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Remedial Action Work Plan for Voluntary Cleanup at Buffalo Brake Beam Site in Lackawanna, New York

Pertaining to
Voluntary Cleanup Agreement
Site #V00625-9

Index #B9-0630-02-12

Prepared for: Rigel Enterprises, Inc.
Youngstown, New York

Prepared by: Snyder Engineering
Grand Island, New York

Original Date: March 7, 2003
Revision Date: May 15, 2003
Revision Date: June 30, 2003

PROFESSIONAL ENGINEER CERTIFICATION

I, the undersigned, hereby certify that this Remedial Action Work Plan for Voluntary Cleanup at Buffalo Brake Beam Site (Voluntary Cleanup Agreement Site Number V00625-9) in Lackawanna, New York has been prepared under my direction in accordance with good engineering practices.

Name: Richard R. Snyder

Signature: Richard R. Snyder

Date: May 15, 2003 Registration Number: 54616 State: New York

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1.0 INTRODUCTION

This Remedial Action Work Plan (this "Work Plan") is being submitted to the New York State Department of Environmental Conservation (NYSDEC) on behalf of Rigel Enterprises, Inc. in connection with the Voluntary Cleanup Agreement for Site #V00625-9. Capitalized terms in this Work Plan shall have the same meaning as set forth in the Voluntary Cleanup Agreement unless otherwise defined herein.

Rigel Enterprises, Inc. was formerly known as Buffalo Brake Beam Company, Inc. Its name was changed to Rigel Enterprises, Inc. in December, 2002. Rigel Enterprises, Inc. is also the same entity as the "Volunteer" in the Voluntary Cleanup Agreement. Accordingly, references in this Work Plan to "Buffalo Brake Beam", "Rigel Enterprises", "Rigel" and the "Volunteer" are all intended to refer to the same entity, namely the Volunteer described in the Voluntary Cleanup Agreement.

The property to which this Work Plan relates is commonly known as the Buffalo Brake Beam property located at 400 Ingham Avenue in Lackawanna, New York and is the same property defined in the Voluntary Cleanup Agreement as the "Site". Accordingly all references in this Work Plan to the "property" are intended to refer to the Site in the Voluntary Cleanup Agreement.

The Site is owned by Rigel and is located in an industrialized area of Lackawanna. It is bounded as follows:

North - Former Lehigh Industrial Park which is a closed inactive hazardous waste site
East - Inactive rail line (South Buffalo Railroad)
South - Erie County Sewerage Treatment Facility and new industrial park which is under development
West - Residential neighborhood and scrap yard

Development and usage of the Site for industrial purposes was started around 1900. Since then, and until December, 2000 the Site was continuously occupied and used by Rigel to manufacture parts for railroad cars.

In December of 2000, Rigel sold the operating assets of Rigel to Powerbrace Corporation (herein "Powerbrace"). That transaction is referred to in this Work Plan as the "Powerbrace Transaction". From December, 2000 until approximately September, 2001, Powerbrace occupied the Site as a tenant of Rigel, and used the facilities on the Site to similarly manufacture parts for railroad cars. However, in September 2001 Powerbrace vacated the Site and surrendered its leasehold interest to Rigel. At this time, the Site is not occupied by either Rigel or any tenant, and no manufacturing activities are performed at the Site.

The Site has been the focus of several environmental investigations and/or actions as follows:

1992 - Limited soil investigation
1993 through 1997 - Extensive soil investigation and limited remedial action
1997 - Petroleum spill investigation and remedial action
1997 through 1998 - Limited soil investigation
2000 - Phase I Environmental Site Assessment
2000 - Phase II Environmental Site Assessment
2001 - Gasoline contamination remedial action
2001 - Fuel oil spill remediation
2002 - Quenchant pit contamination investigation
2002 - Monitoring well installation and groundwater monitoring
2002 - BTEX contamination investigation

The results of each investigation and/or remedial action are summarized in this Work Plan.

This Work Plan addresses the following specific items to satisfy various requirements of the Voluntary Cleanup Agreement:

1) Objectives of Rigel to be achieved by implementation of the Work Plan to satisfy requirements of Voluntary Cleanup Agreement,
2) Site location and description,
3) Site history,
4) Contemplated future use of the Site,
5) Descriptions of and statements of findings from environmental investigations at the Site,
6) Descriptions and results of interim remedial actions performed to date at the Site,
7) Identification of existing contamination at the Site,
8) Conceptual site model,
9) Identification and development of remediation alternatives,
10) Evaluation of remediation alternatives,
11) Work plan for implementation of remediation actions.

2.0 PROJECT OBJECTIVES

The primary objective of this Work Plan is to set forth a plan of environmental remediation, with respect to the Site, that will satisfy the requirements of the Voluntary Cleanup Agreement, and enable Rigel to be issued the "Release and Covenant Not to Sue" provided for therein. Rigel proposes to complete the following items in order to satisfy this objective:

1) Obtain any additional site information necessary to characterize the nature and extent of any remaining threats to human health or the environment due to residual contamination either from petroleum/gasoline residuals or hazardous compounds.
2) Obtain additional information (both general and site specific) necessary to evaluate various remediation alternatives and make a remediation selection decision concerning any remaining threats to human health or the environment at the Site.
3) Obtain NYSDEC approval for remediation work proposed by Rigel to be performed at the Site.
4) Implement NYSDEC approved remediation work as proposed in the Work Plan.

This Work Plan contains additional information regarding the Existing Contamination at the Site in order to better clarify the nature of the Existing Contamination and evaluate its potential as a threat to human health or the environment.

In connection with the Powerbrace Transaction in 2000, an extensive and comprehensive due diligence environmental evaluation of the Site was completed by Earth Tech, Inc. ("Earth Tech"). Rigel has previously provided a copy of this report to the NYSDEC, and it is herein referred to as the "Earth Tech Report" or the "Phase II Assessment". It is important to note that the Earth Tech Report was completed at the request of Miner Enterprises, Inc. (the owner of Powerbrace). In connection with the previously noted Powerbrace Transaction, Powerbrace obtained an option to purchase the Site from Rigel. In order to have as full and complete an understanding as possible of the environmental conditions at the Site for utilization in evaluating whether or not to exercise its purchase option, Powerbrace contracted Earth Tech to complete the previously noted Phase II Assessment. When Powerbrace vacated the Site in September of 2001 and surrendered its leasehold interest in the Site to Rigel, the purchase option was terminated.

3.0 SITE LOCATION AND DESCRIPTION

The Site is located at 400 Ingham Avenue in Lackawanna, New York (refer to Figure 3-1 for Property Location Map). It consists of approximately 8.1 acres of land. It is bounded by a closed inactive hazardous waste site (former Lehigh Industrial Park) on the north, inactive rail line (South Buffalo Railroad) on the east, Erie County Sewerage Treatment Facility and new industrial park under development on the south, and a residential neighborhood and scrap yard to the west.

The Site is located on the lake plain approximately one mile from the shore of Lake Erie. It is relatively flat but is characterized by a gentle slope from north to south and from east to west. The Site is functionally divided into two subparcels by a chain link fence.

The smaller parcel (approximately 2.5 acres) contains a one story office building (approximately 4,500 sq. ft.) along its western boundary near the intersection of School Road and Ingham Street. This building and its adjacent asphalt parking areas and driveways occupy approximately 0.75 acres, and the balance of this 2.5 acres is covered with grass and landscaped areas. The larger parcel (approximately 5.5 acres) contains manufacturing and storage facilities (approximately 56,000 sq. ft.) which consist of several contiguous structures of various size, age, and shape. The main building and its railroad sidings, loading docks, concrete aprons, storage pads, and asphalt parking areas cover approximately 3 acres, and the balance of this 5.5 acres is sparsely vegetated.

A chain link fence encloses approximately 5 acres of the Site which includes the manufacturing and storage facilities. Loading bays located along the southwest portion of the manufacturing facility and the smaller 2.5 acre parcel which contains the office building are not fenced.

A storm water diversion berm (approximately 300 feet long and ranges in height from 1.5 to 4 feet) is located along and inside the northern fence line between the fence and the facility. This berm was constructed by Rigel in 1998 using on-site material which was excavated from the site during the construction of a building addition (refer to Drawing SEBBB-01 for location of dike material source). Its purpose was to prevent sheet runoff from the closed inactive hazardous waste site adjacent to the northern side of the property from flowing onto the property and covering the area between the closed landfill and the manufacturing facility. A layer of coarse gravel (reportedly placed by the NYSDEC as part of the former landfill closure activities) extends to approximately 50 feet south of the fence along the Site's northern boundary.

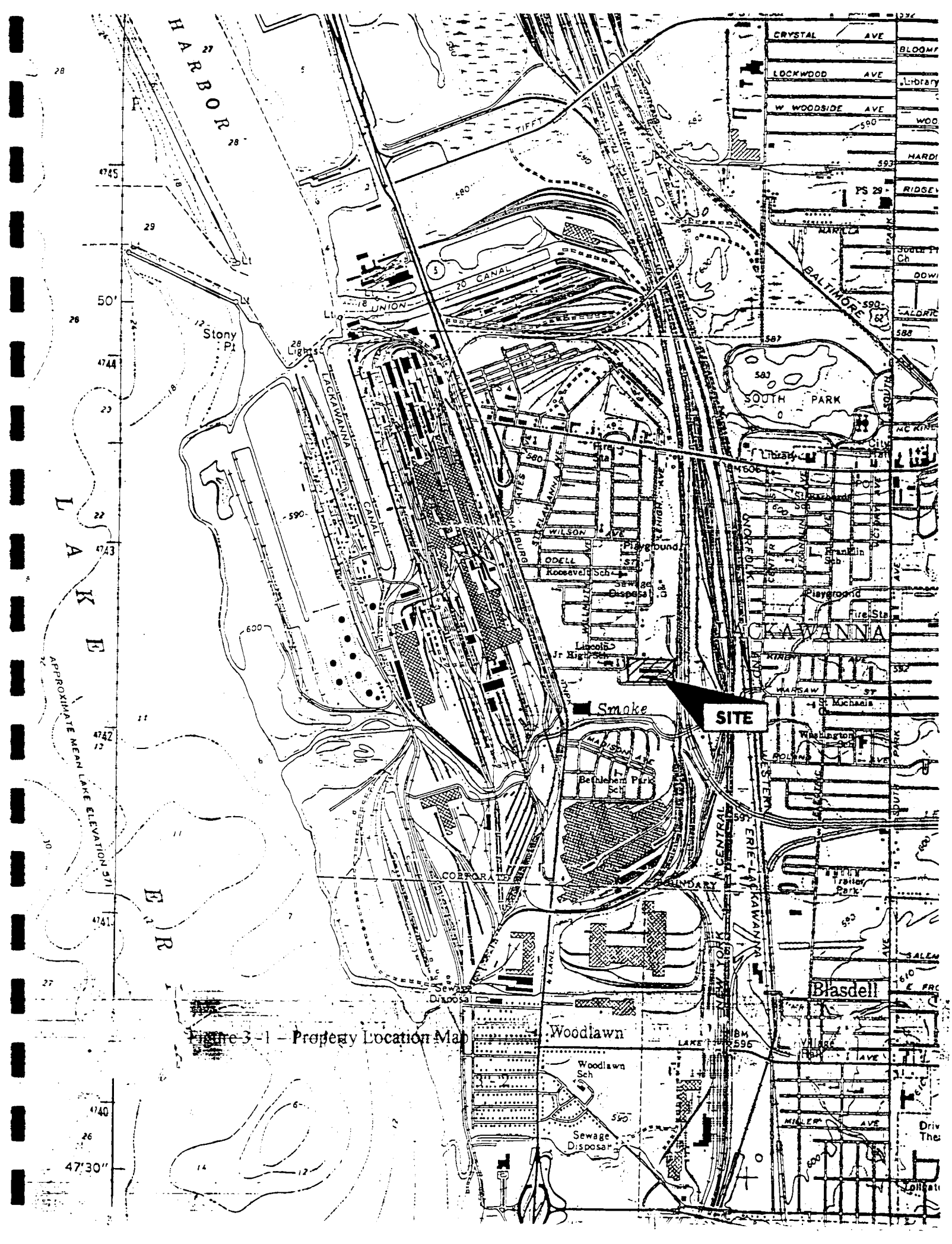


Figure 3-1 – Property Location Map

4.0 SITE HISTORY

The development and usage of this Site for industrial purposes was initiated around 1900. Since that time, and until December of 2000, it was continuously utilized by Rigel to manufacture parts for railroad cars. During this period, Rigel made various improvements at the Site, such as placement of fill and regrading of undeveloped portions of the Site, addition of new structures, demolition and/or replacement of structures, additions and modifications to existing structures, and replacement of machinery and equipment.

The building on the Site's smaller parcel housed the administrative offices of Buffalo Brake Beam. The manufacturing and storage facilities of Buffalo Brake Beam on the Site's larger parcel (refer to Drawing SEBBB-01) included the following:

1) Machine shop
2) Crane room/shipping and receiving: Received raw materials, storage of product, and loading of product
3) Beam shop: Bent, heat treated, welded and molded raw steel into the various brake beam components; also included office area, compressor room and power room, and a product staging storage area
4) Engineering/maintenance: Included maintenance and welding shops and an engineering/testing, and quality assurance laboratory
5) Locker room
6) Steel shop: Utilized for industrial processing of various steel components (processes included heat treating, quenching.

The Site contains five electrical transformers located outside of buildings. Each transformer contains a sticker which indicates that it has been tested and contains less than 50 ppm PCBs. Three electrical transformers are located in a room attached to the maintenance shop. These three have no markings indicating PCB levels and therefore will be tested for PCBs as part of this Remedial Action Work Plan.

The Site Drawing SEBBB-01 also includes three above ground storage tanks. These tanks were utilized as follows:

1) Argon gas storage tank,
2) Quenchant fluid storage tank,
3) Emergency paint dump tank (Note: Never utilized).

Former buildings which are no longer present include the casting storage/rubber room, truss fabrication, and beam storage. No degreasing or plating operations are known to have existed at the site.

5.0 CONTEMPLATED FUTURE SITE USE

In recognition of the industrial use of the Site for over 100 years, Rigel has agreed to restrict the future use of the Site to the "Contemplated Use" provided for in the Voluntary Cleanup Agreement, namely "Restricted commercial use, excluding day care, child care and medical care uses". This Work Plan has been prepared consistent with such Contemplated Use. Therefore, this Work Plan is intended to set forth those additional remedial activities Rigel proposes in order to remediate the Site to a level that is protective of public health and the environment consistent with the Contemplated Use of the Site.

6.0 SITE INVESTIGATIONS

6.1 Introduction

A number of environmental investigations have previously been conducted at the Site. These investigations have been performed for a variety of purposes. They include both investigations relating to the entire Site and investigations which deal only with specific issues and actions relating to various portions of the Site. These environmental investigations and/or actions include the following:

1992 - Limited soil investigation
1993 through 1997 – Extensive soil investigation and limited remedial action
1997 - Petroleum spill investigation and remedial action
1997 through 1998 – Limited soil investigation
2000 - Phase I Environmental Site Assessment
2000 - Phase II Environmental Site Assessment
2001 - Gasoline contamination remedial action
2001 - Fuel oil spill remediation
2002 - Quenchant pit contamination investigation
2002 - Monitoring well installation and groundwater monitoring
2002 - BTEX contamination investigation and remediation

The previously noted Site environmental investigations were comprehensive in scope. One can conclude with a high degree of certainty that conditions relating to existing contamination at the Site have been identified and in most cases remediated to a degree which minimizes any potential threats to human health or the environment. The Phase II Earth Tech Report provided an extensive and comprehensive due diligence environmental evaluation of the entire Site and associated facilities. The proposed remediation work plans to satisfy the remaining issues at the Site (quenchant pit and Tetrachloroethene contamination) are included in this Work Plan. In addition work plan implementation includes sampling of the three untested transformers at the Site for PCBs and a Site Surface Monitoring Plan. Upon NYSDEC approval and successful implementation of this Work Plan, all issues relating to the protection of human health and environment at the Site will have been resolved in a manner consistent with the Site's Contemplated Use.

Specific information is provided in this Section of the Work Plan for each investigation and includes investigation objectives, scope of work, evaluation of environmental media sampling and analyses, and conclusions. In those instances where these investigations were involved with previous site remedial actions, additional information is provided in Section 7.0 (Interim Remedial Actions) of this Work Plan.

6.2 Environmental Site Assessments

6.2.1 Phase I Environmental Site Assessment (2000)

A Phase I Environmental Site Assessment was completed in August 2000 by Chopra-Lee of Grand Island, New York for Buffalo Brake Beam. The assessment was performed in general accordance with ASTM Standard E1527-00. It noted that several "recognized environmental conditions" as defined by the ASTM Standard existed at the Site. These included the following:

1) Petroleum product spill beneath the manufacturing facility's floor which was remediated and granted a "Closed-Inactive" status by the NYSDEC,
2) Past on site usage of bulk petroleum products storage tanks,
3) On site usage of bulk chemical storage tanks,
4) On site storage of chemicals in 55 gallon drums,
5) Past use of fill materials of unknown origin at Site,
6) Documentation of hazardous waste disposal on adjacent properties.

The Chopra-Lee Phase I Report concluded that no further action with respect to either additional investigation of the property or the previously noted "recognized environmental conditions" was necessary at that time.

6.2.2 Phase II Site Environmental Assessment (2000)

In connection with the Powerbrace Transaction, the Phase II Earth Tech Report was completed in December 2000 at the request of Miner Enterprises, Inc. (the owner of Powerbrace). The Earth Tech Report was prepared on behalf of Powerbrace, as a prospective tenant and/or purchaser of the Site. As noted in the Earth Tech Report, the purpose of the investigation was to establish an initial baseline of the current (December 2000) quality of the on site environmental media with respect to known or suspected contamination resulting from historical usages and/or practices. This investigation was an extensive and comprehensive due diligence environmental evaluation of the entire Site and associated facilities. It included sampling of both soil and groundwater in areas with both known and/or suspected contamination and in areas where no evidence of contamination was previously identified. It involved the completion of 23 primary soil borings, 13 step-out borings, and 8 temporary groundwater sampling points. Environmental sampling and laboratory analysis included 22 soil samples and 5 groundwater samples. Laboratory reported concentrations of compounds in these samples were compared to applicable Standards, Criteria, and Guidance of the New York State Department of Environmental Conservation. Based upon its review of historical information, field observations, and analytical data from soil and groundwater samples, Earth Tech concluded that the Buffalo Brake Beam property had been adversely impacted

by its past use. A summary of these potential impacts and their present status is as follows:

Item 1 (Arsenic Concentrations in Site Soils):

Potential Impact: Elevated concentrations of arsenic in excess of recommended soil cleanup objectives listed in TAGM 4046.

Basis for Concern: Maximum reported total concentration of arsenic in soil sample SB-05 (13 mg/kg) is higher than upper limit of the average arsenic concentration in New York soils of 12 mg/kg. In addition arsenic was reported in three additional soil samples at concentrations in excess of the Recommended Soil Cleanup Objective of 7.5 mg/kg.

Analysis/Conclusion: Average reported arsenic concentration (5 mg/kg) from eleven soil samples is well within the average arsenic concentration in New York soils of 12 mg/kg. Statistical analysis indicated that the maximum reported concentration of 13 mg/kg is less than two standard deviations above the average and is therefore considered to be within the range of normal spatial variability. Earth Tech concluded that arsenic does not represent an environmental risk at the Site and additional investigation and/or remediation of soils for arsenic is/are not necessary or likely to be required in the future.

Item 2 (Lead Concentrations in Site Soils):

Potential Impact: Elevated concentrations of lead associated with reddish dried paint like substance in soils along the Site's northern boundary.

Basis for Concern: During the Lehigh Industrial Park remediation, the NYSDEC noted the presence of a reddish dried paint like substance in soils along the Site's northern boundary. A series of samples was taken by a representative of the NYSDEC at fifteen foot intervals (Note: Sample taken only where evidence of reddish dried paint was identified) from two one foot deep trenches along the Buffalo Brake Beam Site's northern boundary. A total of eight samples were taken and each was analyzed for TCLP lead and total lead. Total lead results ranged from 0.0470 to 0.337 weight percent (average 0.1682) and TCLP lead results ranged from less than 0.500 to 2.13 mg/l. The excavated material (approximately 22 tons) was removed from the Site and shipped to the Chemical Waste Management facility in Model City, New York for disposal. The lead concentrations reported in this 1997 soil sampling event

were higher than the upper limit of the average for Eastern USA soils. However, the TCLP lead concentrations obtained from these samples were all sufficiently low that the lead does not represent a significant threat to the site's groundwater.

Analysis/Conclusion: Remediation of the lead contaminated soils at the Site was performed by the NYSDEC in July 1997 as part of the Lehigh Industrial Park remediation (refer to Section 7.4). After completion of this removal action a series of twelve shallow test pits were excavated by Chopra Lee on 11/10/97 to investigate the red paint residue remaining onsite. This residue is located in the north yard of the manufacturing facility inside the fenced area. The residue is in shallow soils in the 0 to 2 foot interval however not visible on the surface. Earth Tech noted the residue in two of their borings, SB01 at 14 inch depth and SB02 at 18 inch depth. Seven samples were taken by Chopra Lee from the test pits at those locations suspected of lead contamination due to the soils reddish color (Refer to Drawing SEBBB-02). The lead concentrations in six of the seven samples taken by Chopra Lee ranged from 0.0499 to 0.0760 weight percent while one sample, from TP-14, exhibited a lead concentration of 0.2670 weight percent resulting in an average of 0.0926 percent. On November 21, 1997 two additional samples were taken from the Chopra Lee test pits (TP-16 and TP-21) and analyzed for TCLP metals, TCLP volatiles, and TCLP semi volatiles. All results including lead were less than TCLP limits. Earth Tech concluded that additional investigation and/or remediation of soils for lead is/are not necessary at this time. This conclusion is based on both the lead results obtained by Chopra Lee and lead results (average reported lead concentration of 20 mg/kg) from eleven samples obtained at various locations on the Buffalo Brake Beam Site as part of the Earth Tech site assessment in 2000. Summary tables of lead sample results for media remaining onsite is attached as Figure 6-1. Earth Tech noted that it may become necessary to provide for lead abatement at the site if future on site activities and/or natural erosion processes remove the protective soil cover over the reddish dried paint and create a potential direct exposure pathway for humans.

A series of shallow test pits will be installed as part of the remediation action to better identify the areal extent of the paint residue. This residue will then be identified in the soil management plan and the final deed restriction.

Item 3 (Chromium Concentrations in Site Soils):

Potential Impact: Elevated concentrations of chromium in on site soils.

Basis for Concern: Both average (9.3 mg/kg) and median (8.2 mg/kg) concentrations of chromium reported from investigation's soil samples are higher than upper limit of the normal chromium concentration in New York State soils of 4 mg/kg but are below the Recommended Soil Cleanup Objective of 10 mg/kg. The higher chromium concentrations appear to be associated with fill material at the Site.

Analysis/Conclusion: Statistical analysis indicated that the highest reported concentration for chromium (18.7 mg/kg) is less than two standard deviations above the mean and is therefore considered to be within the range of normal spatial variability. Earth Tech concluded that chromium does not represent an environmental risk at the Site and additional investigation and/or remediation of soils for arsenic is/are not necessary or likely to be required in the future.

Figure 6-1

Summary Table of Lead Sample Results

Earth Tech Soil Samples from Borings Installed in 2000

Sample #	Depth	Total Lead, mg/kg
SB01	8-12 '	33.6
SB03	8-9'	21.2
SB04	4-8'	22.5
SB05	4-8'	44.6
SB06	4-8'	9.37
SB10	8-12'	13.2
SB14	8-12'	14.4
SB17	0-4'	17.5
SB18	4-8'	14.5
SB20	2-4'	14.3
SB22	0-4'	13.9

Earth Tech Water Samples from Borings Installed in 2000

Sample #	Total Lead, mg/L
TGSP4	BDL of 0.001
TGSP10	BDL of 0.001
TGSP14	BDL of 0.001

- BDL – Below Detection Limit

Chopra Lee Test Pit Samples 1997 – "soil samples were obtained from worst case scenario (reddish color) areas"

Sample #	Depth	Total Lead, mg/kg
TP10	0-2'	760
TP11	0-2'	499
TP12	0-2'	620
TP13	0-2'	547
TP14	0-2'	2670
TP15	0-2'	639
TP21	0-2'	747

TCLP Lead Results for Paint Samples Collected from Chopra Lee Test Pits 1997

Test Pit #	TCLP Lead, mg/L
TP16	0.5
TP21	<0.1

Item 4 (Gasoline Spill):

Potential Impact: Soils contaminated with petroleum constituents may represent a significant threat to the environment.

Basis for Concern: Residual concentrations of petroleum constituents consistent with a gasoline spill are present in the soils beneath the factory's crane room floor. These residual concentrations are associated with the "closed-inactive" spill #9708447. Earth Tech noted that contamination appears to be confined to the backfill soils adjacent to the building's western and southern foundation walls and the bedding trench of the in ground utilities beneath the floor. Obstructions within the building made it impossible to determine the eastern limit of contaminated soils. The impacted area was estimated to be 18 feet x 60 feet and 9 feet deep.

Analysis/Conclusion: In October, 1997 soil contaminated with gasoline constituents was discovered at the Site during the removal of the former machine shop's floor (located along the western side of the manufacturing facility) and associated excavation for an addition to the manufacturing facility. Sampling and analysis of the soils confirmed the presence of gasoline type contaminant concentrations in excess of the AGV values contained in the NYSDEC's STARS Petroleum Contaminated Soil Guidance Policy. The NYSDEC was notified and issued the Site spill #9708447. Remedial activities were performed by Sterling Environmental and included the removal of 212 tons of material for disposal at Modern Landfill, Inc. in Model City, New York. During the excavation of the contaminated materials it was determined that contaminated material was present beneath the footer and floor of the existing manufacturing building. A determination was made that further excavation could jeopardize the structural integrity of the existing manufacturing facility. Analytical data obtained from post excavation confirmatory samples indicated that the previously described remedial action had successfully removed the contaminated soils which were accessible. Based on this information the NYSDEC issued a "Closed-Inactive" decision for the Site with respect to Site spill #9708447. Additional remediation was completed at this location in August 2001 in connection with the Powerbrace Transaction (refer to Section 7.2.2 for details concerning this remediation). An additional 705 tons of soil was excavated from this location. Based on the results from the remediation samples the NYSDEC indicated that no further remediation activities were required at this location. Earth Tech previously had retrieved water from Geo Probe samples at this location. Analysis of this water raised concerns about groundwater contamination by constituents of gasoline. However, no groundwater was encountered during the excavation work completed during the additional remediation in 2000. Water table depths as noted in Earth Tech borings SB14, SB15, SB16 were

1.5 ft., 3.5 ft., and 6 ft. respectively. Since the previously noted excavation was continued to a depth of 14 feet and no groundwater was encountered, the water encountered by Earth Tech during the Geo Probe sampling was probably perched water and their concerns unfounded regarding groundwater contamination by constituents of gasoline. The locations of the soil removal and confirmation samples associated with this remediation action are noted on Drawing SEBB-02. A description of the remedial activities and its results were submitted to the NYSDEC in the following:

Remedial Activities Report – Gasoline Spill Area NYSDEC Spill #9708447
Buffalo Brake Beam Site, 400 Ingham Ave., Lackawanna, NY
Prepared by Sterling Environmental Services, Inc.
June 2001

Item 5 (Fuel Oil Spill):

Potential Impact: Soils contaminated with residual concentrations of petroleum constituents may represent a significant threat for environmental impacts.

Basis for Concern: The Earth Tech Report identified residual concentrations of petroleum products (SVOCs only) consistent with a fuel oil spill in the soils immediately east of the manufacturing facility. In addition residual concentrations of petroleum constituents were identified in the soils along the eastern property boundary. It was noted that this contamination may be associated with bulk petroleum AST(s) which were believed to have been located in this area. It was noted in the Earth Tech Report that the NYSDEC would probably require investigation and remediation of both areas. The contamination was reported and the NYSDEC issued Site spill #0009396.

Analysis/Conclusion: Rigel agreed to remediate the area immediately east of the manufacturing facility in the vicinity of SB-22 (soil boring completed as part of Phase II Environmental Assessment) to contamination levels below the NYSDEC TAGM 4046 cleanup standards for the NYSDEC STARS list of fuel oil constituents. In addition an investigation was performed under the direction of Sterling Environmental Services, Inc. ("Sterling Environmental") which involved the installation of test pits and sampling and analysis to address the issue of whether unacceptable levels of petroleum constituent contamination may be present in the areas of SB-05 and SB-18.
Sterling Environmental's work plan included one test pit at the location of SB-18 and five test pits in the area of SB-05 (one pit near the location of SB-05 and four additional pits at a 25 to 30 feet radius). If deemed necessary by field observations, additional test pits would be installed. Each test pit was to be advanced in two foot increments, a sample collected from each 2 foot increment, the sample's headspace screened with a PID for VOCs, and visual and olfactory observations noted and

recorded for each interval. A sample for laboratory analysis was to be retained for each pit from the pit's interval which exhibited the highest potential level of contamination by PID and/or observation.
The test pit and sampling plan was implemented on May 4, 2001. The original plan was modified in the field when free petroleum type product was found in the test pit located 30 feet North of SB-05. In an effort to delineate the areal extent of the contamination two additional test pits (one 30 feet to the west and one 30 feet to the north of the test pit located 30 feet North of SB-05) were installed.. The additional test pits were monitored and sampled as described in the work plan.
Based on field observations and analytical results from this investigation, one additional area of contamination was identified within the fuel oil spill area at the Site. This area (test pit located 30 feet North of SB-05) in addition to the previously noted SB-22 area were both determined to require remediation. The visible oil encountered in the test pit 30 feet North of SB-05 appears to be confined to a perched water pocket within buried debris. While the size of the debris pocket and the extent of impacted surrounding soil was not well delineated, it appeared to be relatively shallow in depth (less than four or five feet). Test pits at points 30 feet to the south and west and 25 feet to the North of this pit did not provide any evidence of significant contamination. A third area (test pit located near SB-18) was also recommended for remediation. While the analytical results from the test pit's soil sample indicated that contaminant levels were below required cleanup standards, petroleum odors were noted throughout the top four feet of the excavation. The recommendation for remediation in this area was based on NYSDEC TAGM 4046 which states that "any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria".
Additional information (including copies of laboratory reports, sample chain of custody, and sampling location diagrams) concerning this investigation can be found in the following:

Test Pit Sampling Activities - Fuel Oil Spill Area
Buffalo Brake Beam Site, 400 Ingham Ave., Lackawanna, NY
Prepared by Sterling Environmental Services, Inc.

On the basis of information contained in the Earth Tech Report and the ensuing investigation by Sterling Environmental, three distinct areas of petroleum type contamination were identified and have since been remediated (refer to section 7.3). It is important to note that no Benzene contamination was identified in any of the soil samples taken by Earth Tech and Sterling Environmental as part of these investigations.

Item 6 (PCB Concentrations in Site Soils):

Potential Impact: PCBs may be present in on site soils at concentrations in excess of Standards, Criteria, and Guidance.

Basis of Concern: Earth Tech noted that PCBs had historically been reported in soils on the Site in excess of Standards, Criteria, and Guidance. During the remediation of the Lehigh Industrial Park site the NYSDEC found low level PCB contamination (grater than 10 but less than 50 ppm) on the northern portion of the Site. These PCBs were determined by the NYSDEC to not be the responsibility of Buffalo Brake Beam but instead were remediated under the NYSDEC's direction as part of the Lehigh Industrial Park remediation.

Analysis/Conclusion: In 1997 soils from two areas identified as PCB hot spots 2 and 3 were excavated to a depth of one and two feet respectively (refer to Drawing SEBBB-2 for locations) and placed under the cap at the Lehigh Industrial Park site. Earth Tech found no PCBs at concentrations at or above the laboratory reporting limits of 400 ug/kg and 0.5 ug/l for nine soil and three groundwater samples respectively (Drawing SEBBB-01). Based on the available information Earth Tech concluded that additional investigation and/or remediation for PCBs in locations outside the footprint of the manufacturing facility is not necessary at this time and is considered not likely to be required in the future. However, it was indicated that building demolition or renovation at the Site may expose areas of PCB contamination that have not previously been discovered. Such soils should be analyzed for the presence of PCBs.

Item 7 (Quenchant Pit):

Potential Impact: Earth Tech stated that the manufacturing facility's quenchant pit is a recognized environmental condition" as defined in ASTM E1527-00 and requires further investigation. It was further noted that at a minimum, the pit should be emptied, cleaned, and inspected for evidence of cracks and/or leak points, and evidence of repairs.

Basis for Concern: The primary area of concern was that the integrity of the pit's concrete was breached and potentially hazardous compounds had migrated to the soils underlying the pit.

Analysis/Conclusion: The manufacturing facility's quenchant pit was identified in the Earth Tech Report as an area of potential environmental concern. The integrity of this quenchant pit (identified in the Site's Phase I Environmental Assessment) was not assessed. The quenchant pit was used to quench hot steel

coming out of the heat treat furnace. UCON Quenchant RL (refer to Appendix B for MSD Sheet), a solution of polyalkylene glycol was reportedly used in the quenchant bath. This product contained sodium nitrate and aminates including cyanoaminate. No determination was made as to what solutions were used in the process prior to the use of UCON Quenchant RL. The Earth Tech Report noted that the pit is a recognized environmental condition as defined in ASTM E1527-00 and requires further investigation. Earth Tech recommended that, at a minimum, the pit should be emptied, cleaned, and inspected for evidence of cracks and/or leak points, and evidence of repairs. Sterling Environmental was retained by Rigel to investigate this concern. The quenchant pit consisted of an open top rectangular steel tank set in a poured rectangular concrete pit approximately 16.5 feet x 12 feet x 6.5 feet in depth. The tank occupied most of the pit's space with a spacing of between four inches and three feet between the steel and the concrete walls. The top of the tank was located approximately four inches below the floor surface so that any overflow would collect in the pit. The steel floor plates were removed and residual sludge located between the outer walls of the steel tank and the concrete walls were removed and the pit was visually inspected. Breaches were observed in the concrete (primarily in the corners of the pit where the concrete had either broken out or the concrete pour was incomplete) and underlying soils were visible. This raised a concern that use of the quenchant pit might have resulted in contamination of soils adjacent to the pit. A work plan was developed by Sterling Environmental to investigate these concerns. This plan was reviewed by Earth Tech and modified as requested by Earth Tech. Upon receipt of plan approval from Earth Tech the investigation was implemented. Residual sludge and the steel tank were removed from the quenchant pit area. Inspection of the pit after removal of these materials revealed that the pit had originally been rectangular in shape. The majority of the north and south walls had previously been removed and the pit widened. It appeared that after placement of wooden forms but prior to making the concrete pour, soil subsidence occurred in all four corners of the pit. This resulted in the exposed soils which were noted in the original pit inspection. A series of four split spoon borings were taken at four foot intervals from the surface to either refusal or the water table. These borings were taken on the south side of the quenchant pit. Borings could not be made either on the north side of the pit due to a concrete wall or on the east and west sides of the pit due to other obstructions. As the split spoon borings were advanced each soil interval was screened with a PID and soil samples were taken from intervals deemed to have the highest potential for impact from the quenchant pit's operation. This potential was based on headspace PID screening and olfactory and visual observations. Four soil samples were obtained and submitted to Upstate Laboratories for analysis under standard chain of custody procedures. Sample locations and the reasons for choosing these locations are as follows:

Boring Location	Sample Location	Reason for Sample
QTB1: 2 feet south and 14 inches west of the southwest corner of the pit	QTB1-01: 8 foot -12 foot interval	PID reading - 10 ppm
QTB1	QTB1-02:16 foot -17 foot interval	PID reading -19 ppm
QTB 2: 2 feet east and 33 inches south of the southeast corner of the pit	No sample	No sample taken since hit refusal at 5 feet and PID reading of the 0 foot – 4 foot interval was only 2 ppm
QTB 3: 5.5 feet south and 6 inches west of the southeast corner of the pit	QTB3-01: 8 foot - 12 foot interval	Significant odor but no significant PID reading
QTB 4: 14 feet south from of south wall of pit	QTB4-01: 12 foot-14.5 foot (refusal) interval	PID reading – 25 ppm

All four samples were analyzed for TCL metals, SVOC's, PCB's and cyanides. Metals were analyzed due to the potential for alloy metals to have leached from the steel that was being quenched. PCB's and SVOC's were analyzed, since historically oils were sometimes used as quenching agents in heat treating processes. Cyanides were analyzed, since the quenchant product (UCON Quenchant RL) most recently used at the Site contained cyanoaminates and the possibility existed that the cyanoaminates could break down to form cyanides. In addition although sampling for VOC's was not a part of the investigation's work plan, a field decision was made to analyze samples QTB1-02 and QTB4-01 for VOC's due to high PID readings for the boring intervals from which these samples were obtained.
Cyanide and PCB concentrations were below detectable levels in all four samples. VOC concentrations in samples QTB1-02 and QTB4-01 were less than TAGM 4046 recommended soil cleanup objectives. The results for SVOC concentrations showed no specific exceedances of the TAGM 4046 recommended soil cleanup objectives. However, the detection limits for QTB1-01 were extremely high due to the amount of sample dilution required to protect the laboratory equipment because the extract was dark colored. This does not necessarily indicate that the sample contained significant concentrations of any of the analytes under evaluation. Sample QTB1-01 (boring depth of 8 to 12 feet) was from the same boring as QTB1-02 (boring depth

of 16 to 17 feet). The detection limits for QTB1-02 were significantly lower than for QTB1-01. The only analytes detected were Phenanthrene (0.380 ppm) and Bis(2-Ethylhexyl)phthalate (1.600 ppm) with both concentrations well below the cleanup objective of 50.0 ppm for these compounds. Sample QTB3-01 was obtained from the same sample depth as QTB1-01 but off the southeast corner of the pit as opposed to the southwest corner for QTB1-01. Similar breaches in the concrete and the presence of exposed soil at both of these locations were noted during the investigation. The detection limits for sample QTB3-03, although higher than for QTB1-02 were significantly lower than the detection limits for QTB1-01. Bis(2-Ethylhexyl)phthalate (3.60 ppm) was the only analyte detected in QTB3-01 and its concentration was well below the cleanup objective of 50.0 ppm. It would be anticipated that any contamination from the operation of the quenchant pit would be similar in QTB1-01 and QTB3-01 considering the shallow sample depth below the pit floor and the proximity to the corners exhibiting direct soil contact. It is therefore unlikely that the quenchant pit is the source of SVOCs in high enough concentrations to be of significant environmental concern.
The analytical results indicated the presence of several metals in elevated concentrations above documented background levels. However, only antimony and selenium were found to be present at unusually high concentrations. Neither antimony or selenium is a common constituent of steel or steel alloys. Heavy metals can pose a human health risk through ingestion or breathing of air borne dust. These two routes of exposure are from surface soils and do not apply in this circumstance since the soil samples were taken at depths ranging from 8 to 17 feet deep below a concrete floor. An additional concern with heavy metals is their potential to impact groundwater. Heavy metal mobility in soils requires either direct contact with groundwater or water percolation. During the investigation it was noted that these soils are not in contact with groundwater. In addition the potential for surface water percolation as a transport mechanism is negligible since these soils are located below the concrete floor of a building. The Site investigation found no evidence of significant environmental impact from the operation of the quenchant pit. Additional information (including copies of laboratory reports, sample chain of custody, and sampling location diagrams) concerning this remediation can be found in the following:

Supplemental Environmental Field Investigation Report
Quenchant Pit
Buffalo Brake Beam Site, 400 Ingham Ave., Lackawanna, NY
Prepared by Sterling Environmental Services, Inc.
March 2002

Item 8 (Perchloroethylene Contamination):

Potential Impact: Earth Tech evaluation of Site's groundwater indicated that it might be contaminated with chlorinated organics.

Basis for Concern: In November 2000 three monitoring wells were installed on the property as part of the Site's Phase II Environmental Assessment. A sample from one of the these wells (MW10) exhibited concentrations of Tetrachoroethene (Perchloroethylene) (140 ppb) and cis-2-Dichloroethene (7 ppb). Both concentrations were in excess of the ambient water quality standards. It was noted that these compounds were not detected in the soil sample from the previous soil boring at the location of the monitoring well. Based on the available information it was Earth Tech's recommendation in the Earth Tech Report that additional investigation of the groundwater be performed.

Analysis/Conclusion: Sterling Environmental was retained by Rigel to develop and implement an investigation to address the issue of potential groundwater contamination at the site. The plan for the groundwater investigation was reviewed by Earth Tech and modified as requested by Earth Tech. Upon receipt of plan approval from Earth Tech the investigation was implemented.
Four groundwater monitoring wells were installed in an effort to delineate the extent of contamination and investigate potential sources of the contamination. Based upon the anticipated groundwater flow in a southwest direction from the north side of the property toward Lake Erie, two wells (MW101 and MW102) were presumed to be upgradient of MW10 and two wells (MW103 and MW104) were presumed to be down gradient of MW10. Following installation the wells were developed in accordance with the agreed upon Supplemental Environmental Field Investigation Work Plan/Quenchant Pit & Chlorinated Solvent Projects prepared January 2002 by Sterling Environmental. All four wells were completely developed within a two week period (1/25/02 through 2/8/02). Wells MW101, MW102, and MW103 were able to reach the turbidity requirement of 50 NTU's or less after the required purging volume had been pumped out of the wells. MW 104 was a low volume well with slow recharge and was unable to reach the turbidity requirement. It was purged dry five times with at least ninety percent volume recovery between purges. Monitoring well MW104 was purged on 2/19/02 by pumping until all water was removed (24 hour recovery period) and sampled on 2/20/02. Monitoring wells MW10, MW101, MW102, and MW103 were purged by removing three well volumes with a peristaltic pump (All wells recovered within 2.5 hours) and each well was sampled on 2/20/02. The samples were collected from each well using a dedicated disposable bailer. The samples (contained in precleaned VOA vials) were packed in ice and sent to Upstate Laboratories under standard chain of custody procedures for analysis of VOC's by SW-846 Method 8260.
Tetrachloroethene was detected in MW10 (22 ppb), MW101 (less than groundwater

standard of 5 ppb), MW102 (43 ppb), and MW103 (94 ppb). Trichloroethene was detected in MW102 and MW103 but both concentrations were below the groundwater standard While no chlorinated solvents were detected in MW104, BTEX compounds were detected. Concentrations of Benzene (24 ppb), Toluene (65 ppb), Ethylbenzene (10 ppb), and total Xylenes (318 ppb) exceeded groundwater standards.

It is not possible to make definitive conclusions based on the available information. However, it is apparent that MW104 is unrelated to the groundwater regime characterized by samples from the other four wells. This is based on relative water levels of the wells, hydrogeological conditions of the low well volume and slow recharge, and its chemical finger print. It is also apparent that Tetrachloroethene is present above the ambient groundwater standard in the shallow groundwater beneath a portion of the Site. The Tetrachloroethene concentrations determined in this sample round were less than the concentration (140 ppb) found in the sample from MW10 obtained in December 2000.

Additional information (including copies of laboratory reports, sample chain of custody, and sampling location diagrams) concerning the monitoring well activities can be found in the following:

Chlorinated Solvents Monitoring Well Activities Report
Buffalo Brake Beam Site, 400 Ingham Ave., Lackawanna, NY
Prepared by Sterling Environmental Services, Inc.
April 2002

Item 9 (BTEX Contamination):

Potential Impact: Potential that gasoline related products were present in the groundwater and/or soil in the vicinity of MW104.

Basis for Concern: Monitoring well MW104 was installed, developed, and sampled by Sterling Environmental in January 2002 as part of an investigation to delineate the extent and possibly find the source of chlorinated solvent groundwater contamination found in a sample from MW10 (Note: Installed by Earth Tech as part of Phase II Environmental Assessment). No chlorinated solvents were detected in January 2002 sample from MW104. However, concentrations of Benzene, Toluene, Ethylbenzene and Xylene were detected in excess of TOGS 1.1.1 Groundwater Standards and Guidance Values. These results raised the possibility that gasoline related products were present in the groundwater and/or soil. Analysis of a groundwater sample taken in June 2002 also indicated the presence of these compounds. The BTEX compounds were not detected in any other monitoring wells at the Site. Investigative activities were completed at the Site on July 31, 2002. An area approximately

20 feet x 20 feet East of the manhole was excavated in lifts of approximately 6 inches to 1 foot in depth at a time. The soil from each lift was observed and screened using a PID and the bottom of the excavation was also screened. There were no significant readings on the PID and no visual or olfactory indications of contamination. No evidence of tanks, demolition debris, drain lines or other utility conduits were found.

A trench was dug adjacent to the well and to the full depth of the well. This trench was extended in a due north direction from the well. Soils were removed in one foot lifts. Shale was encountered at a depth of 10.5 feet and bedrock at a depth of 11.5 feet (Depth of MW104). The shale was slightly moist while the bedrock was dry and no flow of groundwater or perched water was encountered. There were no significant PID readings and no olfactory or visual signs of contamination. A similar trench was excavated on the south side of the well, adjacent to the well on the street side. No evidence of contamination was found during this excavation and no source of groundwater or perched water was found. Soil samples were collected from just above the shale at the bottom of each trench. Well MW104 was left in place and the excavation was backfilled with the excavated soil. Both samples were submitted to Upstate Laboratories under standard chain of custody procedures for analysis of the STARS list of constituents of concern for gasoline by USEPA Method 8260. All constituents in both samples were below the detection limit of 3 ug/kg. The remedial action failed to locate any contaminated soil in the vicinity of MW104. It also failed to find any source of perched water or groundwater in the area of the remediation. At the time of the excavation MW104 contained approximately 7 inches of water. Excavations on the north and south sides of the well within three feet of the well casing to the full depth of the well failed to find any water. MW13 installed as part of the Phase II Investigation is located 104 feet east of MW104 in the same parking area. This well has not produced any water since its installation. Since no evidence of groundwater or soil contamination was found surrounding MW104, the findings from the previous well sampling were considered an anomaly and no further investigation for the BTEX Area was recommended.

Additional information (including copies of laboratory reports, sample chain of custody, and boring logs) concerning this remediation can be found in the following:

Remedial Activities Report – BTEX Area/MW104
Buffalo Brake Beam Site, 400 Ingham Ave., Lackawanna, NY
Prepared by Sterling Environmental Services, Inc.
August 2002

7.0 SITE INTERIM REMEDIAL ACTIONS

7.1 Introduction

Several environmental assessments relating to specific areas of concern at the Site were completed after completion of the Earth Tech Report in December 2000. In addition some site remediation work has been completed to mitigate Site environmental concerns noted in the Earth Tech Report. By satisfying these concerns Rigel is confident that the Site will have been remediated to a level that is sufficiently protective of public health and the environment that it can continue to be utilized for the Contemplated Use.

7.2 Gasoline Spill Remediation (Refer to Item 4 of Section 6.2.2)

7.2.1 Gasoline Spill Remediation (1997)

In October, 1997 soil contaminated with gasoline constituents was discovered at the Site during the removal of the former machine shop's floor (located along the western side of the manufacturing facility) and associated excavation for an addition to the manufacturing facility. The NYSDEC was notified and issued the Site spill #9708447. Remedial activities were performed by Sterling Environmental and included the removal of 212 tons of material for disposal at Modern Landfill, Inc. in Model City, New York. During the excavation of the contaminated materials it was determined that contaminated material was present beneath the footer and floor of the existing manufacturing building. A determination was made that further excavation could jeopardize the structural integrity of the existing manufacturing facility. Analytical data obtained from post excavation confirmatory samples indicated that the previously described remedial action had successfully removed the contaminated soils which were accessible. Based on this information the NYSDEC issued a "Closed-Inactive" decision for the Site with respect to Site spill #9708447.

7.2.2 Gasoline Spill Remediation (2000)

In connection with the Powerbrace Transaction, post closing, Rigel agreed to further remediate remaining gasoline type contaminants in the location of the former machine shop. Remediation action was previously undertaken at this location (NYSDEC Site spill #9708447) and the NYSDEC issued a "Closed-Inactive" decision for this Site spill (refer to Section 7.2.1).

Sterling Environmental was commissioned to investigate and implement the remedial action inside the manufacturing facility's crane room. Preliminary excavation limits were established using information from the previous remediation activities at this location.

Geoprobe sampling indicated two additional contaminated areas of concern. Area one was at the Southwest corner of the crane bay's main floor and the rail siding retaining wall and Area two was approximately three quarters of the way across the crane bay in a due east direction.

The concrete floor was broken up and soil excavation was begun at the southwest corner of the main floor of the crane bay and the rail siding retaining wall. Odors of aged gasoline were noted at a shallow depth in the southwest corner. As excavation proceeded to the north along the west wall of the crane bay the odors diminished both with excavation depth and distance from the southwest corner. Care was exercised during the excavation process to slope the excavation below the building footer in order to protect the building structure. Excavation proceeded downward and outward from the southwest corner until contaminant screening (visual, olfactory and PID) indicated that the excavation's limits appeared to be clean. This portion of the remediation involved the excavation and shipment of approximately 563 tons of soil to CID Landfill. Seven confirmation samples were taken from the excavation's bottom and sidewalls. Three of the seven samples exceeded the cleanup objectives. Three of the four remaining samples showed no exceedances but the detection limit for Benzene was above the Recommended Soil Cleanup Objective. The three non complying samples were taken from below the west side wall footer, eastern end of north sidewall, and a composite sample (five points) from the bottom of the excavation. An additional 142 tons of soil was excavated from the bottom and eastern one half of the North wall and below the footer and shipped to the CID Landfill. Three confirmation samples were taken in those areas where additional excavation was performed. Analytical results for the eastern one half of the North wall and bottom of the excavation were below the Recommended Soil Cleanup Objective. The soil sample taken from below the west side wall footer did not satisfy the cleanup objective (sample result of 8.4 ppm versus cleanup objective of 5.0 ppm for Isopropyl Benzene). For two of the three samples the detection limit for Benzene was above the Recommended Soil Cleanup Objective. However, no further soil removal could be completed below the footer without jeopardizing the structural integrity of the building. It was therefore necessary to leave some contaminated soil in place below the footer (Contamination location is noted on Drawing SEBBB-02). The remaining contaminated soil is in an area approximately 25 feet long in a north to south direction, starting at a depth of four feet below grade, the width of the building footer, and sloping outward to the east and west to a depth of approximately 10 feet. It is important to note that this remaining contamination is contained in clayey-silty soil that is not in direct contact with groundwater and below a footer that is interior to a concrete slab floored building on each side which prevents rain water percolation through this area. Therefore, the potential for groundwater impacts associated with the residual contamination is minimal. This remaining contamination will be identified in the soil management plan and the final deed restriction. All confirmation samples were submitted to Upstate Laboratories, Inc ("Upstate Laboratories") under standard chain of custody procedures and analyzed for the NYSDEC STARS analyte list of VOCs by EPA Method 8260 and TOC. Additional information (including copies of laboratory reports, sample chain of custody, and sampling location diagrams) concerning this remediation can be found in the following:

7.3 Fuel Oil Spill Remediation (Refer to Item 5 of Section 6.2.2)

In connection with the Powerbrace Transaction, Rigel addressed a number of environmental issues pertaining to the property. Included in these issues was a possible fuel oil spill in the "yard area" which is located to the east of the manufacturing facilities. As previously noted (Section 7.3.1) the contamination in this area as described in the Earth Tech Report was reported to the NYSDEC and the NYSDEC issued Site spill # 0009396.

On the basis of information contained in the Earth Tech Report and the ensuing investigation by Sterling Environmental, three distinct areas of petroleum type contamination were identified within the spill area. A decision was made to remediate these three areas to contamination levels below the NYSDEC TAGM 4046 cleanup standards for the NYSDEC STARS list of fuel oil contaminants. A work plan was developed and implemented by Sterling Environmental. The on site remedial activities were performed from August 20, 2001 through August 22, 2001..

Excavation of contaminated soils was initiated using SB05-N30 as a starting point and proceeded due east to the fence line at an initial depth of approximately six feet. A layer of black carbonaceous grit with an odor provided indications of contamination approximately two to three feet below the surface. The excavation's depth was increased to ten feet based upon field screening of the excavation's bottom. Using primarily visual and olfactory indicators as a guide, the excavation was extended to the north and south in the direction of the Site's eastern fence line. Pockets of perched water were encountered at various excavation depths and locations and a visible sheen was noted on some of these water pockets. Upon establishment of the excavation's endpoints in the north, east, and southerly directions, additional soil removal was performed in the westerly direction. The remediation work in this area resulted in the removal and disposal off site of 1227 tons of soil and resulted in a triangular shaped excavation area 67 feet x 82 feet x 62 feet and 10 feet deep.

Excavation of contaminated soils in the vicinity of SB22 was started in the interior corner of a railroad track intersection switch and proceeded westward along the edges of each set of tracks at a depth of about seven feet. During this excavation work, a strong odor was present but no significant soil discoloration was noted. The remediation work in this area resulted in the removal and disposal off site of 220 tons of soil and resulted in a triangular shaped excavation area 27 feet x 35 feet x 34 feet and 7 feet deep.

Excavation of soils in the vicinity of SB18 was along a railroad spur between two buildings. No significant odors were noted during the excavation work. An old clay drain line was broken and the water contained in the pipe flooded the excavation. The

water (approximately 125 gallons) which exhibited no sheen was pumped to a storage tank for proper disposal after sampling and analysis. Additional soil removal was completed after excavation dewatering. Since no visual or olfactory indicators of contamination were noted, the excavation work was stopped. The remediation work in this area resulted in the removal and shipment off site of 25 tons of soil and resulted in a rectangular shaped excavation 14 feet x 6 feet and 6 feet deep.

Confirmation samples were taken from each excavation for analysis to evaluate the effectiveness of the remediation efforts. Multiple grab samples were taken and composited for analysis. Sample locations for the excavations were as follows:

FSA-05-EW: 5 grab sample composite of SB05 excavation's east wall below fence line
FSA-05-SWE: 3 grab sample composite of SB05 excavation's eastern half of southwest wall
FSA-05-SWW: 2 grab sample composite of SB05 excavation's western half of southwest wall
FSA-05-NWS: 4 grab sample composite of SB05 excavation's southern half of northwest wall
FSA-05-NWN: 3 grab sample composite of SB05 excavation's northern half of northwest wall
FSA-05-B: 5 grab sample composite of SB05 excavation's bottom
FSA-22-N: 2 grab sample composite of SB22 excavation's north wall
FSA-22-E: 2 grab sample composite of SB22 excavation's east wall
FSA-22-SW: 3 grab sample composite of SB22 excavation's southwest wall
FSA-22-B: 5 grab sample composite of SB22 excavation's bottom
FSA-18-SW: 4 grab sample composite of SB18 excavation's sidewalls
FSA-18-B: 2 grab sample composite of SB18 excavation's bottom

All confirmation samples were submitted to Upstate Laboratories under standard chain of custody procedures and analyzed for the NYSDEC STARS analyte list of VOCs by EPA Method 8260 and SVOCs by EPA Method 8270.

Analytical results from these samples indicated that none of the 12 post excavation samples showed concentrations of any compounds contained on the STARS list of constituents of concern for fuel oil in excess of the TAGM 4046 soil cleanup objectives. Although Benzene was not detected, the method detection limit for Benzene in all 12 samples was significantly higher than the TAGM 4046 soil cleanup objective for Benzene. Upon review of this data, the NYSDEC determined that since the Benzene results failed to document compliance with the soil cleanup objectives a status of inactive was issued for Site spill #0009396. It is important to note that elevated levels of semi-volatile constituents and not volatiles was the basis for this remedial action and that no Benzene was detected in any of the soil samples analyzed as part of the fuel oil spill investigation.

In an attempt to achieve a closed status for this spill to satisfy Powerbrace, Sterling

discussed the possibility of obtaining lower Benzene detection limits with Upstate Laboratories. Upstate Laboratories indicated that the elevated detection limits for Benzene was the result of interference from the presence of elevated levels of semi-volatiles and non target compounds in the soil and no alternative analytical method was available which would result in a lower detection limit. Upstate Laboratories noted that the method detection limit was approximately 6 times the instrument detection limit. Upstate Laboratories issued an amended analysis report, for these samples, which included the instrument detection limit for Benzene along with the method detection limit for all other constituents. The concentration of Benzene was below the soil cleanup objective for 8 of the 12 samples. For the other four samples (FSA-05-SWW, FSA-05-NWS, FSA-22-B and FSA-22-E) the instrument detection limit was still 50 to 75 percent above the soil cleanup objective as opposed to 8 to 10 times greater as contained in the original laboratory report. This amended information has been submitted to the NYSDEC for review.

Additional information concerning this remediation work can be found in the following:

1) Remedial Activities Report
   Fuel Oil Spill Area
   NYSDEC Spill #0009396
   Buffalo Brake Beam Site, 400 Ingham Ave, Lackawanna, NY
   Prepared by: Sterling Environmental Services, Inc.

2) March 21, 2002 correspondence to Mr. John Otto of NYSDEC
   from Wayne Cameron of Sterling Environmental

7.4 Waste Removal from Site Associated with Lehigh Industrial Site Remediation

During the remedial investigation of the Lehigh Industrial Site it was found that soils located on the northern portion of the Buffalo Brake Beam Site were contaminated with PCBs, cadmium, chromium, and lead. In 1997 approximately 67 cubic yards of PCB contaminated soils were removed from the Site under the direction of the NYSDEC Division of Hazardous Waste Site Remediation and placed under the cap of the Lehigh Industrial Park Landfill.

Remediation of the lead contaminated soils at the Site was performed by the NYSDEC in July 1997 as part of the Lehigh Industrial Park remediation. A one foot cut was made in the area contaminated with lead along the northern Site boundary (refer to Drawing SEBBB-02) and the excavated nonhazardous soils (approximately 1,200 cubic yards) placed under the cap at the Lehigh Industrial Park. The entire excavated area was backfilled with crushed concrete and brick by a NYSDEC contractor. A description of these remedial activities is provided in the following:

8.0 CONCEPTUAL SITE MODEL

8.1 Introduction

The primary purpose for developing a conceptual site model is to define the potential exposure pathways and receptors for any contaminants of concern which may be present at the Site. This information is utilized in defining all legally applicable or relevant and appropriate requirements and associated media cleanup requirements and identifying potential remediation technologies for utilization at the Site. It also is useful in the identification of sampling requirements in order to satisfy additional data needs. In developing the conceptual site model consideration was given to known and suspected sources of contamination, types of contaminants and affected media, known and potential routes of migration, and known or potential human or environmental receptors. The conceptual model as developed for the Site is provided by Figure 8-1.

8.2 Definition of Site Contamination

A contaminant of concern at the Site is Tetrachloroethene. It was initially identified as a potential Site contaminant in the Earth Tech Report. Based on the available information it was Earth Tech's recommendation in the Phase II Investigation that additional groundwater investigation was required. Four groundwater wells were installed in an attempt to delineate the extent of contamination and investigate potential sources of the contamination. Samples were obtained from these wells and analyzed for Tetrachloroethene. Based upon these results it is apparent that Tetrachloroethene is present above the ambient groundwater standard in the shallow groundwater beneath a portion of the Site.

In addition a Site Surface Monitoring Plan (Refer to Section 11.0) will be implemented. Approximately twelve surface samples (0 – 2 inch depth) will be obtained at selected locations. Analytical parameters for each sample will be based on specific contaminants of concern for the specific location. The results from implementation of the Site Surface Monitoring plan will be utilized to evaluate direct contact exposure and the potential for off site transport of contaminants in soil and dust.

8.3 Potential Contaminant Pathways

Potential secondary contaminant release mechanisms at the Site include dust and/or volatile emissions, infiltration/percolation, and storm water runoff. The available pathways for such emissions include wind, groundwater, and surface water and sediments respectively. In order to evaluate the potential problems associated with Tetrachloroethene at the Site and evaluate the success of any remedial actions which are undertaken at the Site, consideration must be given to potential exposure pathways.

These include the following:

1) Direct human and wildlife ingestion of soil,
2) Human and wildlife inhalation of soil particles or volatilized compounds,
3) Human and wildlife dermal contact/adsorption,
4) Human and wildlife ingestion of crops and other vegetation grown in contaminated soil,
5) Human consumption of contaminated groundwater,
6) Human, fish, and wildlife contact with and consumption of subsurface water contaminated by soil leaching or particle transport of contaminants,
7) Bioaccumulation in aquatic and terrestrial food webs.

Each potential exposure pathway has been evaluated in the context of whether it now represents a potential problem at the Site. The primary goal of any further remediation at the Site is to remediate the Site to a level that is protective of public health and the environment under the conditions of the Site's Contemplated Use. A similar evaluation of potential exposure pathways will be completed for any potentially significant contamination which is identified during the implementation of the Site Surface Monitoring Plan.

8.4 Contaminant Migration

As previously noted (refer to Section 7.0) several environmental assessments and various remediation projects were undertaken at the Site after completion of the Earth Tech Report in December 2000. By satisfying the concerns raised in the Phase II, Rigel is confident that the Site will have been remediated to a level that is protective of public health and the environment for the Contemplated Use.

The spill remediation projects (PCB removal, gasoline spill remediation, fuel oil remediation) were all completed under the direction of the NYSDEC. These remediations all involved the excavation and removal of contaminated soils from the Site. Based upon verification samples obtained during the remediation work, the residual contamination levels are sufficiently low that the remediated areas pose no threat to either public health or the environment.

The only remaining area of concern relating to potential contaminant migration at the Site is the Tetrachloroethene contamination of the shallow groundwater under a portion of the Site. It has been investigated and further action is proposed to resolve the issue.

Low concentrations of Tetrachloroethene can be relatively mobile in soils. This is reflected by the partition coefficient of Tetrachloroethene. A compound such as Tetrachloroethene may desorb from soil, move, then reabsorb over and over. This phenomenon results in the Tetrachloroethene moving at a rate which is many times slower than the water mass.

During the previous investigations and remedial actions, no evidence was found to indicate that a significant release of volatile organics had occurred at the Site. This was based on the following:

1) No evidence of residual liquid organic contamination was found to indicate that a large release of volatile organics had previously occurred at the Site.
2) Results from laboratory analyses of soil samples obtained during the Phase II Assessment did not provide any evidence to suggest the presence in significant concentrations of Tetrachloroethene or other volatile organics.

8.5 Potential Human and Environmental Contaminant Receptors

The primary source of potential human and environmental contaminant impact by Tetrachloroethene is through the groundwater underlying the Site. In order to evaluate the potential for such impacts it is important to understand how subsurface contaminant migration could occur at the Site.

Before evaluating the status of the Tetrachloroethene contamination at the Site and making a determination as to whether or not additional remediation work is required it is important to identify and describe those hydrogeological parameters which are important to developing and understanding how the Site's subsurface conditions may affect contaminant migration. This is necessary before making an evaluation of the Tetrachloroethene contamination at the Site and making a determination as to whether or not additional remediation work is required. Consideration must be given to the fact that the contaminants can exist in three phases. These are as follows:

1) As contaminant vapors in the soil pore spaces (vapor phase),
2) As residual liquid trapped between soil particles (liquid phase),
3) Dissolved in the pore water that surrounds the soil particles (dissolved phase).

The number of phases in which the Tetrachloroethene may be found and the amount contained in each phase is directly affected by the amount of Tetrachloroethene which was the original source of the existing contamination.

8.5.1 Site Soils

The following information relating to the Site's soils was obtained from the Phase II Assessment by Earth Tech. Based on the Soils Conservation Service (SCS) Survey of Erie County the area within which the Site resides contains urban land soils. Such soils are commonly found in urbanized areas and exhibit characteristics of urban filling. These soils include reworked locally derived soils, construction and demolition debris type fill, other fill and grading materials, and soils covered by a high percentage

of asphalt, concrete, and structures. Underlying this fill material is a loam derived from reworked glacial till consisting of a clayey-silty sand and fine gravel. Based on the "Quarternary Geology of New York, Niagara Region" bedrock underlying the Site consists of Middle Ordovician shale and limestone of the Hamilton formation. Results from the installation of the monitoring wells indicate that bedrock beneath the Site is typically at a depth of approximately 17 feet.

Soil information obtained during field investigations associated with the Phase II Assessment and remedial investigations and remediation work was consistent with the previously noted information from the SCS Survey. The Site's surface soils consist primarily of urban fill type material. It includes various amounts of construction and demolition debris consisting of brick, cinderblock, concrete, vitrified clays, asphalt, coal chips, foundry slag, ash, railroad ballast, and sandy fill materials. These fill type materials are found in various Site locations ranging in depth from one to seven feet. Beneath the fill material is either unaltered glacial till or a clayey-silty sandy loam formed in reworked glacial till.

8.5.2 Site Surface Water

Precipitation at the Site in excess of infiltration and ponding drains as sheet runoff in a southerly direction. Catch basins at the Site are connected to the municipal storm sewer system located along the south side of the facility. This storm sewer discharges to Smokes Creek which ultimately drains into Lake Erie. The discharge of low level contaminated groundwater is not expected to have a detectable impact on any down gradient surface water bodies.

8.5.3 Site Groundwater

Water table conditions were encountered during the implementation of soil borings at depths ranging from nine to thirteen feet below grade. Discontinuous pockets of perched water were also encountered in several borings at the fill/till interface and in sand layers and pockets on top of clay lenses. The undisturbed overburden consists of clayey-silt and fine sand till. The infiltration and flow rate of groundwater into and through this material is relatively low.

8.5.4 Regional Groundwater

The regional groundwater flow direction is typically towards Lake Erie. This is based on the local topography and locations and/or flows of surface water bodies. It is important to note that this flow pattern may be significantly impacted by various characteristics of the Site such as variations in the subsurface conditions, locations and orientations of in ground utilities and sewer systems.

No public or private drinking water wells are known to exist in the area.

8.6 Additional Data Requirements

Additional data is required to better characterize the potential significance of the Tetrachloroethene contamination at the Site. An investigation was initiated with the installation of four additional monitoring wells at the Site (refer to Section 7.6). Monitoring of these wells confirmed that the existing levels of Tetrachoroethene in the Site's groundwater are relatively low. Future work will be directed toward determining, and if possible eliminating, the source of this contamination.

Additional data is required to better characterize any contamination which may exist in the Site's surface soils. This will be obtained by implementing the proposed Site Surface Monitoring Plan. The data obtained from this evaluation will be utilized to evaluate direct contact exposure and the potential for off site transport of contaminated soil and dust.

Figure 8-1

Conceptual Site Model for Buffalo Brake Beam Lackawanna Site

Primary Sources:	Containers		
Primary Release Mechanism:	Spills of Unknown Origin		
Secondary Sources:	Soil		
Secondary Release Mechanisms:	Dust and/or Volatile Emissions	Infiltration/ Percolation	Storm Water Runoff
Pathway:	Wind	Groundwater	Surface Water and Sediments
Exposure Route:			
1) Ingestion			
a) Humans			
Area Residents	No	Yes	No
Site Visitors	No	No	No
b) Biota			
Terrestrial	No	No	No
Aquatic	No	No	No
2) Inhalation			
a) Humans			
Area Residents	Yes	Yes	No
Site Visitors	Yes	No	No
b) Biota			
Terrestrial	Yes	No	No
Aquatic	No	No	No
3) Dermal Contact			
a) Humans			
Area Residents	No	No	Yes
Site Visitors	No	Yes	Yes
b) Biota			
Terrestrial	No	No	Yes
Aquatic	No	No	Yes

9.0 IDENTIFICATION AND DEVELOPMENT OF REMEDIATION ALTERNATIVES

9.1 Introduction

In order to determine the course of remediation activities which will be required at the Site, it was necessary to first develop a range of potential solutions for additional evaluation. In determining potential remediation alternatives for implementation at the Site, it was necessary to do the following:

1) Develop remedial action objectives specifying the contaminants and media of interest, exposure pathways, and preliminary remediation goals,

2) Develop general response actions for each medium of interest,

3) Identify volumes or areas of media to which the general response actions should be applied,

4) Identify the technologies which are applicable to each general response action which might be implemented at the Site,

5) Evaluate the applicable technology options for specific utilization at the Site,

6) Develop specific remediation options for potential utilization at the Site.

9.2 Specific Objectives of Remedial Action

The primary objective of Rigel is to develop, gain NYSDEC approval for, and implement any remediation actions at the Site which are necessary in order to obtain the Release and Covenant Not to Sue. Specific remedial action objectives are as follows:

1) Close quench pit area in a manner which will minimize the potential for surface water infiltration and the associated potential for dispersion of any residual contaminants which may be present in the soils located either adjacent to or underneath the pit.

2) Prevent ingestion of water (surface or ground) containing a concentration of Tetrachloroethene in excess of New York State Groundwater Standard of 5 ug/l.

3) Prevent ingestion/direct contact with soils having concentrations of Tetrachloroethene greater than 1.4 mg/kg.

4) Prevent migration of Tetrachloroethene that would result in additional groundwater contamination.

5) Prevent migration of Tetrachloroethene in concentrations which present a significant health risk.

6) Prevent inhalation of Tetrachloroethene in concentrations which present a significant health risk.

A range of options for achieving these objectives has been developed and evaluated. Options which were given consideration with respect to Objective 1 include the following:

1) Option 1 - No additional action would be taken at this time with respect to the quenchant pit.

2) Option 2 - Quenchant pit will be brought up to grade with clean fill. Concrete will be poured over the fill material to provide a continuous impermeable barrier to surface water infiltration.

Options which were given consideration with respect to Objectives 2 thru 6 include the following:

1) Option 1 - No additional action would be taken at this time at the Site with respect to the Tetrachloroethene contamination at the Site.

2) Option 2 - Complete elimination of hazardous substances at the Site. The elimination of Tetrachloroethene from the Site would be established by the absence of this contaminant in both soil and groundwater samples at levels above detectable (10 ug/kg for soil and 5 ug/l for groundwater).

3) Option 3 – Reduce concentrations of Tetrachloroethene at the Site to satisfy all legally applicable or relevant and appropriate requirements (ARARs). This will result in the reduction of concentrations of Tetrachloroethene to less than 1.4 mg/kg in the Site's soils and to less than 5 ug/l in the Site's groundwater. These values are based on NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046.

4) Option 4 – Reduce concentration of Tetrachloroethene at the Site to satisfy ARAR for soil (1.4 mg/kg) but not the ARAR for groundwater (5 ug/l).

A similar evaluation will be completed for any remediation work which may be required at the site due to findings from work completed as part of this Work Plan. The specific objectives of any additional remedial work will be defined, potential remediation technologies and options identified, and remediation options developed.

9.3 Identification and Evaluation of Technology Types and Process Options

As previously discussed in this Work Plan several investigative and remedial actions have already been completed at the Site. These include actions taken both before and after the Phase II Assessment. Actions taken before the Phase II Assessment include the following:

1992 - Limited soil investigation
1993 through 1997 - Extensive soil investigation and limited remedial action
(Note: Involved removal of PCB contaminated soils from Site as part of NYSDEC cleanup of former Lehigh Industrial Park Inactive Hazardous Waste Site)
1997 - Petroleum spill investigation and remedial action
1997 through 1998 - Limited soil investigation

Actions taken after the Phase II Assessment include the following:

2001 - Gasoline contamination remedial action
2001 - Fuel oil spill remediation
2002 – Quenchant pit contamination investigation
2002 – Monitoring well installation and groundwater monitoring
2002 – BTEX contamination investigation

These actions can be considered to be interim remedial actions and were previously discussed in this Work Plan. Implementation of these actions have proven successful in removing a high percentage of the contamination (gasoline spill residuals, petroleum spill residuals, PCBs) which was previously identified at the Site. Therefore the range of necessary and practical potential remediation actions which must be evaluated and implemented under the Voluntary Cleanup Plan has been significantly reduced.

Any additional investigation and or remediation work at the Site will be focused on specific objectives which are defined in Section 9.2 of this Work Plan. The range of remediation options under consideration will provide guidelines for utilization in defining the additional investigatory work which will be completed at the Site. As the additional Site investigation work proceeds Rigel and the NYSDEC will be able to make the necessary evaluations (technical, feasibility, cost, etc.) to insure that the final Site cleanup objective is attainable. If deemed attainable the chosen remediation option will be implemented.

9.4 Development of Remediation Alternatives

The selected available response actions and associated technologies have been assembled into alternatives which represent a range of contaminant treatment and containment combinations. The range of available alternatives is dependent on site specific conditions. As previously indicated, the one remaining potentially significant environmental issue at the Site which has been identified and requires further evaluation and potential remediation relates to Tetrachloroethene. It was found to be present at relatively low concentrations in the shallow groundwater under a portion of the Site. Additional investigative work is proposed at the Site in order to determine the source of the Tetrachloroethene. If the Tetrachloroethene's source can be located an evaluation will be performed to determine the feasibility for its removal from the Site. If a determination is made that it is both technically and economically practical the contaminated material will be remediated. It is important to note that the existing levels of Tetrachloroethene contained in some of the Site's shallow groundwater should not deter the Site from satisfying the goals and requirements of the voluntary cleanup program. In addition this groundwater contamination should have no significant impact on humans or wildlife in locations surrounding the Site.

10.0 EVALUATION OF REMEDIATION OPTIONS

10.1 Introduction

Each remediation alternative is analyzed to determine relevant information which can be utilized in selecting the most appropriate Site remedial action. Each potential remediation alternative is assessed against various evaluation criteria. These criteria include the following:

1) Overall protection of human health and the environment,

2) Attainment of compliance with applicable or relevant and appropriate requirements relating to residual contaminant levels,

3) Long term effectiveness and permanence for controlling the magnitude of residual risks,

4) Degree of reduction in contaminant toxicity, mobility, or volume,

5) Short term effectiveness for protection of the community, on site personnel, and the environment during implementation of the remediation action,

6) Potential for success with respect to remediation alternative implementability,

7) Capital, operating, and maintenance costs,

8) Technical and administrative issues and concerns of the NYSDEC,

9) Public concerns and issues.

When evaluating remediation options (refer to Section 9.2) consideration was given to both the potential pathways for contaminant migration (refer to Section 8.3) and the specific objectives of the remedial action (refer to Section 9.2).

10.2 Individual Analysis of Options

Specific objectives of any additional remedial actions conducted at the Site were noted in Section 9.2 and include the following:

1) Close quenchant pit area in a manner which will minimize the potential for surface water infiltration and the associated potential for dispersion of any residual contaminants which may be present in the soils located either adjacent to or underneath the pit.

2) Prevent ingestion of water (surface or ground) containing a concentration of Tetrachloroethene in excess of New York State Groundwater Standard of 5 ug/l.

3) Prevent ingestion/direct contact with soils having concentrations of Tetrachloroethene greater than 1.4 mg/kg.

4) Prevent migration of Tetrachloroethene that could result in additional groundwater contamination.

5) Prevent migration of Tetrachloroethene in concentrations which could present a significant health risk.

6) Prevent inhalation of Tetrachloroethene in concentrations which could present a significant health risk.

10.2.1 Description and Evaluation of Options Relating to Quenchant Pit

10.2.1.1 Option 1 Description and Evaluation

Option 1: No additional action would be taken at this time at the Site with respect to the quenchant pit.

This option does not minimize the potential for surface water infiltration and the associated potential for dispersion of any residual contaminants which may be present in the soils located either adjacent to or underneath the pit. If such contamination does exist this option does not provide any controls for exposure or any long term management measures. Any current and potential future risks would remain the same under this option. No additional risks would be posed to the community, site workers, or the environment as a result of this option being implemented. No implementation concerns are associated with this option since no action would be taken. In addition this option does not have any capital or operating costs associated with it.

10.2.1.2 Option 2 Description and Evaluation

Option 2: The quenchant pit will be brought up to grade with clean fill. Concrete will be poured over the fill material to provide a continuous impermeable barrier to surface water infiltration.

This option does minimize the potential for surface water infiltration and the associated potential for dispersion of any residual contaminants which may be present in the soils located either adjacent to or underneath the pit. If such contamination does exist this option does minimize the potential for exposure to the community, site workers, and the environment. No problems are known which would inhibit the implementation of this option.

10.2.2 Description and Evaluation of Options Relating to Tetrachloroethene

10.2.2.1 Option 1 Description and Evaluation

Option 1: No additional action would be taken at this time at the Site with respect to the Tetrachloroethene at the Site.

This option does not provide for any additional evaluation of the Site's soils or groundwater to determine the extent of Tetrachloroethene contamination at the Site. If such contamination does exist in the Site's soils, implementation of this option would allow for the possible continued migration of the contaminant into the Site's shallow groundwater and allow for its further degradation. This option does not provide any controls for exposure or any long term management measures. Any current and potential future risks would remain the same under this option. No additional risks would be posed to the community, site workers, or the environment as a result of this option being implemented. No implementation concerns are associated with this option since no action would be taken. In addition this option does not have any capital or operating costs associated with it.

10.2.2.2 Option 2 Description and Evaluation

Option 2: Consists of the complete elimination of Tetrachloroethene contamination at the Site.

Successful implementation of this option would provide for the elimination of Tetrachloroethene from the Site. This would be established by the absence of this contaminant in both soil and groundwater samples at levels above detectable (10 ug/kg for soil and 5 ug/l for groundwater). Complete elimination of Tetrachloroethene contamination from the Site is not required to satisfy the objectives of the remedial action as defined in Section 9.2 of this Work Plan. Implementation of this option and successful achievement of its objective would minimize the risk to human health and the environment. However, it is doubtful that this option is technically feasible. In any case it would not be cost effective.

10.2.2.3 Option 3 Description and Evaluation

Option 3: Consists of reducing concentrations of Tetrachloroethene at the Site to satisfy all legally applicable or relevant and appropriate requirements (ARARs).

Successful implementation of this option will result in the reduction of Tetrachlorethene concentrations to less than 1.4 mg/kg in the Site's soils and to less than 5 ug/l in the Site's groundwater. These values are based on NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046. While it appears technically and economically feasible to reduce concentrations of Tetrachloroethene in the Site's soils to less than 1.4 mg/kg such may not be the case with the Site's groundwater. Any attempt to directly remediate the relatively low concentrations of Tetrachloroethene as found in the shallow groundwater under a portion of the Site would be very costly and provide very little, if any, real benefit. However, by removing any potentially significant sources of Tetrachloroethene from the Site's soils it will still be possible to satisfy the objectives of the remedial action as defined in Section 9.2 of this Work Plan. These objectives will be satisfied as follows:

1) There are no known drinking water wells located close enough to the Site to be significantly impacted by the Site's existing shallow groundwater at the Tetrachloroethene concentrations which it now contains (Note: There are no known drinking water supply wells in the City of Lackawanna). By checking the Site's soils for Tetrachloroethene in those areas which may be contaminated and removing any soils from the Site which are found to contain significant concentrations of Tetrachloroethene, it is anticipated that the concentrations of Tetrachloroethene contained in the Site's shallow groundwater will be reduced over time. Even at existing levels no known significant environmental impacts have occurred to date or are any anticipated in the future.

2) Site's soils will be checked for Tetrachloroethene and any soils found to contain greater than 1.4 mg/kg of Tetrachloroethene will be removed from the Site. Therefore the possibility for human ingestion/direct contact with soils having concentrations of Tetrachloroethene greater than 1.4 mg/kg will be eliminated.

3) The potential for the migration of Tetrachloroethene which would result in additional groundwater contamination or create a significant health risk will be minimized.

4) By removing any soils from the Site which are found to contain greater than 1.4 mg/kg and wearing the proper personal protective equipment during this removal the potential for human inhalation of Tetrachloroethene in concentrations which present a significant health risk will be minimized.

10.2.2.4 Option 4 Description and Evaluation

Option 4: Reduce concentrations of Tetrachloroethene at the Site to satisfy ARAR for soil but not the ARAR for groundwater.

Implementation of this option will result in the reduction of concentrations of Tetrachloroethene to less than 1.4 mg/kg in the Site's soils but no additional work will be done to satisfy the ARAR for the Site's groundwater of less than 5 ug/l. It appears technically and economically feasible to reduce concentrations of Tetrachloroethene in the Site's soils to less than 1.4 mg/kg. As previously noted, by removing any potentially significant sources of Tetrachloroethene from the Site's soils it will still be possible to satisfy the objectives of the remedial action as defined in Section 9.2 of this Work Plan. These objectives will be satisfied as follows:

1) There are no known drinking water wells located close enough to the Site (Note: None are located in the City of Lackawanna) to be significantly impacted by the Site's existing shallow groundwater at the Tetrachloethene concentrations which it now contains. By checking the Site's soils for Tetrachloroethene in those areas which may be contaminated and removing any soils from the Site which are found to contain significant concentrations of Tetrachloroethene, it is anticipated that the concentrations of Tetrachloroethene contained in the Site's shallow groundwater will be reduced over time. Even at existing levels no problems have occurred to date or are anticipated to occur in the future.

2) Site's soils will be checked for Tetrachloroethene and any soils found to contain greater than 1.4 mg/kg of Tetrachloroethene will be removed from the Site. Therefore the possibility for human ingestion/direct contact with soils having concentrations of Tetrachloroethene greater than 1.4 mg/kg will be eliminated.

3) The potential for the migration of Tetrachloroethene which would result in additional groundwater contamination or create a significant health risk will be minimized.

4) By removing any soils from the Site which are found to contain greater than 1.4 mg/kg and wearing the proper personal protective equipment during this removal the potential for human inhalation of Tetrachloroethene in concentrations which present a significant health risk will be minimized.

10.3 Engineering Evaluation of Selected Options

Based upon an evaluation of the remediation options it is the intention of Rigel to remediate the Site to a level that is protective of public health and the environment for the Contemplated Use of the Site. The proposed remediation actions were chosen from the previously described remediation options and are as follows:

Option 2 for quenchant pit remediation: Bring quenchant pit up to grade with Clean fill and pour an impermeable concrete pad over its surface.

Option 4 for Tetrachloroethene remediation: Evaluate Site's soils in locations of expected contamination using olfactory, visual, and PID field screening meter and soil sampling and testing as required. Site soils will be removed as required to satisfy ARAR for concentration of Tetrachloroethene in soil (1.4 mg/kg).

11.0 WORKPLAN FOR IMPLEMENTATION OF REMEDIATION ACTION

11.1 Project Plans and Specifications

11.1.1 Introduction

As previously indicated the Site remediation options which will be implemented include the following:

Quenchant pit remediation: Quenchant pit will be brought up to grade with clean fill and an impermeable concrete pad will be poured over its surface.

Tetrachloroethene remediation: Site's soils will be evaluated in various locations for the presence of Tetrachloroethene. These locations will be those sites which based upon Site conditions are expected to have the greatest potential for being contaminated with Tetrachloroethene. Test pits will be installed in these locations and the soils will be checked for Tetrachloroethene contamination. Soil samples will be field screened using olfactory and PID meter headspace testing. If field screening provides evidence that Tetrachloroethene may be present in significant quantities at a location, soil samples will be obtained for laboratory testing. Based upon the laboratory results Site soils will be removed as required to satisfy ARAR for concentration of Tetrachloroethene in soil (1.4 mg/kg). Confirmation sampling and analysis will be performed to insure that this concentration limit is satisfied.

The three transformers located inside the electrical room will also be checked for the presence of PCBs. In addition the previously noted Site Surface Monitoring Plan will be implemented. Its results will be evaluated and a determination made as to whether or not any mitigation of the Site's surface soils will be required. Upon receipt of NYSDEC approval any required mitigation will be implemented.

11.1.2 Quenchant Pit Remediation

Crushed stone will be delivered to the Site and placed in the vicinity of the closest entrance to that portion of the building which contains the quenchant pit. The clean fill will be moved into the building and placed in the quenchant pit. The clean fill will be placed to a depth of approximately 10 inches below the existing concrete floor. The clean fill will be tamped and leveled. A concrete pad will be poured over the clean fill. This concrete pad will tie into the existing concrete floor of the building.

11.1.3 Tetrachloroethene Remediation

A backhoe will be used to excavate test pits in the most likely locations at the site where Tetrachloroethene contamination may be present in the soils. The backhoe and operator will work in a coordinated fashion with a representative from Sterling

Environmental to perform the required sampling. The proposed locations of the test pits are identified on Drawing SEBBB03. Soils will be continuously observed for visual and olfactory indications of contamination and field screened using a PID meter as the test pits are advanced. Samples for PID headspace screening will be collected from 0 - 4 feet, 4 - 8 feet, and 8 - 12 feet below grade or possibly deeper depending on subsurface conditions. Test pits will be advanced until the water table or refusal is reached. Samples for laboratory testing will be obtained from intervals which are determined to contain potential contamination This judgement will be based on headspace screening with a PID meter, olfactory, and visual observations. Samples will be submitted to a NYDOH approved lab for analysis for Tetrachloroethene.

Any deviation from the proposed test pit locations, if required by site conditions, will be recorded on a drawing of the Site. The general conditions (moisture content, type, color, etc.) of the soil being sampled at each location will be noted. Soil samples will completely fill the sample container. In order to prevent cross contamination of samples, all sampling tools will be decontaminated with Alconox and water between each sample point.

Each sample will be given a label which contains the sample identification number, date, time, sample location , sampler's name, project name, parameters, and comments relative to sample collection. Each label will be firmly secured to the bottle by water resistant tape or wire. Each sample will be sealed with a sample seal or water resistant tape.

Each sample will be recorded on a chain of custody form. The completed custody form will remain with the sample shipping container at all times. Each sample possession exchange must be noted and acknowledged on the custody form to confirm that the sample's seal is intact.

The sampling technician will maintain a field log book which contains the following information:

Identification of soil sample and associated location,
Description of sampling methods,
Physical appearance of samples,
Date and time of sample collection,
Weather conditions,
Types of sample containers and sample identification numbers,
Preservatives used with samples,
Field measurements and field equipment calibration data, and
Miscellaneous field observations.

If laboratory results indicate Tetrachloroethene concentrations of greater than 1.4 mg/kg in a sample, soil will be excavated to remove the contaminated material. Excavation progress will be monitored using PID headspace monitoring. The excavated material will be transported to an approved waste disposal facility. Upon completion of excavation at a location confirmation samples will be taken for laboratory analysis to

confirm that the residual Tetrachloroethene analysis meets the required standard of 1.4 mg/kg. If no concentrations of Tetrachloroethene are found exceeding 1.4 mg/kg no further action will be taken.

The following sections address the various items relating to implementation of the Site's remediation. These include Health and Safety Plans, QA/QC Plan, Project Schedule, and institutional controls which may be imposed after the completion of the proposed site remediation.

11.1.4 Site Surface Monitoring Plan

Soil samples will be taken by a representative of Sterling Environmental from a depth of 0 – 2 inches at twelve locations. Two samples will be obtained from the berm along the site's northern perimeter. The additional ten samples will be taken at those Site locations which are believed most likely to contain significant contamination in the surface soils. During the sampling process a PID meter will be used for field screening in addition to olfactory and visual observations. All samples will be analyzed for SVOCs and TAL metals. In addition three of the samples with the highest PID readings will be analyzed for VOCs and PCBs.

Proposed sampling locations are indicated on Drawing SEBBB03. The general conditions (moisture content, type, color, etc.) of the soil being sampled at each location will be noted. Soil samples will completely fill the sample container. In order to prevent cross contamination of samples, all sampling tools will be decontaminated with Alconox and water between each sample point.

Each sample will be given a label which contains the sample identification number, date, time, sample location , sampler's name, project name, parameters, and comments relative to sample collection. Each label will be firmly secured to its container by water resistant tape or wire. Each sample will be sealed with a sample seal or water resistant tape.

Each sample will be recorded on a chain of custody form. The completed custody form will remain with the sample shipping container at all times. Each sample possession exchange must be noted and acknowledged on the custody form to confirm that the sample's seal is intact.

The sampling technician will maintain a field log book which contains the following information:

Identification of soil sample and associated location,
Description of sampling methods,
Physical appearance of samples,
Date and time of sample collection,
Weather conditions,
Types of sample containers and sample identification numbers,

Preservatives used with samples,
Field measurements and field equipment calibration data, and
Miscellaneous field observations.

Upon receipt of results a report will be submitted to the NYSDEC. This report will contain analytical results and an evaluation as to whether or not the results warrant additional remedial action at the site. If a determination is made that additional remedial action will be required, the potential remediation technologies and options identified and remediation options developed. Upon receipt of approval from the NYSDEC the required remedial actions will be implemented.

11.2 Health and Safety Plans

A project health and safety plan will be prepared to govern field work during on site activities. The plan will define the work, threat, work practices, equipment and emergency response actions. Remedial work will involve soil sampling, backfilling the quenchant pit with clean fill, and concrete placement over clean fill. After evaluation of the analytical data obtained from any soil samples which may be taken additional site work relating to excavation and disposal of soil contaminated with Tetrachloroethene may be performed.

The major safety concern during implementation of this Work Plan is expected to be inhalation of volatile organics. While this is not expected to represent a significant problem the appropriate precautions will be followed. The health and safety plan shall include limiting exposure to volatile organics and respirable particles, and minimizing skin contact with any potentially contaminated materials.

During any soil excavation activities, air monitoring will be conducted continuously for organic vapors using a photoionization detector and/or organic vapor analyzer. Any open excavations and the immediate vicinity of such an excavation will be considered an exclusion zone. The immediate vicinity of the excavation is defined as no less than six feet from the excavation, but otherwise as deemed appropriate by the contractor. Safe boundary lines will be set up with yellow caution tape to keep unauthorized personnel out of the remedial area while work is in progress. This will help ensure the respiratory safety of those involved in remedial activities who could possibly be exposed to contaminants. It will also allow adequate space for excavating equipment to operate without danger to human health.

All persons entering the exclusion zone shall fulfill OSHA training and medical surveillance requirements. Work performed at the Site will require Level D personal protection, i.e., work clothes, gloves, steel toe shoes, and hard hat.

Should photoionization detector readings in the breathing zone exceed 50 ppm for 5 minutes or 100 ppm at any one time, then Level D protection will be modified to include a respirator with vapor/dust cartridges. The above levels are selected as 50% of TLV concentrations established by OSHA for the contaminants previously identified on site.

Any person who enters an excavation showing greater than 50 ppm volatiles should wear disposable coveralls, latex gloves and respirator. Work shall cease should a volatile organic concentration exceed an OSHA TLV level at any time.

Eating, drinking, and smoking within the contamination exclusion zone is prohibited. Alcoholic or controlled substances will be prohibited on the Site. All contaminated disposable clothing will be placed in appropriate containers. Personnel will not be allowed to leave the Site with clothing suspected of being contaminated. All workers shall properly clean their face and hands prior to leaving the Site or eating.

Construction equipment used in excavation, backfilling and on-site hauling will be decontaminated prior to leaving the Site at the completion of the project. Steam cleaning, or any other method providing equivalent decontamination will be required.

11.3 QA/QC Plan

The Quality Assurance/Quality Control Plan describes the methods which will be utilized to insure that the analytical results obtained from the sampling program are reliable and properly documented. The laboratory utilized to perform analysis of soil samples from the Site will be approved by the New York State Health Department under its ELAP program for all parameters of concern. The laboratory will utilize procedures (including quality assurance samples, replicates, spikes, and calibration standards) which will help insure that the laboratory generates precise, accurate, and reliable data. Sampling personnel must be familiar with all equipment required to collect representative soil samples. Sampling personnel must have a minimum two years of technical training in chemistry, environmental science, or other technical discipline. This educational requirement may be waived for personnel with a minimum of 5 years experience in the collection of environmental samples.

Sterling Environmental will be responsible for ensuring that the required soil sampling program is correctly carried out. Responsibilities will include the following:

1) Overall responsibility for management of the sampling and analytical program and validity of all data,

2) Selection of an analytical laboratory to perform sample analyses,

3) Performance monitoring of analytical laboratory and review of all analytical protocols required for measuring and monitoring,

4) Submission of all analytical data to NYSDEC.

A project coordinator is to be designated by the analytical laboratory. This individual is to have responsibility for the following:

1) Communication with Sterling Environmental regarding the analytical data obtained from the soil sample,

2) Monitor analytical techniques and recommend modifications as required,

3) Verify that laboratory quality control and analytical procedures are being followed as specified in the quality control plan when laboratory personnel are analyzing the soil samples,

4) Review raw analytical data and check arithmetic calculations for a minimum of 20% of the samples analyzed (includes inspection of reduced data, calibration curves and bound laboratory notebooks),

5) Verify soil samples at the laboratory and verify that incoming samples correspond to the chain of custody sheet,

6) Maintain records of all incoming samples and track samples while they are being processed,

7) Prepare quality control samples for analysis as required to satisfy quality assurance requirements,

8) Approve completed data and analytical report before transmittal to Sterling Environmental.

Specific analytical methods often prescribe the necessary specific quality assurance procedures. In order to achieve a high degree of accuracy (degree of measurement or average of measurements agreement with an accepted reference or true value obtained from executing a method in a particular laboratory using an interference free matrix) the laboratory must do the following:

1) Reagents used as reference standards must be the highest purity commercially available materials and must be certified by the supplier.

2) Each instrument utilized in performing the analyses must be checked on each day that the samples are run in order to demonstrate performance.

3) Recovery factors for individual contaminants are determined for the analytical method which is utilized.

4) Analytical results for spiked level of the contaminant under evaluation in a replicate sample must be within the required limits for the contaminant under evaluation.

Full documentation of all analyses must be kept in notebooks and be available for inspection at the designated laboratory.

All analytical data will be evaluated according to the "Guidance for the Development of Data Usability Summary Reports". A Data Usability Summary Report (DUSR) will be prepared and submitted, along with the analytical data package, to the NYSDEC.

11.4 Project Schedule

A proposed schedule of events for implementation of the proposed remediation work at the Site is provided by Figure 11-1. Upon receipt of agreement from the NYSDEC regarding the work scope for the proposed remediation associated with the Site's Voluntary Cleanup Program a time schedule will be provided for implementation of the proposed schedule of events.

FIGURE 11-1

Schedule of Events for Buffalo Brake Beam Site Remediation Action

Item

1) Submit Voluntary Cleanup Agreement Plan to NYSDEC

2) Receive approval to proceed with proposed Site remediation work from NYSDEC

3) Quench pit backfilling with clean fill and installation of concrete pad over its surface

4) Install test pits to obtain soil samples for field evaluation and laboratory evaluation if field evaluation indicates that significant concentrations of Tetrachloroethene may be present

5) Upon receipt of soil sample data define locations where soil removal may be required in order to satisfy ARAR of 1.4 mg/kg for Tetrachloroethene

6) Implement soil removal as deemed necessary to satisfy ARAR of 1.4 mg/kg for Tetrachloroethene and provide NYSDEC with results from cleanup confirmation samples

7) Install shallow test pits to delineate area of remaining red paint residue

8) Sample electrical transformers (3) for PCBs

9) Implement Site Surface Monitoring Plan

10) Prepare remedial action plan (if required) based on results from Site Surface Monitoring Plan

11) Implement remedial action plan (if required) for Site surface soils

12) Prepare and submit Construction Completion Report including a summary of work completed, compilation of sampling results with DUSR evaluation, copy of VCP agreement, copy of Deed restriction and the Soil/Fill Management plan, to the NYSDEC for review and approval.

13) Obtain Release and Covenant Not To Sue from NYSDEC under the Voluntary Cleanup Agreement

Figure 11-2

Summary Table of Proposed Samples and Analysis

Sample Description	Sample Type	Media	Parameter	Method	# of Samples
Transformer Oil		Oil	PCBs	SW-846 Method 8082	3
Test Pits	Subsurface	Soil	Tetrachloroethene	SW-846 Method 8260	TBD*
Surface Monitoring	Surface	Soil	SVOCs	SW-846 Method 8270	12
	Surface	Soil	TAL Metals	SW-846 Method 6010	12
	Surface	Soil	VOCs	SW-846 Method 8260	3
	Surface	Soil	PCBs	SW-846 Method 8082	3

* TBD – To Be Determined based upon field screening and observations – estimate 1 to 6 samples

Appendix A - Drawings

N

INGHAM STREET (50' WIDE)

671.158' D. & M.

BERM AREA

MW101 MW102 MW103 MW104 MW10 MW13 MW20

TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP18 TP19 TP20 TP21

TPSB05N55 TPSB05N30W30 TPSB05N30 TPSB05E14.6 TPSB05 TPSB05S25

BRICK AND METAL CLAD BUILDING

FENCE AROUND AIR CONDITIONING UNIT

BLACKTOP PARKING

UTILITY POLE

414.277' D. & M.

355.865' D. & M.

CABLE (NON-TRANS) SUPPORT POLE 25.3'E.

CONCRETE

PRODUCT STAGING

WELDING SHOP

TANK STORAGE AREA

BEAM ASSEMBLY

CRANE ROOM

ADDITION

FORMER MACHINE SHOP

PAINT DIP TANK

MAINTENANCE SHOP STORAGE AST-1

LOCKER ROOMS

TRACK

340.923' D. & M.

FENCE 0.3'E.

FENCE 0.1'E.

FENCE 0.8'W.

FENCE 2.1'W.

TPSB18

SHIPPING

AST-2 QUENCH PIT

QTB1 QTB3 QTB4

HEAT TREAT HOT FORMING

MACHINE SHOP

DEEDED 2011.68' TO EAST LINE OF HAMBURG TURNPIKE 137.0' D. & M.

PERMANENT EASEMENT TO CITY OF LACKAWANNA L.9231/P.555

137.00' D. & M.

FENCE 2.0'N.-0.3' S.W. OF L.

ENLARGED LOADING AREA

BLACK BLDG.

BUFFALO BRAKE BEAM COMPANY BY L. 1605/P. 220 (LAND SHOWN ON MAP COVER 1079)

TEST PIT 3-5" DEEP

TEST PIT 6' DEEP

BETX AREA TEST PIT 12' DEEP

ENDS OF HERS

ALLEY

CITY OF LACKAWANNA (L.9231/P.557)

793.06' D. – 792.80' M.

629.35' D. – 629.42' M.

210.322' D. – 210.06' M.

BUFFALO BRAKE BEAM COMPANY BY L. 2905/P. 300

NORTH LINE OF MARK ROBERT CONSTRUCTION COMPANY, INC. BY L. 8016/P. 118

■ TRANSFORMERS

ABOVE GROUND STORAGE TANKS

AST-1 Quenchant Holding Tank

AST-2 Paint Dump Tank for Fire Protectant - Never Used

TEST PITS

SAMPLE POINTS

MONITORING WELLS

EARTHTECH SAMPLE POINTS

1' deep trenches were sampled every 15' where paint resin was visible as part of Lehigh **site** remediation in 1997.

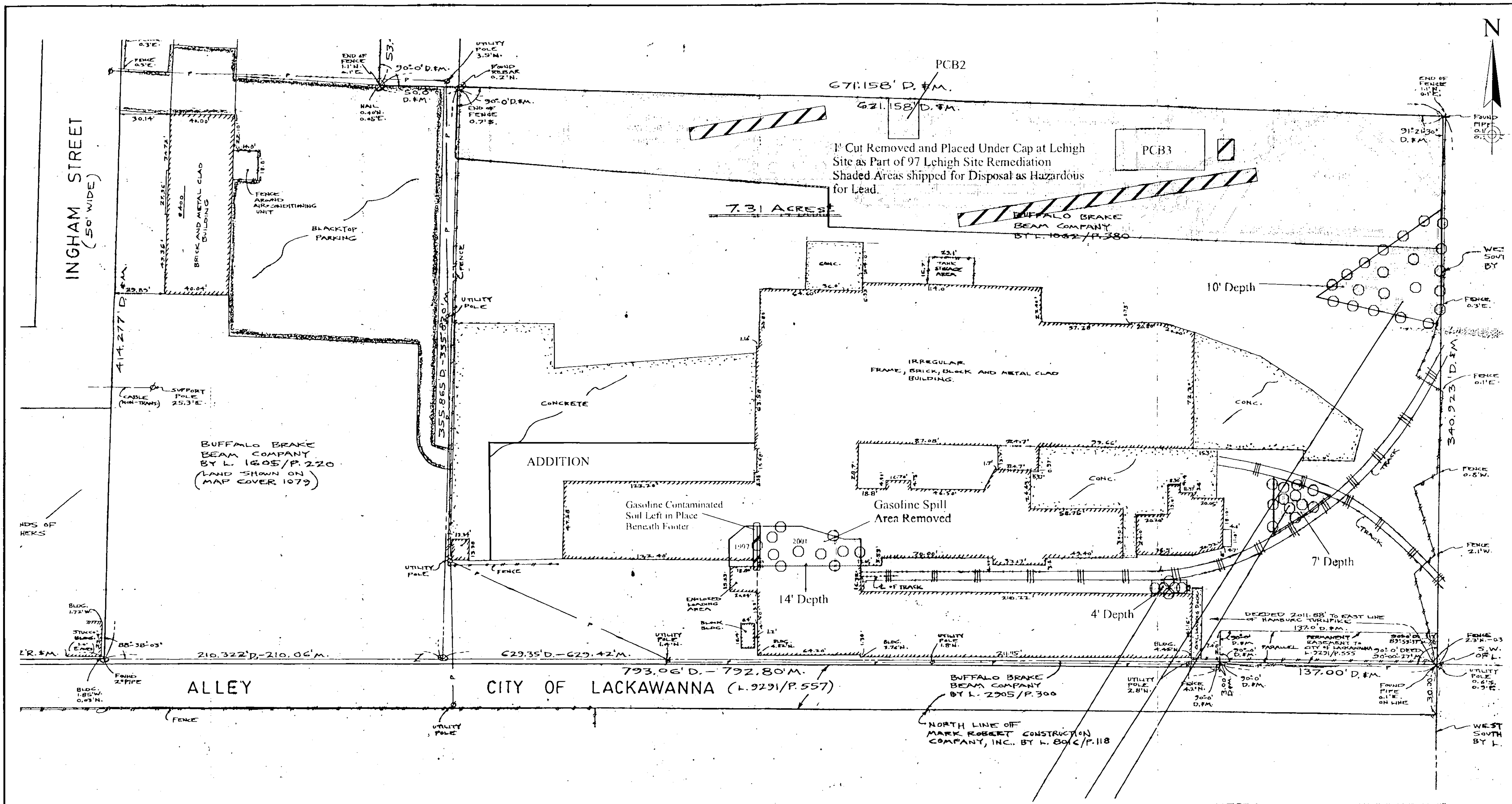
TP10 - TP21 installed to 2.5' depth in 1997, as a supplemental paint investigation by Brake Beam.

STERLING ENVIRONMENTAL
50 Lake Avenue
Blasdell, New York 14219

INVESTIGATIVE SAMPLE POINTS
DRAWING SEBBB01

BUFFALO BRAKE BEAM
400 INGHAM AVENUE
BUFFALO, NEW YORK

NOT TO SCALE | **MAY 2003**



N
PCB2
PCB3
1' Cut Removed and Placed Under Cap at Lehigh Site as Part of 97 Lehigh Site Remediation
Shaded Areas shipped for Disposal as Hazardous for Lead.
7.31 ACRES±
BUFFALO BRAKE BEAM COMPANY
INGHAM STREET (50' WIDE)
BLACKTOP PARKING
BRICK AND METAL CLAD BUILDING
CONCRETE
ADDITION
IRREGULAR FRAME, BRICK, BLOCK AND METAL CLAD BUILDING
CONC.
10' Depth
7' Depth
14' Depth
4' Depth
Gasoline Contaminated Soil Left in Place Beneath Footer
Gasoline Spill Area Removed
1997
2001
TRACK
BUFFALO BRAKE BEAM COMPANY BY L. 1605/P. 220 (LAND SHOWN ON MAP COVER 1079)
ALLEY
CITY OF LACKAWANNA (L. 9291/P. 557)
BUFFALO BRAKE BEAM COMPANY BY L. 2905/P. 300
NORTH LINE OF MARK ROBERT CONSTRUCTION COMPANY, INC. BY L. 8016/P. 118
671.158' D. & M.
414.277' D. & M.
355.865' D.–355.80' M.
340.923' D. & M.
210.322' D.–210.06' M.
629.35' D.–629.42' M.
793.06' D.–792.80' M.
137.00' D. & M.
UTILITY POLE
FENCE
FUEL OIL SPILL AREAS REMOVED

○ CONFIRMATION SAMPLE POINTS

EXCAVATED AREAS

STERLING ENVIRONMENTAL
50 Lake Avenue
Blasdell, New York 14219

PREVIOUS REMEDIAL ACTIONS
DRAWING SEBBB02

BUFFALO BRAKE BEAM
400 INGHAM AVENUE
BUFFALO, NEW YORK

NOT TO SCALE	MAY 2003

INGHAM STREET (50' WIDE)

414.277' D. & M.

671.158' D. & M.

621.158' D. & M.

340.923' D. & M.

355.865' D. - 355.820' M.

793.06' D. - 792.80' M.

629.35' D. - 629.42' M.

210.322' D. - 210.06' M.

137.00' D. & M.

BRICK AND METAL CLAD BUILDING

BLACKTOP PARKING

CONCRETE

FENCE AROUND AIR CONDITIONING UNIT

BUFFALO BRAKE BEAM COMPANY BY L. 1605/P. 220 (LAND SHOWN ON MAP COVER 1079)

ALLEY

CITY OF LACKAWANNA (L. 9291/P. 557)

BUFFALO BRAKE BEAM COMPANY BY L. 2905/P. 300

NORTH LINE OF MARK ROBERT CONSTRUCTION COMPANY, INC. BY L. 8016/P. 118

DEEDED 2011.68' TO EAST LINE OF HAMBURG TURNPIKE

137.0' D. & M.

PERMANENT EASEMENT TO CITY OF LACKAWANNA L. 9291/P. 555

● Surface Sample Points

▨ Test Pit Locations

PROPOSED SAMPLE LOCATIONS
DRAWING SEBBB03

BUFFALO BRAKE BEAM
400 INGHAM AVENUE
BUFFALO, NEW YORK

NOT TO SCALE | **JUNE 2003**

STERLING ENVIRONMENTAL
50 Lake Avenue
Blasdell, New York 14219

Appendix B – MSDS for UCON Quenchant RL

UNION CARBIDE CORPORATION
A Subsidiary of The Dow Chemical Company

MATERIAL SAFETY DATA SHEET

Product Name: UCON(TM) QUENCHANT RL
MSDS#: 971

Effective Date: 07/26/2000

Union Carbide urges each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: 1) Notify its employees, agents, contractors and others whom it knows or believes will use this material of the information in this MSDS and any other information regarding hazards or safety; 2) Furnish this same information to each of its customers for the product; and 3) Request its customers to notify their employees, customers, and other users of the product of this information.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 IDENTIFICATION

Product Name	UCON(TM) QUENCHANT RL
Chemical Name	Mixture
Chemical Family	Polyalkylene Glycol
Formula	Not applicable
Synonym	None

1.2 COMPANY IDENTIFICATION

Union Carbide Corporation
A Subsidiary of The Dow Chemical Company
39 Old Ridgebury Road
Danbury, CT 06817-0001

1.3 EMERGENCY TELEPHONE NUMBER

24 hours a day: CHEMTREC 1-800-424-9300.
Number for non-emergency questions concerning MSDS (732) 563-5522
Additional information on this product may be obtained by calling the Union Carbide Corporation Customer Service Center at 1-800-568-4000.

MATERIAL SAFETY DATA SHEET

2. COMPOSITION INFORMATION

Component	CAS #	Amount (%W/W)
Water	7732-18-5	< 65%
Polyalkylene glycol	Trade secret	< 45%
Sodium nitrite	7632-00-0	< 3%

3. HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Appearance Straw-colored

Physical State Liquid

Odor Characteristic

Hazards of product WARNING! HARMFUL IF SWALLOWED - CONTAINS INORGANIC NITRITE.
VAPOR, AEROSOL OR MIST OF THE PRODUCT AND THERMAL DEGRADATION PRODUCTS GENERATED AT HIGH TEMPERATURE CAN BE IRRITATING AND HARMFUL IF INHALED.

3.2 POTENTIAL HEALTH EFFECTS

Effects of Single Acute Overexposure

Inhalation Short-term harmful health effects are not expected from vapor generated at ambient temperature.

Eye Contact No evidence of harmful effects from available information.

Skin Contact No evidence of harmful effects from available information.

Skin Absorption No evidence of harmful effects from available information.

Swallowing May cause irregular heart rate, decreased blood pressure, roaring sound in ears, with throbbing persistent headache, dizziness, disorientation, nausea, vomiting, irregular respiration, with possibility of fainting, convulsions, and collapse.

Chronic, Prolonged or Repeated Overexposure

Effects of Repeated Overexposure No adverse effects anticipated from available information.

Other Effects of Overexposure Overexposure to vapor, aerosol or mist generated at high temperature may result in eye and respiratory tract irritation, dizziness, nausea and the inhalation of harmful amounts of material. Acute overexposure to nitrogen oxides may cause irritation of the respiratory tract and result in coughing, breathing difficulties and other respiratory reactions.

Medical Conditions Aggravated by Exposure

There is evidence that persons with glucose-6-phosphate dehydrogenase deficiency may be more sensitive to the toxicity of nitrites.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Section 12 for Ecological Information.

4. FIRST AID PROCEDURES

4.1 INHALATION

Remove to fresh air.

4.2 EYE CONTACT

Flush eyes thoroughly with water for several minutes. Remove contact lenses, if worn.

4.3 SKIN CONTACT

Wash skin with soap and water.

4.4 SWALLOWING

If patient is fully conscious, rinse mouth with water. Give two glasses of water. Induce vomiting. This should be done only by medical or experienced first-aid personnel. Obtain medical attention.

MATERIAL SAFETY DATA SHEET

4.5 NOTES TO PHYSICIAN

The principal hazard of this material is due to the nitrite content. Administer oxygen to relieve headache and a general sense of weakness. Determine methemoglobin concentration in blood every 3-6 hours for first 24 hours. It should return to normal within 24 hours. The treatment of toxic methemoglobin may include the intravenous administration of methylene blue in a dose of 2 mg/kg. Improvement should be evident within one hour. The dose may be repeated if necessary. Otherwise, treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Flash Point - Closed Cup: None.

Flash Point - Open Cup: None.

Autoignition Temperature: *Not currently available.*

Flammable Limits In Air:

Lower	*Not Determined, Aqueous System*
Upper	*Not Determined, Aqueous System*

5.2 EXTINGUISHING MEDIA

Non-flammable (aqueous solution): After water evaporates, remaining material will burn. Use alcohol-type or all-purpose-type foam, applied by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

5.3 EXTINGUISHING MEDIA TO AVOID

No information currently available.

5.4 SPECIAL FIRE FIGHTING PROCEDURES

Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity.

5.5 SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Use self-contained breathing apparatus and protective clothing.

5.6 UNUSUAL FIRE AND EXPLOSION HAZARDS

During a fire, oxides of nitrogen may be produced.

5.7 HAZARDOUS COMBUSTION PRODUCTS

Combustion may produce the following products: Oxides of carbon and nitrogen. Carbon monoxide is highly toxic if inhaled. Carbon dioxide in sufficient concentrations can act as an asphyxiant. Acute overexposure to the products of combustion may result in irritation of the respiratory tract. See Section 3.2 - Other Effects of Overexposure. See Section 8.2 - Personal Protection (Ventilation).

6. ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material is Released or Spilled:
Small spills can be flushed with large amounts of water; larger spills should be collected for disposal.

Personal Precautions: Wear suitable protective equipment. See Section 8.2 - Personal Protection.

7. HANDLING AND STORAGE

7.1 HANDLING

General Handling
Do not swallow.
Avoid breathing vapor, aerosol and mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FOR INDUSTRY USE ONLY.

Ventilation
Steam and small amounts of organic vapors can be evolved during quenching. The vapors could be irritating and toxic if allowed to accumulate. Adequate workplace ventilation should be provided to prevent irritation and accumulation of vapors; this may require use of a special, local ventilation system in the immediate area where vapors are released.

Other Precautions
Do not mix with amines. A nitrosamine, which may cause cancer, may be formed. Where this product is burned under conditions of relatively complete combustion, the major products are carbon dioxide and water vapor. Where this material is subjected to overheating (thermal degradation) but does not burn, the degradation products can be such things as organic acids (formic, acetic acids), aldehydes, esters, ketones, etc. These vapors or fumes can be highly

MATERIAL SAFETY DATA SHEET

irritating to the eyes, nose and throat. Special ventilation may be needed. In normal use, no respiratory protective equipment should be needed, but self-contained breathing apparatus should be available for use in emergencies. Small amounts of organic vapors can be formed by oxidation of quenchants. These vapors could be irritating or toxic if released in a poorly ventilated area. Good ventilation should be maintained in the area around quench tanks.

7.2 STORAGE

Storage at room temperature recommended. Product freezes at ~0°C (~32°F) and becomes highly viscous at temperatures above freezing.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 EXPOSURE LIMITS

None established by OSHA, ACGIH or UCC.

8.2 PERSONAL PROTECTION

Respiratory Protection:	None expected to be needed at low temperatures. See Section 7.1 - Other Precautions.
Ventilation:	Steam and small amounts of organic vapors can be evolved during quenching. The vapors could be irritating and toxic if allowed to accumulate. Adequate workplace ventilation should be provided to prevent irritation and accumulation of vapors; this may require use of a special, local ventilation system in the immediate area where vapors are released.
Eye Protection:	Safety Glasses
Protective Gloves:	Rubber or plastic.
Other Protective Equipment:	Eye Bath, Safety Shower

8.3 ENGINEERING CONTROLS

Use good housekeeping and acceptable industrial engineering practices.

MATERIAL SAFETY DATA SHEET

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Straw-colored

pH: *Not currently available.*

Solubility in Water (by weight): 100 %

Odor: Characteristic

Boiling Point (760 mmHg): > 100 °C > 212 °F

Freezing Point: 0 °C 32 °F

Specific Gravity (H2O = 1): 1.077 *20 °C / 20 °C*

Vapor Pressure at 20°C: ~ 2.3 kPa ~ 17 mmHg

Vapor Density (air = 1): < 1 Volatile portion

Evaporation Rate (Butyl Acetate = 1): ~ 1 Volatile portion

Melting Point: *Not applicable (for liquids)*

10. STABILITY AND REACTIVITY

10.1 STABILITY/INSTABILITY Stable

Incompatible Materials: Normally unreactive; however, avoid strong bases at high temperatures, strong acids, strong oxidizing agents and materials reactive with hydroxyl compounds. If the pH of the product is allowed to fall below 6.5, either as a result of the addition of acid or due to severe oxidation, the formation of nitrogen oxides may occur.

10.2 HAZARDOUS POLYMERIZATION Will Not Occur.

MATERIAL SAFETY DATA SHEET

10.3 INHIBITORS/STABILIZERS Not applicable.

11. TOXICOLOGICAL INFORMATION

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS
Contains sodium nitrite which may react with amines to form a nitrosamine. Some nitrosamines have been shown to be carcinogenic in laboratory animals.

12. ECOLOGICAL INFORMATION

12.1 ENVIRONMENTAL FATE

BOD (% Oxygen consumption)

	Day 5	Day 10	Day 15	Day 20	Day 30
	1 %	12 %		24 %	

BOD (% Oxygen consumption)

	Day 5	Day 10	Day 15	Day 20	Day 30
	2 %	18 %		18 %	

12.2 ECOTOXICITY

Toxicity to Micro-organisms
Bacterial/NA; 16 h; IC50
Result value: > 1000 mg/l

Toxicity to Aquatic Invertebrates
Daphnia; 48 h; LC50
Result value: 5148 (4288 - 6180) mg/l

Toxicity to Aquatic Invertebrates
Daphnia; 48 h; LC50
Result value: 4287 (3292 - 5583) mg/l

MATERIAL SAFETY DATA SHEET

12.3 FURTHER INFORMATION

Chemical Oxygen Demand (COD) - calculated: 0.73 mg/mg

13. DISPOSAL CONSIDERATIONS

13.1 WASTE DISPOSAL METHOD

Incinerate in a furnace or otherwise dispose of in accordance with applicable Federal, State and local requirements. Dispose in accordance with all applicable Federal, State, and local environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

13.2 DISPOSAL CONSIDERATIONS

See Section 13.1

Disposal methods identified are for the product as sold. For proper disposal of used material, an assessment must be completed to determine the proper and permissible waste management options permissible under applicable rules, regulations and/or laws governing your location.

14. TRANSPORT INFORMATION

14.1 U.S. D.O.T.

NON-BULK
Proper Shipping Name : NOT REGULATED

BULK
Proper Shipping Name : ENVIRONMENTALLY HAZARDOUS SUBSTANCES LIQUID, NOS
Technical Name : CONTAINS SODIUM NITRITE
ID Number : UN3082
Hazard Class : 9
Packing Group : PG III

Reportable Quantity : 4,762 LB

MATERIAL SAFETY DATA SHEET

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

15.1 FEDERAL/NATIONAL

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 SECTION 103 (CERCLA)

The following components of this product are specifically listed as hazardous substances in 40 CFR 302.4 (unlisted hazardous substances are not identified) and are present at levels which could require reporting:

Component	CAS #	Amount
Sodium nitrite	7632-00-0	< 3.0000%

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EPCRA) SECTIONS 302 AND 304

The following components of this product are listed as extremely hazardous substances in 40 CFR Part 355 and are present at levels which could require reporting and emergency planning:

None.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EPCRA) SECTION 313

The following components of this product are listed as toxic chemicals in 40 CFR 372.65 and are present at levels which could require reporting and customer notification under Section 313 and 40 CFR Part 372:

Component	CAS #	Amount
Sodium nitrite	7632-00-0	< 3.0000%

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EPCRA) SECTIONS 311 AND 312

MATERIAL SAFETY DATA SHEET

Delayed Hazard : No
Fire Hazard : No
Immediate Health Hazard : No
Reactive Hazard : No
Sudden Release of Pressure **Hazard** : No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)

All components in this product are in compliance with EINECS.

CEPA - DOMESTIC SUBSTANCES LIST (DSL)

The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

15.2 STATE/LOCAL

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT)

This product is subject to the Worker and Community Right-to-Know Act. The following components of this product are at levels which could require identification in the MSDS:

Component	CAS #	Amount
Sodium nitrite	7632-00-0	< 3.0000%

MASSACHUSETTS (HAZARDOUS SUBSTANCES DISCLOSURE BY EMPLOYERS)

The following components of this product appear on the Massachusetts Substance List and are present at levels which could require identification in the MSDS:

Component	CAS #	Amount
Sodium nitrite	7632-00-0	< 3.0000%

MATERIAL SAFETY DATA SHEET

NEW YORK (HAZARDOUS SUBSTANCES BULK STORAGE ACT)

New York State Bulk Storage Regulations (6 NYCRR Parts 595-599)This product is covered by 6 NYCRR for bulk storage and release reporting and response. Technical guidance and recommended practices are as follows: NAME AND PHYSICAL/CHEMICAL CHARACTERISTICS - See Sections 1, 2, 3, 5, & 9. MATERIALS OF CONSTRUCTION - Suitable materials of construction: Steel orstainless steel. Materials not to be used: Aluminum, copper and copper alloys. CONDITIONS FOR STORAGE - Storage at room temperature recommended. Product freezes at ~32 F and becomes highly viscous at temperatures above freezing. STORAGE SYSTEM DESIGN - Design should comply with applicable industry, Federal, and local codes with regards to mechanical, electrical, safety and health components. Should also comply with the current versions of the applicable reference documents cited in NYS/DEC Chemical Bulk Storage Regulations Sections 598.3 to 598.6 (for existing tanks) or Sections 599.2 and 599.7 (for new or substantially modified tanks). INSPECTION AND MAINTENANCE - A testing/inspection program which ensures structural integrity and proper system operation should be established. Inspection and maintenance procedures and testing of equipment should comply with NYS/DEC Regulations Sections 598.7 to 598.10. TRANSFER AND UNLOADING - These operations should comply with NYS/DEC Regulations Sections 598.5. SPILL EMERGENCY RESPONSE PROCEDURES - These operations should comply with NYS/DEC Regulations Section 599.17. See SECTION 6. See also othersections of this MSDS.

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

CALIFORNIA SCAQMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 443.1, LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

VOC: Not determined

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

16. OTHER INFORMATION

MATERIAL SAFETY DATA SHEET

16.1 AVAILABLE LITERATURE AND BROCHURES

ADDITIONAL INFORMATION: Additional product safety information on this product may be obtained by calling your Union Carbide Corporation Sales or Customer Service contact.
Ask for the brochure:
UCON Fluids and Lubricants (Family Brochure). Ask about the availability of specific product and end-use bulletins.

16.2 SPECIFIC HAZARD RATING SYSTEM

Additional information on this product may be obtained by calling your Union Carbide Sales or Customer Service contact.

16.3 RECOMMENDED USES AND RESTRICTIONS

FOR INDUSTRY USE ONLY

16.4 REVISION

Version: 3.
Revision: 07/26/2000
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

16.5 LEGEND

A	Asphyxiant
Bacterial/NA	Non Acclimated Bacteria
F	Fire
H	Health
HMIS	Hazardous Materials Information System
N/A	Not available
NFPA	National Fire Protection Association
O	Oxidizer
P	Peroxide Former
R	Reactivity
TS	Trade Secret
VOL/VOL	Volume/Volume
W	Water Reactive
W/W	Weight/Weight

MATERIAL SAFETY DATA SHEET

Product Name: UCON(TM) QUENCHANT RL **Effective Date:** 07/26/2000
MSDS#: 971 **Page** 14 of 14

The opinions expressed herein are those of qualified experts within Union Carbide. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of the use of the product are not under the control of Union Carbide, it is the user's obligation to determine conditions of safe use of the product.