEC. The Technical Committee consisted of technically qualified volunteers from the Group who were responsible for providing assistance with the activities of consultants, reviewing technical data, and acting as liaison with the Steering Committee. The Allocation Committee was established to receive and evaluate information so as to advise the Steering Committee on the equitable and fair allocation of shared costs, and to resolve allocation disputes among members.

The Group's contractors for the first portion of the drum removal were: Environmental Waste Technology, Inc. (EWT) with GemChem, Inc. as the project coordinator. For the second portion of the drum removal, the Group contracted with Environmental Project Control, Inc. to manage the project, Conestoga-Rovers & Associates, Inc. (CRA) to be the designated project coordinator and on-site manager, and Laidlaw Environmental Services (NE), Inc. (Laidlaw) to remove and dispose of the drums and materials. A copy of the contracts between the Group and the above companies are presented in Appendix B.

A listing of all contractor and sub-contractor personnel that performed on-Site work and their company affiliation and training certificates are presented in Appendix C.

1.4 SCOPE OF WORK

The scope of work associated with the Phase I Drum Removal Action involved the removal and off-Site disposal of all drums, lab packs, and laboratory chemicals existing at the Site. In compliance with paragraph 33 of the Administrative Order, detailed work plans describing the procedures to be implemented to remove and dispose of the above materials were submitted to USEPA for review and approval.

On October 18, 1993, EWT submitted the Phase I Drum Removal Action Work Plan on behalf of the Respondents. On October 20, 1993, USEPA submitted their comments on the work plan and as a result the work plan was modified and received USEPA approval on October 27, 1993. Upon approval of this work plan, it was deemed to be incorporated into and an enforceable part of the Administrative Order.

EWT initiated the removal action on October 11, 1993. However, contractual difficulties led to a suspension of field work by January 7, 1994 and subsequent termination of the EWT Contract.

The Respondents then contracted with Laidlaw and CRA to take over the project. A new work plan was submitted by Laidlaw on behalf of the Respondents on March 24, 1994. The work plan reflected the scope of work remaining and detailed Laidlaw's operating procedures. On March 28, 1994, USEPA submitted its comments on the work plan. On March 31 1994, Laidlaw resubmitted the work plan to USEPA. USEPA subsequently approved the resubmitted work plan on April 1, 1994.

A USEPA On-Scene Coordinator (OSC) was present on Site during all Phase I Drum Removal Action activities. Any variations of the work from the approved work plans, was subject to USEPA overview and approval in the field.

Based on a review of documentation received from EWT, only two field modifications occurred during its activities at the Site. These modifications were documented in the bi-weekly report to the USEPA OSC dated November 15, 1993. The modifications allowed EWT personnel to use Frontier's locker room as a support facility and involved revisions to daily air monitoring requirements.

Modifications to Laidlaw's work plan implemented in the field included the following:

i) Laidlaw had originally planned to use existing documentation at the Site to characterize drums. However, based on a review of the documentation at the Site, it was decided that it would be better to rely primarily on in situ characterization to ensure proper drum characterization;

ii) Laidlaw's transfer facility in North Andover was to be the primary routing facility for Frontier drums. However, based on cost and time effectiveness, Laidlaw decided to ship the majority of drums directly to the off-Site disposal facilities;

iii) the project schedule was reduced from ten weeks to seven weeks; and

iv) the Health and Safety Plan was revised to allow repackaging of lab packs in Level D personnel protective equipment (PPE).

A copy of USEPA correspondence regarding work plan modifications and this report is presented in Appendix D. Amendments to the work plans are presented in Appendix E.

As required by the work plans, air monitoring was performed during all drum removal activities. Logs documenting the air monitoring performed are presented in Appendix F.

1.5 CHRONOLOGY OF EVENTS

Table 1.1 gives a chronological summary of the Phase I Drum Removal Action from the effective date of the Administrative Order (September 30, 1993) to completion of the project. A brief summary is presented below.

The Respondents contracted EWT on October 11, 1994 to manage the drum removal program. EWT received final approval from USEPA for the work plan on October 27, 1993 and began operations on October 28, 1993. EWT proceeded to compile an inventory of waste on Site and to develop waste characterizations through confirmatory tests. EWT estimated that 47 loads of drums/lab packs existed on Site. EWT had tested and staged 42 loads and had tested, staged, and shipped off Site 18 loads of drums/lab packs as of the end of December 1993. At this time, EWT estimated that 2,838 drums remained on Site.

On March 15, 1994, CRA resumed work on the Phase I Drum Removal Action under contract with the Respondents and proceeded to compile a drum inventory. CRA estimated that 2,889 drums/lab packs remained on Site. On April 4, 1994, CRA/Laidlaw executed the program per the approved work plan and completed the final off-Site shipment of drums on May 13, 1994. All field activities associated with the Phase I Drum Removal Action were completed on May 19, 1994. In total, 3,024 drums, lab

packs, empty drums and containers of PPE and sodium sulfide were removed from the Site and disposed of by Laidlaw.

2.0 DRUM INVENTORY ACTIVITIES

2.1 USEPA INVENTORY

USEPA conducted an initial drum inventory, on or about December 4, 1992 as part of the NYSDEC RIA.

USEPA estimated that there were approximately 4,100 drums at the Site. The drums were said to contain hazardous substances, including, but not limited to, lead, chromium, methyl ethyl ketone, barium, selenium, chlordane, and lindane. There were also approximately 6,700 pounds of laboratory chemicals at the Site which contained hazardous substances including, but not limited to, cadmium carbonate, copper cyanide, lead nitrate, lead peroxide, mercuric chloride, silver nitrate, and sodium perchlorate. Approximately 50 percent of the laboratory chemicals were in liquid form.

This inventory became part of the administrative record as it is included in the Administrative Order.

2.2 EWT INVENTORY

Upon arrival at the Site, EWT conducted an inventory of the existing drums at the Site. EWT confirmed USEPA's estimate that approximately 4,100 drums existed on Site, consisting of 3,400 drums of classified waste and 700 drums of unclassified waste.

EWT conducted a second inventory of the drums remaining on Site between December 24, 1993 and January 7, 1994. Based on this inventory, EWT estimated that 2,838 drums remained on Site. This inventory includes 80 drums not previously inventoried/found by EWT. According to EWT records, no drums were sent off Site after this inventory.

2.3 CRA INVENTORY

CRA, upon arrival at the Site, conducted an inventory of all drums remaining on Site. The inventory indicated that 2,889 drums, containers, and lab packs existed on Site as of March 22, 1994. As part of the inventory, each individual drum, lab pack, and container was logged for location, condition, and type and size of container. Any labelling on the containers presenting such information as Frontier drum and generator numbers, USEPA numbers, material descriptions, and USEPA hazard classes was also recorded. An individual drum/lab pack log number was placed on each drum for tracking by Laidlaw.

At the completion of the project all drums, containers and lab packs had been removed from the Site as indicated by the Final Site Inspection conducted on May 11, 1994. Details of the Final Site Inspection are presented in Section 5.0.

3.0 DRUM CHARACTERIZATION

3.1 REVIEW OF EXISTING WASTE PROFILES

The initial step for both EWT and Laidlaw, was to review all existing Frontier documentation at the Site. This documentation included analytical data, drum characterizations and approved waste profiles. From this review, it was evident that not all the drums had been characterized and thus a sampling program was required.

3.2 DRUM SAMPLING

Frontier had prepared drum characterizations and waste profiles for a limited number of drums on Site. The documentation on Site was incomplete and its reliability was unconfirmed. Of the approximately 4,100 drums on Site, 3,400 drums had some sort of characterization documentation and the remaining 700 drums had no characterization documentation.

EWT, on November 1, 1994, began a series of confirmatory tests to establish Frontier's characterizations, reliability, and accuracy. This process involved field sampling and testing by on-Site technicians and field chemists. The tests would either confirm the existing characterization or question the accuracy of the Frontier characterization. Additional testing, including more extensive field testing and testing at independent labs, was performed on those drums without confirmed characterizations. The sampling program included QA/QC analysis for 10 percent of the field tests as backup to the field test results.

On April 4, 1994, Laidlaw initiated its program to sample and confirm drum characterizations. Laidlaw checked every drum, to confirm its characterization with existing documentation and labelling. Drums were then visually inspected and field screened to confirm contents. The field screening consisted of a pH test, a water miscibility test, an organic vapor screen, and a layering/composition screen. If the field analysis was able

to confidently identify the drum contents, the drum was labelled and matched to an approved waste profile and prepared for shipment. If the field tests were unsuccessful in confirming drum contents, samples were analyzed at the Site for cyanides, sulphides, PCBs, chlorinated solvents, combustibility, reactivity, and flammability (as required) using a Haz Cat screening lab. Based on the results of the above analysis, all drums were characterized sufficiently to be matched to an approved waste profile. All lab packs were handled in a similar manner. Each lab pack was opened, contents verified and regrouped (if required) to match compatible chemical groupings. Regrouping and consolidation of lab packs reduced the total volume of lab packs to be shipped by Laidlaw for off-Site disposal by approximately 38 percent.

3.3 ANALYTICAL RESULTS

Analytical results were produced from field tests, on-Site laboratory analysis, and off-Site laboratory analysis. The results from the testing program were utilized to confirm and/or develop drum characterizations and match each characterized drum to an approved waste profile. Additionally, the analytical results from QA/QC analysis were used to confirm field test results and ensure accurate drum characterization. Appendix G presents the analytical results for all drums sampled including QA/QC analysis and chain-of-custody records where appropriate.

3.4 DEVELOPMENT OF WASTE PROFILES

The review of existing drum documentation and the results of drum characterization sampling permitted the development of waste profiles. Existing waste profiles were used when appropriate and additional waste profiles were created as necessary to facilitate off-Site disposal. The waste profiles were used to assemble drums into appropriate loads for disposal under that particular waste profile.

Given the unknown nature of the materials on Site, broad-based waste profiles were used. The waste profiles included many

USEPA waste codes, chemical constituents, and physical states to ensure that during transportation and handling, all drums would be in compliance with USEPA, Department of Transportation (DOT), and disposal facility requirements.

All waste profiles were approved by the receiving disposal facility and the USEPA OSC prior to any off-Site waste shipments. Waste profiles for all wastes shipped from the Site are presented in Appendix H.

4.0 DRUM REMOVAL AND DISPOSAL

The drum removal and disposal was performed as per the approved work plans, with the approved modifications listed in Section 1.4. The first segment was performed by EWT from December 11, 1993 to January 7, 1994. The second and final segment was performed by CRA/Laidlaw from April 4, 1994 to May 13, 1994. As of May 13, 1994, all drums had been removed from the Site.

4.1 OVERVIEW OF PROCEDURES

The removal and disposal process of the program proceeded once drum characterization had been completed. Both EWT and Laidlaw consolidated and staged drums according to characterization results in appropriate approval waste profile groups for transportation to the disposal facilities. Once sufficient drums were staged, manifests were developed and the load was shipped off Site. All hazardous wastes were transported to the end disposal facility by USEPA and DOT licensed waste haulers.

EWT shipped 1,811 drums/lab packs in 18 loads from the Site. Table 4.1 summarizes each load shipped and its destination, manifest document number, state manifest number, number of drums shipped in each load and waste classification.

CRA/Laidlaw shipped 2,698 drums and lab packs from the Site. In addition, 314 empty metal drums, 10 bags of sodium sulfide and two roll-offs of PPE were shipped from the Site. The above materials were shipped in 42 loads. Table 4.2 summarizes each load shipped and its destination, manifest document number and state manifest number, number of drums in each load, and waste classification.

The initial inventory conducted by CRA indicated that 2,889 drums and lab packs existed on Site prior to Laidlaw activities. The difference between the inventory and the actual number of drums/lab packs shipped off Site (2,698) is attributed to the following:

i) additional laboratory chemicals were found in the front laboratory subsequent to the inventory;
ii) the inventory included 34 drums said to contain kiln dust which did not require removal pursuant to the Administrative Order; and
iii) numerous lab packs were consolidated thereby reducing the number of lab packs to be disposed by approximately 38 percent.

Drum logs presenting a listing of drums/lab packs shipped in each load are presented in Appendix I. Attached to the drum log for each load are the manifests under which the drums were shipped and Certificates of Disposal/Destruction. The drum logs list each drum/lab pack by the Frontier generator number and/or Laidlaw drum number.

4.2 DISPOSAL FACILITIES SELECTION

EWT's selection of disposal facilities for the Frontier project was based on a facilities' ability to meet or surpass the following evaluation criteria:

1. CERCLA approved;
2. Sterling compliance history;
3. Capacity to handle large volumes of waste;
4. Expansion capabilities;
5. Proper licenses, permits, and insurance as necessitated by State and Federal guidelines;
6. Financially secure;
7. Ultimate disposal facilities are proposed over Transfer Storage Disposal Facilities or Transfer Storage Facilities for "cradle to grave" liability purposes;
8. Leaders in the field utilizing the most advanced treatment technology available;
9. Strong management and leadership in the industry; and
10. Length of time in the industry.

EWT's investigation of disposal facilities, according to the above criteria, selected the following disposal facilities to accept waste from the Site:

1. APTUS Environmental Services of Coffeyville, Kansas;
2. CyanoKem of Detroit, Michigan;
3. Envotech Management Services Inc. of Belleville, Michigan;
4. Southeastern Chemical and Solvent Company (SCSC) of Sumter, South Carolina;
5. ThermalKem Inc. of Rock Hill, South Carolina; and
6. NSSI/Sources and Services Inc. of Houston, Texas.

Laidlaw selected waste disposal facilities based on similar criteria to that used by EWT and on their experience with each facility in being able to accept anticipated wastes from the Site. All hazardous wastes from the Site were shipped to CERCLA approved facilities. The facilities selected by Laidlaw were:

1. CyanoKem;
2. Envotech;
3. APTUS of Aragonite, Utah and Coffeyville, Kansas;
4. ThermalKem;
5. Wayne Disposal of Canton, Michigan;
6. NSSI;
7. Norlite Corporation of Cohoes, New York;
8. Ross Incineration Services, Inc. of Grafton, Ohio;
9. Rollins Environmental Services, Inc. of Bridgeport, New Jersey;
10. E.I. du Pont de Nemours & Co. of Deepwater, New Jersey;
11. Ensco Inc. of El Dorado, Arkansas;
12. Systech Environmental Corp. of Paulding, Ohio;
13. Heritage Environmental Services, Inc. of Indianapolis, Indiana;
14. Laidlaw of Roebuck, South Carolina;
15. Laidlaw of Nashville, Tennessee;
16. Laidlaw of Reidsville, North Carolina; and
17. Laidlaw of Thorold, Ontario.

Each of the above facilities was approved by the USEPA OSC to receive waste from the Site. All wastes shipped off Site by EWT and Laidlaw were transported to one of the above facilities. Several facilities were also used for recycling of materials (E.C. Whitney for empty drums and CECOS for the sodium sulfide). These facilities were also approved by the USEPA OSC prior to shipment.

4.3 FINAL DISPOSAL

All loads staged at Frontier were assigned full manifests including USEPA and State waste codes. Appendix I presents copies of all manifests.

Upon final disposal, each disposal facility issued Certificates of Disposal/Destruction which certifies the waste was disposed/destroyed in accordance with CERCLA regulations. Appendix I presents copies of all Certificates of Disposal/Destruction. For drums that were initially shipped to Laidlaw's North Andover Transfer Facility, Appendix I contains tracking forms that present the final destination of each drum as well as the associated Certificates of Disposal/Destruction. The final certificate of disposal/destruction for wastes shipped from the Site was received on Mary 1, 1995.

For ease of reference, Appendix I has been organized by load number. For each load, Appendix I presents the drum log, manifests, and Certificates of Disposal/Destruction.

A listing of the ultimate disposal facility for all the wastes shipped from the Site including disposal/destruction methods used at each facility is presented in Table 4.3.

In summary, the following quantities of materials were shipped from the Site:

- 527 lab packs;

- 3,982 drums;
- two 30 cubic yard roll-offs of PPE;
- 314 empty metal drums for recycling; and
- ten 50-pound bags of sodium sulfide.

5.0 FINAL SITE INSPECTION

A final inspection of the Site was conducted on May 11, 1994 to verify that all field activities associated with the Phase I Drum Removal Action, with the exception of demobilization, were complete. Personnel present at the inspection are listed in Table 5.1.

During a walk through of the Site, each building and area where drums, lab packs, and miscellaneous containers had previously been stored was inspected. Based on the inspection, only eight drums/lab packs that were part of the Phase I Drum Removal Action remained on Site in drum storage area DS-9. These drums/lab packs were scheduled to be shipped on May 11, 1994, but due to a transportation delay, were not shipped until May 13, 1994.

In addition to the above eight drums, 38 drums that are said to contain kiln dust remain in Building 27 and two fiber drums with unknown contents remain in Building 56. It was agreed, with USEPA concurrence, that these drums and any other crushed or empty, plastic or steel drums at the Site were not the responsibility of the Respondents under the Administrative Order.

Based on the results of the Final Site Inspection, it was concluded with USEPA concurrence, that:

i) all field activities associated with the Phase I Drum Removal Action with the exception of demobilization and the last shipment of eight drums on May 13, 1994, were completed in accordance with the Administrative Order on May 11, 1994; and

ii) the Respondent's responsibility for sharing operation and maintenance cost of the Site with USEPA terminated on May 11, 1994.

6.0 ACCOUNTING OF EXPENSES

Clean Sites, Inc. maintained a computerized general ledger system to provide accurate recordkeeping of payments to the Group, site receipts and disbursements to contractors. These financial records have been kept in accordance with generally accepted accounting principles. A summary of costs associated with the Phase I Drum Removal Action is presented in Table 6.1.

7.0 CONCLUSIONS

The objectives of the Phase I Drum Removal Action were to remove and appropriately dispose all staged drums, lab packs and miscellaneous laboratory chemicals at the Site. This objective was achieved by:

i) the removal and off-Site disposal of 527 lab packs;
ii) the removal and off-Site disposal of 3,982 drums;
iii) the removal and off-Site disposal of two roll-offs of PPE generated during the Phase I Drum Removal Action;
iv) the removal and off-Site shipment of 314 empty metal drums for recycling; and
v) the removal and off-Site shipment of ten 50-pound bags of sodium sulfide for re-use.

Approval of this report by USEPA will complete the Phase I Drum Removal Action activities required by the Administrative Order.

FIGURES

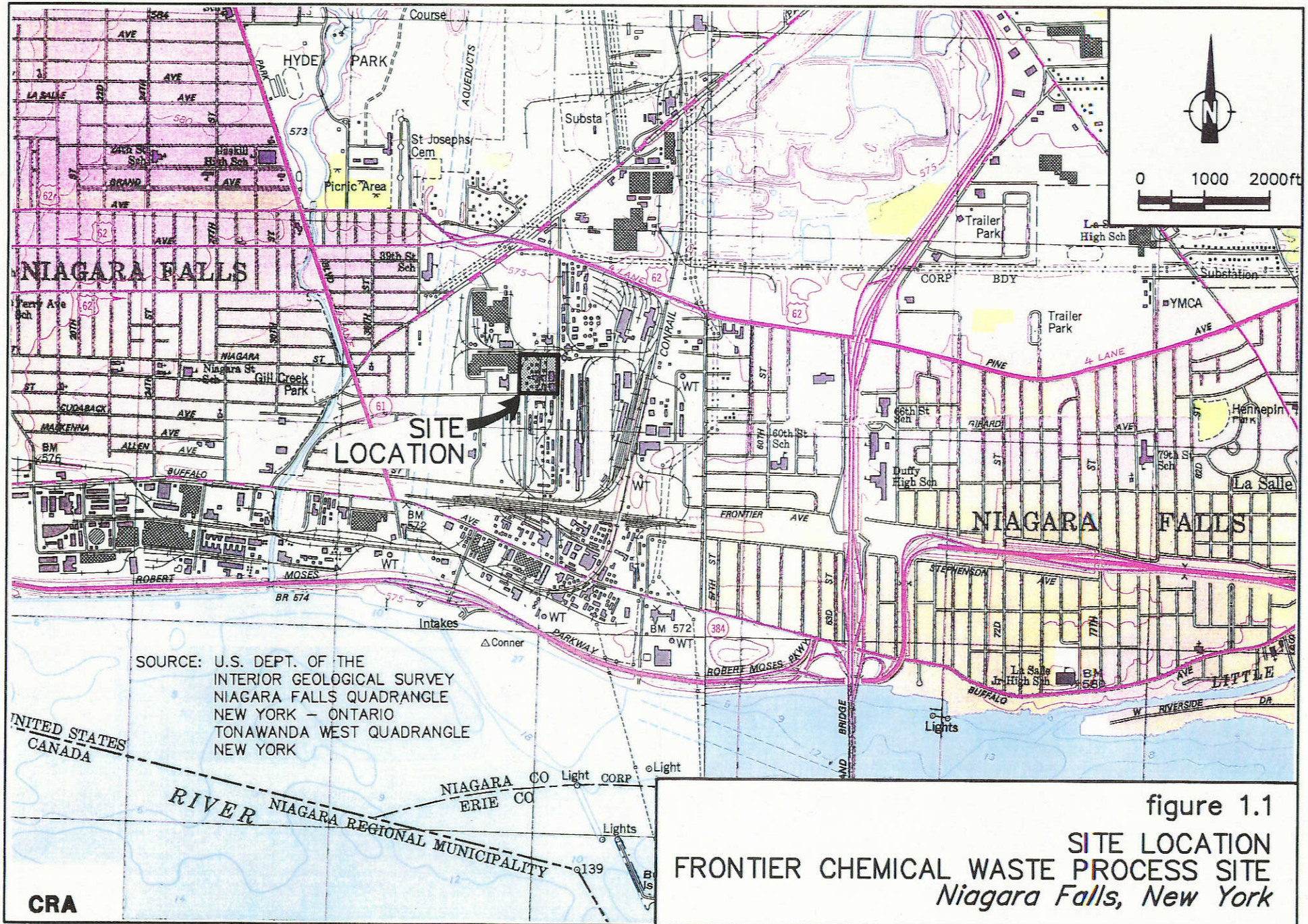


figure 1.1
SITE LOCATION
FRONTIER CHEMICAL WASTE PROCESS SITE
Niagara Falls, New York

5858 (1) FEB 24/95(W) REV.0

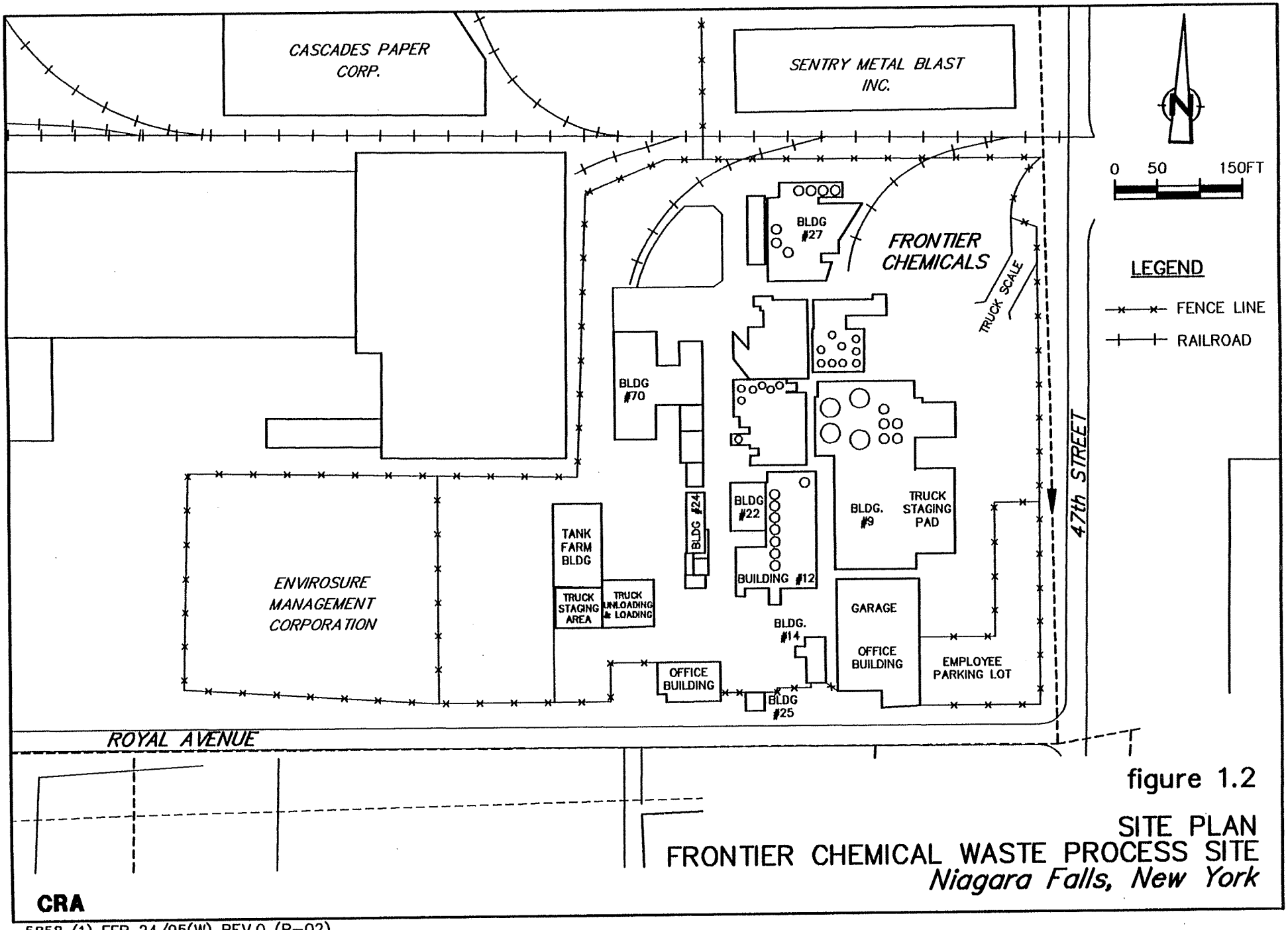


figure 1.2

SITE PLAN

FRONTIER CHEMICAL WASTE PROCESS SITE

Niagara Falls, New York

CRA

5858 (1) FEB 24/95(W) REV.0 (P-02)

TABLES

TABLE 1.1

CHRONOLOGY OF EVENTS
PHASE I DRUM REMOVAL ACTION
FRONTIER CHEMICAL SITE
NIAGARA FALLS, NEW YORK

Date	*Activities/Events*
September 30, 1993	Administrative Order on Consent Removal Action Index No. II CERCLA-93-0207 Lawrence Gemmel of Gemchem as Project Coordinator for Respondents
October 11, 1993	EWT arrives on Frontier Chemical Site; crew and equipment mobilization
October 18, 1993	EWT Work Plan submitted to USEPA
October 20, 1993	USEPA comments on Work Plan
October 27, 1993	Work Plan Approval received
October 28, 1993	Subcontractor arrives on Frontier Chemical Site
November 1, 1993 - November 12, 1994	EWT estimates a total of 47 loads to be characterized, tested, loaded and shipped for disposal. Confirmatory testing on 20 loads including QC analysis for 10% of field tests. 20 loads have been sampled and staged to date Estimated 20% Project Completion as stated in EWT bi-weekly report dated November 15, 1993.
November 15, 1993 - November 26, 1993	Confirmatory testing on 14 additional loads (34 loads tested) 34 loads have been sampled and staged to date Estimated 60% Project Completion as stated in EWT bi-weekly report dated November 29, 1993.
November 27, 1993 - December 10, 1993	Confirmatory testing on 7 additional loads (41 loads tested) 41 loads have been sampled and staged to date Estimated 70% Project Completion as stated in EWT bi-weekly report dated December 13, 1993.

TABLE 1.1

CHRONOLOGY OF EVENTS
PHASE I DRUM REMOVAL ACTION
FRONTIER CHEMICAL SITE
NIAGARA FALLS, NEW YORK

Date	*Activities/Events*
December 11, 1993 - December 23, 1993	42 loads have been sampled and staged or transported to date 14 loads have been shipped for disposal Loads sent this period include: 103, 105, 106, 108, 109, 110, 112, 115, 116, 123, 124, 125, 128, 135 Estimated 80% Project Completion as stated in EWT bi-weekly report dated December 23, 1993.
December 24, 1993 - January 7, 1994	EWT estimates 2,838 drums remaining on Site 18 loads have been shipped for disposal Loads sent this period: 126, 130, 134, 1 lab pack load 9 loads are on hold for anomalies 5 loads are pending QC analysis 12 loads are QC confirmed and awaiting manifests 4 partial loads are awaiting approval 2 loads estimated for lab packs
January 7, 1994 - January 21, 1994	Field activities terminated EWT and PRP meet with regards to funding of project EWT estimates the project 80% complete for labor and 30% complete for transportation and disposal as stated in EWT bi-weekly report dated January 21, 1994.
January 21, 1994 - February 4, 1994	No additional progress
February 5, 1994 -February 18, 1994	No additional progress
March 10, 1994	EWT's contract terminated by Respondents
March 14, 1994	Respondents retain CRA to oversee remainder of drum removal project

TABLE 1.1

CHRONOLOGY OF EVENTS
PHASE I DRUM REMOVAL ACTION
FRONTIER CHEMICAL SITE
NIAGARA FALLS, NEW YORK

Date	*Activities/Events*
March 14, 1994 - March 18, 1994	CRA staff receive Site orientation Initiation of drum inventory 2,671 drums/containers inventoried
March 22, 1994	Drum inventory complete 2,889 drums/containers/lab packs in total
March 21, 1994 - March 25, 1994	Inventory completed Laidlaw submits work plan to USEPA (March 24, 1994)
March 31, 1994	Respondents retain EPC to manage the remainder of the drum removal program
March 28, 1994 - April 1, 1994	Discussions with USEPA to approve Work Plan
April 1, 1994	Respondents retain Laidlaw to remove and dispose of remaining drums at the Site
April 4, 1994	USEPA approves modified Work Plan LES fully mobilized and began operations
April 5, 1994	USEPA notified: Robert Fisher (of CRA) as Project Coordinator to replace Lawrence Gemmel
April 4, 1994 - April 16, 1994	11 loads (883 drums) shipped this period PCB ballasts have been packed
April 18, 1994 - April 22, 1994	11 loads (854 drums) shipped this period Total shipped by CRA/Laidlaw: 22 loads (1,737 drums) Screening and characterization of all on-Site drums complete

TABLE 1.1

CHRONOLOGY OF EVENTS
PHASE I DRUM REMOVAL ACTION
FRONTIER CHEMICAL SITE
NIAGARA FALLS, NEW YORK

Date	*Activities/Events*
April 25, 1994 - April 29, 1994	11 loads (838 drums) shipped this period Total shipped by CRA/Laidlaw: 33 loads (2,575 drums) Screening and characterization of all on-Site lab packs complete 28 drums shipped to Laidlaw for QA/QC were returned April 21, 1994 for disposal 24 drums shipped to Laidlaw for QA/QC were returned April 28, 1994 for disposal
May 2, 1994 - May 6, 1994	6 loads (480 drums (314 empty)+10 bags sodium sulfide+2 roll-offs of PPE) shipped this period Total shipped by CRA/Laidlaw: 39 loads (3,003 containers including 10 bags sodium sulfide + 2 roll-offs of PPE)
May 9, 1994 - May 13, 1994	3 loads (9 drums) shipped this period Total shipped by CRA/Laidlaw: 42 loads (3,024 containers including empty drums, 10 bags sodium sulfide + 2 roll-offs PPE)
May 11, 1994	Final Site Inspection
May 16, 1994 - May 27, 1994	All drums have been shipped from the Site Field activities and demobilization were completed May 19, 1994 Collection of Certificates of Disposal/Destruction initiated
August 17, 1994	Project closeout meeting with Respondents, CRA, EPC, Laidlaw, and USEPA
May 1, 1995	Final Certificate of Disposal/Destruction received

Note: Bi-weekly progress reports were submitted to the USEPA OSC by EWT or CRA throughout the duration of Phase I Drum Removal Action activities.

TABLE 4.1

SUMMARY OF EWT DRUM SHIPMENTS

EWT Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*
103	12/10/93	APTUS, Utah	00004	NYB5569596	71	hazardous
			00003	NYB5569101	16	hazardous
106	12/10/93	APTUS, Utah	00002	NYB5569587	82	hazardous
125	12/16/93	Envotech, Michigan	00022	MI3070808	82	non-hazardous
112	12/17/93	APTUS, Utah	00005	NYB5569119	83	hazardous
108	12/17/93	Southeastern Chemical, South Carolina	00007	--	42	hazardous
			00006	--	43	hazardous
124	12/18/93	Envotech, Michigan	00018	MI3070807	84	non-hazardous
110	12/18/93	Southeastern Chemical, South Carolina	00008	--	78	hazardous
					3	non-hazardous
			00009	--	1	hazardous
109	12/18/93	APTUS, Utah	00001	NYB5569128	86	hazardous
123	12/19/93	Envotech, Michigan	00017	MI3070806	92	non-hazardous
128	12/21/93	Envotech, Michigan	00025	MI3070814	88	non-hazardous
115	12/22/93	APTUS, Utah	00013	NYB5569173	58	hazardous
			00014	NYB5569182	17	hazardous
			00015	NYB5569209	8	hazardous
116	12/22/93	APTUS, Utah	00016	NYB5569218	87	hazardous

TABLE 4.1

SUMMARY OF EWT DRUM SHIPMENTS

EWT Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*
105	12/22/93	APTUS, Utah	00012	NYB5569164	52	hazardous
			00010	NYB5569146	5	hazardous
			00011	NYB5569155	25	hazardous
135	12/22/93	Envotech, Michigan	00030	MI3070815	86	non-hazardous
134	12/27/93	Envotech, Michigan	00026	MI3070817	81	non-hazardous
126	12/28/93	Envotech, Michigan	00023	MI3070818	85	non-hazardous
130	12/30/93	APTUS, Utah	00029	NYB5569272	67	hazardous
			00030	NYB5569281	6	hazardous
Lab Packs	12/10/93	APTUS, Minnesota	C069L	MN153445	383	lab packs
			C069A	MN153447		
			C069P	MN153446		

Total Drums	=	1428
Total Lab Packs	=	383
Grand Total	=	**1811**

TABLE 4.2

SUMMARY OF LAIDLAW DRUM SHIPMENTS

Laidlaw Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*	*Comments*
1	4/7/94	Laidlaw(1)	88001	MAH538617	13	Haz.	
					27	State Reg.	
			88002	MAH538618	41	Non-Reg.	
2	4/8/94	Laidlaw(1)	88003	MAH538622	24	Haz.	
			88004	MAH538623	4	Haz.	
					2	State Reg.	
			88005	MAH538624	2	State Reg.	
					47	Non-Reg.	
			88006	MAH538625	1	Non-Reg.	
3	4/11/94	Cyanokem	89001	MI3202137	84	Haz.	
4	4/11/94	Envotech	89002	MI3202139	77	Non-Haz.	
5	4/12/94	Envotech	89003	MI3120250	51	Haz.	
			89004	MI3120249	32	Non-Haz.	
6	4/11/94	Laidlaw(1)	88007	MAH538639	12	Haz.	
					6	State Reg.	
					6	Non-Haz.	
			88008	MAH538640	50	Non-Haz.	
			88009	MAH538641	7	Non-Haz.	
7	4/13/94	Envotech	89005	MI3120194	36	Haz.	
			89006	MI3120195	13	Haz.	
					1	Non-Haz.	
			89007	MI3120201	38	Non-Haz.	
8	4/13/94	Laidlaw(1)	88010	MAH538680	4	Haz.	
			88011	MAH538681	6	Haz.	
			88012	MAH538682	7	Haz.	
			88013	MAH538683	9	Haz.	
			88014	MAH538684	6	Haz.	
					21	Non-Reg.	

TABLE 4.2

SUMMARY OF LAIDLAW DRUM SHIPMENTS

Laidlaw Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*	*Comments*
8 (cont'd.)	4/13/94	Laidlaw(1)	88015	MAH538685	5	State Reg.	
					3	Non-Reg.	
			88016	MAH538686	12	Non-Reg.	
9	4/13/94	Laidlaw(1)	88017	MAH538671	29	Haz.	
			88018	MAH538672	9	Haz.	2 drums returned to Site and reshipped
					7	Non-Reg.	
			88019	MAH538673	20	Non-Reg.	
					9	Haz.	
10	4/14/94	Envotech	89008	MI3120197	9	Haz.	
			89009	MI3120198	46	Haz.	
					13	Non-Haz.	
			89010	MI3120200	12	Non-Haz.	
11	4/15/94	Envotech	89011	MI3202140	82	Non-Haz.	
12	4/18/94	Envotech	89012	MI3202147	9	Non-Haz.	
					13	Haz.	
			89013	MI3120202	29	Haz.	
			89014	MI3202149	30	Haz.	
13	4/18/94	Laidlaw(1)	88020	MAH538675	20	Haz.	9 drums returned to Site and reshipped
			88021	MAH538676	20	Haz.	
			88022	MAH538677	17	Haz.	15 drums returned to Site and reshipped
					3	Non-Reg.	
			88023	MAH538678	12	State Reg.	
					3	Non-Reg.	
14	4/19/94	Envotech	89015	MI3120245	52	Non-Haz.	
			89016	MI3120248	6	Haz.	
			89017	MI3202144	12	Haz.	

TABLE 4.2

SUMMARY OF LAIDLAW DRUM SHIPMENTS

Laidlaw Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*	*Comments*
15	4/18/94	Laidlaw(1)	88024	MAH538688	12	Haz.	2 drums returned to Site and reshipped
			88025	MAH538689	15	Haz.	
					23	Non-Reg.	
			88026	MAH538690	20	State Reg.	
					4	Non-Reg.	
16	4/20/94	Envotech	89023	MI3054991	28	Non-Haz.	
			89024	MI3054992	19	Non-Haz.	
					25	Haz.	
17	4/19/94	Laidlaw(1)	88027	MAH746937	4	Haz.	
			88028	MAH746938	35	Haz.	
					15	Non-Reg.	
			88029	MAH746939	5	Non-Reg.	
					13	State Reg.	
18	4/21/94	APTUS	89018	NYB5477877	82	Haz.	
			89019	NYB5477886	6	Haz.	
19	4/25/94	APTUS	89022	NYB5478831	2	Haz.	
			89021	NYB5478822	5	Haz.	
			89020	NYB5478813	81	Haz.	
20	4/22/94	Envotech	89025	MI3120239	36	Haz.	
			89026	MI3120240	35	Haz.	
21	4/21/94	Cyanokem	89029	MI3055000	5	Haz.	
		Envotech	89027	MI3054993	81	Non-Haz.	
		Envotech	89028	MI3054994	1	Haz.	
22	4/21/94	Laidlaw(1)	88030	MAH746943	24	Haz.	24 drums returned to Site and reshipped
					11	Non-Reg.	
					36	State Reg.	
			88031	MAH746944	3	State Reg.	

TABLE 4.2

SUMMARY OF LAIDLAW DRUM SHIPMENTS

Laidlaw Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*	*Comments*
23	4/25/94	Envotech	89032	MI3120208	31	Non-Haz.	
					1	Haz.	
			89033	MI3054996	23	Haz.	
			89034	MI3120205	28	Haz.	
24	4/22/94	APTUS	89030	NYB5478885	68	Haz.	
			89031	NYB5478876	22	Haz.	
25	4/26/94	Thermal Kem	89891	SCA0426940	97	Lab Packs	
26	4/26/94	Cyanokem	89035	MI3569572	53	Haz.	
			89036	MI3569573	20	Haz.	
27	4/26/94	APTUS	89037	NYB5478939	62	Haz.	
			89038	NYB5478921	62	Haz.	
28	4/27/94	Thermal Kem	89039	SCA0427940	16	Haz.	
			89040	SCB0427940	61	Haz.	
29	4/27/94	Thermal Kem	89041	SCC0427940	76	Haz.	
30	4/28/94	APTUS	89042	NYB4896261	75	Haz.	
			89044	NYB5478975	3	Haz.	
31	4/28/94	Thermal Kem	89043	SCA0428940	76	Haz.	
32	4/29/94	Thermal Kem	89045	SCA0502940	65	Haz.	
33	5/2/94	Thermal Kem	89892	SCA0429940	41	Lab Packs	
34	5/4/94	Cyanokem	89048	MI3569581	44	Haz.	
			89049	MI3569582	14	Haz.	
			89050	MI3569584	6	Haz.	
			89051	MI3569585	2	Haz.	

TABLE 4.2

SUMMARY OF LAIDLAW DRUM SHIPMENTS

Laidlaw Load Number	*Date Shipped*	*Receiving Facility*	*Manifest Document Number*	*State Manifest Number*	*Number of Drums*	*Classification*	*Comments*
35	4/28/94	Envotech	89893	MI3054997	1	Lab Pack	
36	5/4/94	APTUS	89046	NYB5478957	51	Haz.	
			89047	NYB4986009	8	Haz.	
37	5/5/94	E.C. Witney	--	--	314 (2)	Empty Drums	
38	5/5/94	Wayne Disposal	89052	MI3120216	2 (roll-offs) (3)	Non-Reg.	
39	5/2/94	CECOS	--	--	10 (4)	Sodium Sulfide	
40	5/10/94	NSSI	89053	LO007405	1	Lab Pack	
41	5/11/94	NSSI	89054	LO007392	4	Lab Packs	
			89055	LO007390	1		
42	5/12/94	Laidlaw(1)	89894	MAH746733	1	Haz.	
			89893	MAH746734	2	Haz.	
				TOTAL DRUMS (5)	2554		
				TOTAL LAB PACKS	144		
				OTHER MATERIALS	326		
				TOTAL:	**3024**		

Notes:

(1) Drums initially shipped to Laidlaw's North Andover Transfer Facility. Final destinations of these drums is listed on the tracking forms presented in Appendix F.
(2) Empty Drums.
(3) Two 30-yard roll-offs of personal protective equipment.
(4) Fifty pound bags of virgin sodium sulfide.
(5) Accounts for the 52 drums originally shipped to Laidlaw that were returned to the Site and reshipped to APTUS and Thermal Kem.

TABLE 4.3

ULTIMATE DISPOSAL FACILITIES
FRONTIER CHEMICAL SITE
NIAGARA FALLS, NEW YORK

Facility	*Treatment/Disposal Method*
APTUS	- Incineration
CyanoKem	- Neutralization and Wastewater Treatment - Cyanide Destruction
Envotech	- Neutralization - Solidification/Stabilization - Landfilling
Southeastern Chemical and Solvent	- Recycling - Fuel Blending
ThermalKem	- Incineration
NSSI/Sources and Services	- Incineration - Mercury Retort/Reclamation
Wayne Disposal	- Landfilling
Norlite Corporation	- Incineration
Ross Incineration Services	- Incineration
Rollins Environmental Services	- Thermal Oxidation - Vitrification
E.I. du Pont de Nemours & Co.	- Biological Treatment
Ensco Inc.	- Incineration
Systech Environmental Corp.	- Incineration
Heritage Environmental Services, Inc.	- Fuel Blending
Laidlaw (Nashville, TN)	- Neutralization - Biological Treatment
Laidlaw (Reidsville, NC)	- Neutralization
Laidlaw (Roebuck, SC)	- Incineration
Laidlaw (Thorold, ON)	- Neutralization

TABLE 5.1

FINAL SITE INSPECTION ATTENDEE LIST
MAY 11, 1994
FRONTIER CHEMICAL SITE
NIAGARA FALLS, NEW YORK

Name	*Organization*
Robert Fisher	TreaTek - CRA
Jim Kay	Conestoga-Rovers & Associates
Leanne Merashoff	Laidlaw Environmental Services
Jonathan Wagman	Laidlaw Environmental Services
Tim Cosgrave	Environmental Project Control
Jeff Forgang	TransTechnology Corporation
Kevin Matheis	United States Environmental Protection Agency
Dave Newman	Roy F. Weston

TABLE 6.1

DISBURSEMENTS OF CLEAN-UP AND LEGAL COSTS FRONTIER CHEMICAL SITE

Clean Sites Inc.	$ 186,722.28
Environmental Waste Technology	1,295,805.30
GemChem	36,897.02
Environmental Project Control	39,964.45
Laidlaw Environmental Services	1,050,000.00 *
Conestoga-Rovers & Associates	83,000.00 *
Legal Fees	20,463.03
Total	**$ 2,712,852.08**

* Estimated Cost. Invoicing for these contractors had not been completed at time of report preparation.