Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
TNT Red Star Express Site
Kirkwood, Broome County
Site Number 7-04-028

February 2001

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

TNT Red Star Express Inactive Hazardous Waste Site
Kirkwood, Broome, County, New York
Site No. 7-04-028

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the TNT Red Star Express class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the TNT Red Star Express inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a potential threat to public health and a significant threat to the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the TNT Red Star Express Site and the criteria identified for evaluation of alternatives, the NYSDEC has selected in-situ bioremediation and groundwater extraction and remediation. The components of the remedy are as follows:

- The installation of a groundwater extraction and treatment system. An extraction well centered around monitoring well MW-3 will remove contaminated groundwater from the 1991 PCE spill area for treatment. A second extraction well centered around the oil/water separator will remove TCA contaminated groundwater for treatment and will provide for the containment of this groundwater on-site. Extracted groundwater will be treated using a biological reactor. A portion of treated groundwater will be re-introduced into groundwater through injection wells.

- A treatability study to effectively design the bio-remediation system.

- The installation of injection wells around the two source areas to introduce nutrients and/or microbes into the groundwater to enhance the biodegradation of the contaminants.

- Implementation of a long-term monitoring program to evaluate the effectiveness of the system will be instituted as a component of the O&M Plan for the site. Monitoring will be required to confirm that natural attenuation is occurring at the leading edge of the plume.

- To prevent future exposures to contaminated groundwater, the Department will seek to have restrictions placed upon the use of groundwater at the site. This will help to prevent future exposures to any residual groundwater contamination.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

2/23/2001
Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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RECORD OF DECISION

TNT RED STAR EXPRESS SITE
Kirkwood, Broome County, New York
Site No. 7-04-028
February 2001

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health has selected this remedy to address the potential threat to human health and significant threat to the environment created by the presence of hazardous waste at the **TNT Red Star Express Site**, a class 2 inactive hazardous waste disposal site. As more fully described in Sections 3 and 4 of this document, the site is a trucking terminal where goods are transferred between trucks for distribution. In 1991, while loading drums into a trailer, a forklift punctured several drums containing tetrachloroethene (PCE) accidently releasing approximately 100 gallons of PCE into the trailer and eventually onto the ground. Approximately 120 tons of contaminated soil was removed during the spill response. The disposal of PCE, as a result of the spill, resulted in the contamination of groundwater on-site and somewhat downgradient of the site. Additionally, during the remedial investigation, the groundwater in the vicinity of an oil/water separator was found to be contaminated with 1,1,1-Trichloroethane (TCA) and was determined to be migrating off-site. The oil/water separator is located immediately south of the maintenance garage in the south western portion of the site.

These conditions have resulted in the following potential threat to public health and significant threat to the environment:

- a potential threat to human health associated with the migration of contaminated groundwater off-site in an aquifer used elsewhere as a source of potable water.

- a significant environmental threat associated with the contaminated groundwater and its migration towards the Susquehanna River.

In order to eliminate or mitigate the potential threat to public health and significant threat to the environment resulting from the disposal of hazardous waste at the TNT Red Star Express site, the following remedy was selected:

- The installation of a groundwater extraction and treatment system. An extraction well centered around monitoring well MW-3 will remove contaminated groundwater from the 1991 PCE spill area for treatment. A second extraction well centered around the oil/water separator will remove TCA contaminated groundwater for treatment and will provide for the containment of this groundwater on-site. Extracted groundwater will be treated using a biological reactor. A portion of treated groundwater will be re-introduced into groundwater through injection wells.

- A treatability study to effectively design the bio-remediation system.

- The installation of injection wells around the two source areas to introduce nutrients and/or microbes into the groundwater to enhance the biodegradation of the contaminants.

- A long-term monitoring program to evaluate the effectiveness of the system will be implemented as a component of the O&M Plan for the site. Monitoring will be required to confirm that natural attenuation is occurring at the leading edge of the plume.

- To prevent future exposures to contaminated groundwater, the Department will seek to have restrictions placed upon the use of groundwater at the site. This will help to prevent future exposures to any residual groundwater contamination.

The selected remedy, discussed in detail in Sections 7 and 8 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD), in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The site is located at 97 Industrial Park Drive in the Town of Kirkwood, New York (see Figures 1 & 2) within an industrial park owned by the Broome County IDA. The industrial park is located adjacent to and southwest of US Interstate Route 81, and northwest of Route 11. The site occupies approximately five acres and consists of a single story truck terminal building and a maintenance garage. Public water and sewer utilities serve the area. USF Red Star Express (formerly known as TNT Red Star Express) leases the property from C&D Terminal Leasing and shares the property with Herlihy Trucking. The site is used by USF Red Star Express as a trucking terminal where goods are transferred between trucks for distribution.

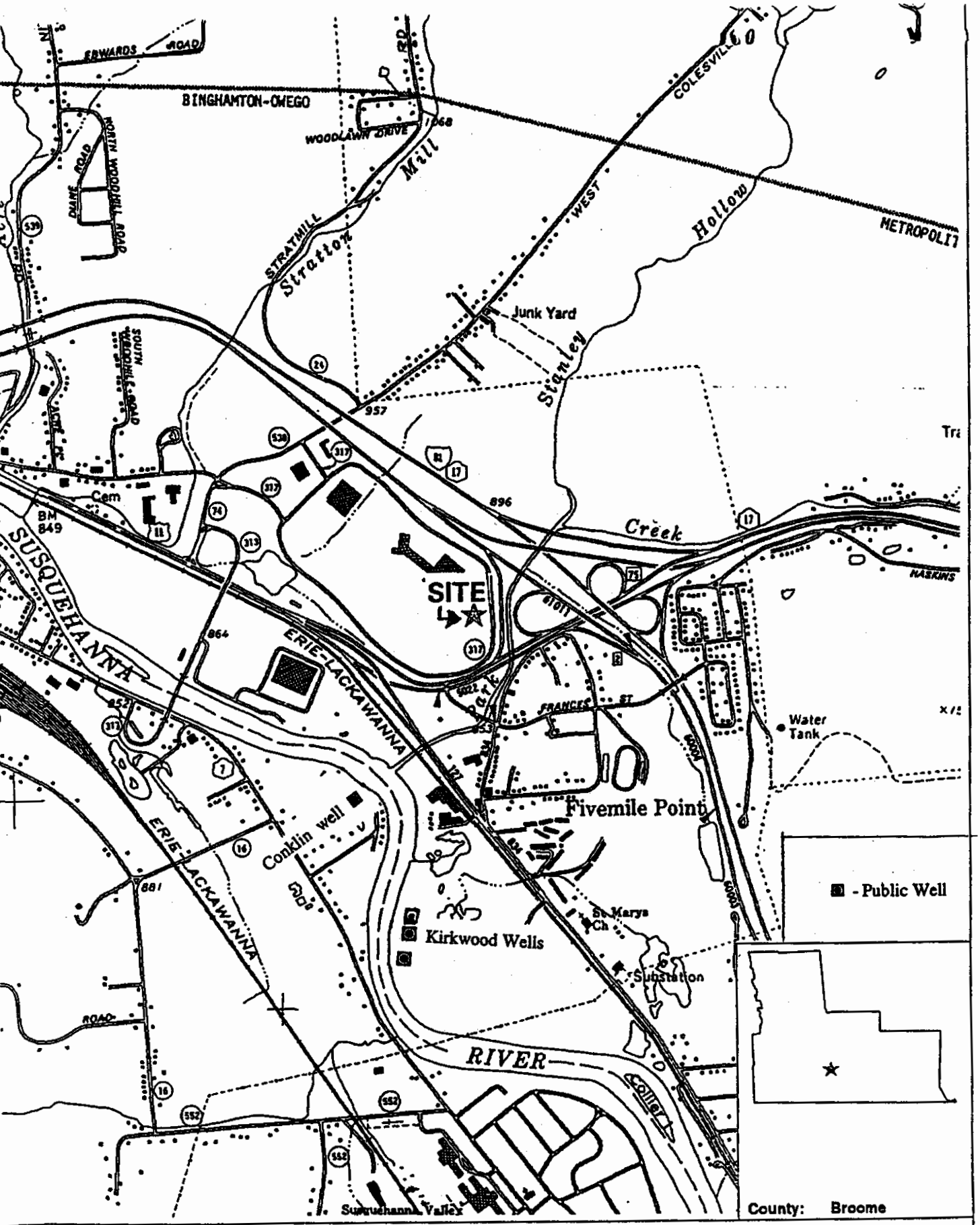
The site is directly adjacent to and south of the Raytheon Corporation (formerly Hughes Flight Simulator facility), east of Universal Instruments Corporation, and northeast of Universal Applied Conveyor Engineering Division facility. Two sites in the vicinity of this site with on-going environmental investigations and/or remediation are the Gorick Landfill site (No. 7-04-019) and the Dover Electronics (No. 7-04-026) site.

The Susquehanna River is approximately one-half mile south of the site. Park Creek, a small tributary to the River, is located less than 500 feet east of the site. An underground diesel fuel tank is located adjacent to the west property line in the southern portion of the site. A maintenance garage is located to the west of the terminal building. The floor drains from the garage flow into an oil/water separator located south of the garage and subsequently drain into the swale at the south property line. A waste oil tank (partly underground) is also located adjacent to and south of the garage building.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site is used by USF Red Star Express as a trucking terminal where goods are transferred between trucks for distributions, and parking of the unused trucks. The garage is used for minor truck repairs. In January 1991, while loading drums in a trailer, a forklift punctured several drums containing perchloroethylene (PCE) accidently releasing approximately 100 gallons of PCE into the trailer and eventually on the asphalt pavement.



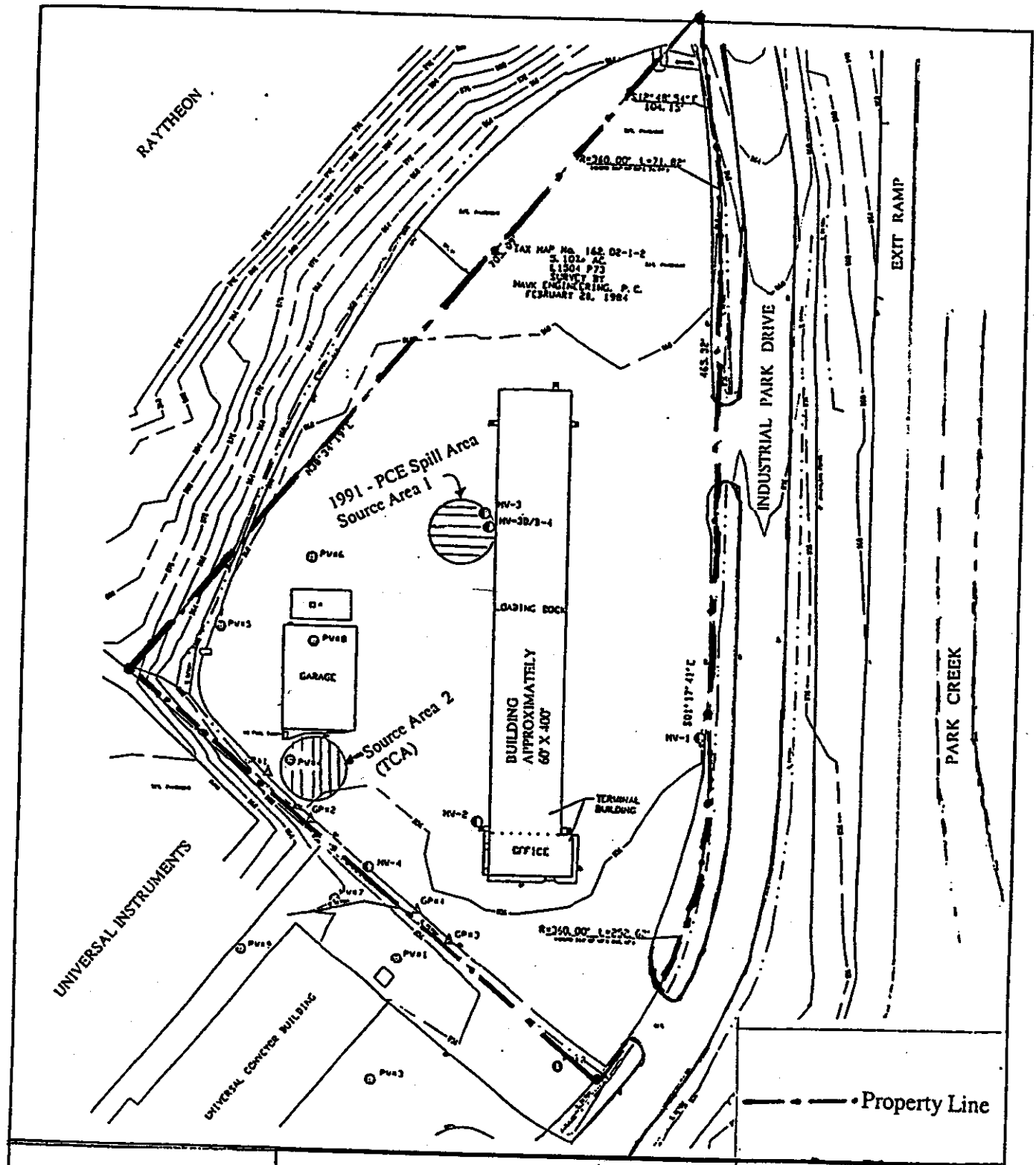
TNT-RED STAR SITE
97 INDUSTRIAL DRIVE
KIRKWOOD, NEW YORK

Figure 1

N

0 500 1000 1500 2000
FEET

Scale 1:24,000



Site plan
TNT-Red Star Site
Site No. 7-04-028
Kirkwood, New York

Figure 2

NOT TO SCALE

3.2: Remedial History

On January 7, 1991, Allwash of Syracuse (now known as AAA Environmental, Inc., ["AAA"]) excavated and removed approximately 120 tons of contaminated soil and asphalt as a part of a spill response action. Between January 1991 and November 1991, Allwash installed and operated a soil vapor extraction system. In 1992, Allwash installed monitoring wells and began quarterly sampling and analysis. One monitoring well located in the spill area contained PCE contamination at 1200 parts per billion (ppb). Therefore, an additional downgradient well was installed near the southern property boundary in 1994. This well revealed that the groundwater contamination was migrating off-site.

Quarterly groundwater sampling confirmed that shallow groundwater is contaminated with PCE, and is migrating off-site in a southerly direction. USF Red Star Express suspended the groundwater sampling and analysis in 1995. Since the Susquehanna River and public water supply wells are located south of the site, they are potentially threatened by the site. Therefore, in December 1996, the site was placed on the New York State Registry of Inactive Hazardous Waste Disposal sites with a classification that indicates that the site presents a significant threat to public health or the environment (Class 2).

The Susquehanna River is located approximately one-half mile south of the site. Park Creek, a small tributary to the Susquehanna River, bends west across the direction of groundwater flow from the site approximately 1500 feet south of the site. Kirkwood public water supply wells are located on the northern side (same side as the site) of the river at approximately three-quarters of a mile from the site. An inactive Conklin public water supply well is located on the southern side of the river approximately one-half mile from the site (see Figure 1).

On August 20, 1998, USF Red Star Express entered into an Order-On-Consent (legal agreement) with the NYSDEC to complete a Remedial Investigation and Feasibility Study (RI/FS) for the TNT Red Star Express site.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, USF Red Star Express has recently conducted an RI/FS.

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in two phases. The first phase was conducted between February 1999 and April 1999 and the second phase between October 1999 and November 1999. A report entitled Remedial Investigation Report - TNT Red Star Express Site, August 2000 has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- Topographical survey to prepare a site plan.

- Installation of soil borings and monitoring wells for analysis of soils and groundwater as well as to determine the physical properties of soil and groundwater.

- Soil gas sampling below the concrete floor in the maintenance garage to determine if there are indications of contamination under the garage.

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the TNT Red Star Express Site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of Chapter One of the New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, for soils, site-specific background concentration levels can be considered for certain classes of contaminants.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported either in parts per billion (ppb) or in parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The soil borings installed at the site indicate that the shallow overburden is relatively silty with small amounts of sand and gravel and extends to a depth of 8 to 14 feet from the ground surface. A sand layer extends below the shallow overburden to a depth of about 22 below the ground surface. Below about 22 feet below the ground surface, there appears to be a low permeability layer consisting of sequences of clay with varying amounts of silt, sand and gravel.

A high yield aquifer exists in the shallow sand and gravel outwash deposits in the area. This sole-source aquifer provides potable water for the towns and villages in the area. The limits of the aquifer are uncertain but may fall within the site boundaries. It is not known if there is a hydraulic connection between the site groundwater and the aquifer. The regional groundwater flow in the area of the site is south to southwest, towards Park Creek and the Susquehanna River.

4.1.2: Nature of Contamination

As described in the RI report, many soil and groundwater samples were collected at the site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs are volatile organic compounds (VOCs).

The contaminants of concern are tetrachloroethene (PCE), and 1,1,1-trichloroethane (TCA). Toluene was detected in one groundwater sample exceeding SCGs.

Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of EXCEEDING SCGs/Background	SCG/ Bkgd. (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	ND to 1,500	34 of 48	5
		1,1,1-Trichloroethane (TCA)	ND - 3,500	7 of 48	5
		1,1 - Dichloroethane	ND - 230	5 of 48	5
		1,1 - Dichloroethene	ND - 260	3 of 48	5
		Acetone	ND - 94	2 of 48	50
		Toluene	ND - 6.5	1 of 48	5

Notes:

1. ppb is an abbreviation for parts per billion.
2. SCGs (Standards, Criteria, and Guidance) are based on NYSDEC Class GA groundwater standards as promulgated in 6NYCRR-703, dated June 1998.
3. ND is an abbreviation for non-detect and means that the compound was not detected in one or more samples.

4.1.3: Extent of Contamination

Two distinct areas of concern at the site, based upon impacts to groundwater, are the 1991 PCE spill area (Source Area 1) and the oil/water separator area (Source Area 2) as shown on Figure 2. PCE contamination is the result of the accidental release of approximately 100 gallons of PCE in 1991. Additionally, during the remedial investigation, the groundwater in the vicinity of an oil/water separator was found to be contaminated with 1,1,1-trichloroethane (TCA). The oil/water separator is located immediately south of the maintenance garage in the south western portion of the site. TCA contamination appears to the result of maintenance activities. Table 1 summarizes the extent of contamination for the contaminants of concern in overburden groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Subsurface Soil

To determine if significant soil contamination remains in Source Areas 1 and 2, four subsurface soil samples were collected. PCE was found at 12 ppb in Source Area 1 and TCA was found at 130 ppb in Source Area 2.

These values are well below the NYSDEC's soil clean up objectives of 1,400 ppb for PCE and of 700 ppb for TCA. Therefore, there does not appear to be significant soil contamination remaining in the PCE spill area after completion of the IRMs. Sampling in the vicinity of the oil/water separator did not indicate significant soil contamination in that area.

Separator Bottoms and Ditch Soils

A sample of settled solids from the bottom of the oil/water separator was collected and was found to contain toluene at 7,600 ppb, ethylbenzene at 9,300 ppb and total xylene at 85,000 ppb. The oil/water separator was cleaned and bottoms were disposed off-site.

A soil sample was collected from the intermittent drainage swale near the oil/water separator outfall and was found to contain toluene at 540 ppb, m,p-xylene at 490 ppb and o-xylene at 360 ppb. These levels are below the NYSDEC's soil clean up objectives of 1,500 ppb for toluene and 1,200 ppb for total xylene.

Groundwater

A total of 21 groundwater samples were collected during the RI to delineate the groundwater contamination. Several compounds were identified at concentrations exceeding the groundwater standards. These compounds included PCE, TCA, acetone, 1,1-dichloroethane, 1,1-dichloroethene, toluene, and o-xylene.

The highest PCE concentration was reported in well MW-3 at 1,500 ppb (Class GA groundwater standard is 5 ppb). Well MW-3 is screened twelve (12) feet below ground surface and is located in the 1991 PCE spill area (Source Area 1). PCE was not detected in deep well MW-3D located in the spill area and screened between 32 to 42 feet below ground surface. PCE was reported in well MW-4 at 110 ppb. Well MW-4 is located near the storm sewer outfall at the southern property line of the site.

The highest TCA concentration was reported in well PW-4 at 3,500 ppb (Class GA groundwater standard is 5 ppb). Well PW-4 is located near the oil/water separator (Source Area 2). Well PW-4 was installed at

a depth of 19 feet below ground surface. Non-aqueous phase liquid (NAPL) was not observed during the investigation.

The contaminated groundwater is migrating in a south- southwesterly direction towards Park Creek and the Susquehanna River. The nearest public water supply well (Conklin well #2) is inactive and it is located approximately one-half mile from the site on the other side of the Susquehanna River. The Kirkwood public water supply wells are approximately three-quarters of a mile downgradient from the site on the same side of the river as the site. As shown in Figures 3 and 4, contaminated groundwater extends a short distance off-site beyond the southern property line of the site (perhaps a few hundred feet).

4.2: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 5 of the RI report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure (e.g., inhalation, ingestion, etc.); and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Currently, there are no completed human exposure pathways at the site. The groundwater is significantly contaminated but on-site groundwater is not used. Since the site is in the vicinity of a sole-source aquifer, there is the potential for future exposures if contaminated groundwater on-site or off-site were to be extracted for use. Therefore exposure pathways that could exist in the future include:

- ingestion, inhalation of vapors, or dermal contact with contaminated groundwater extracted for use.

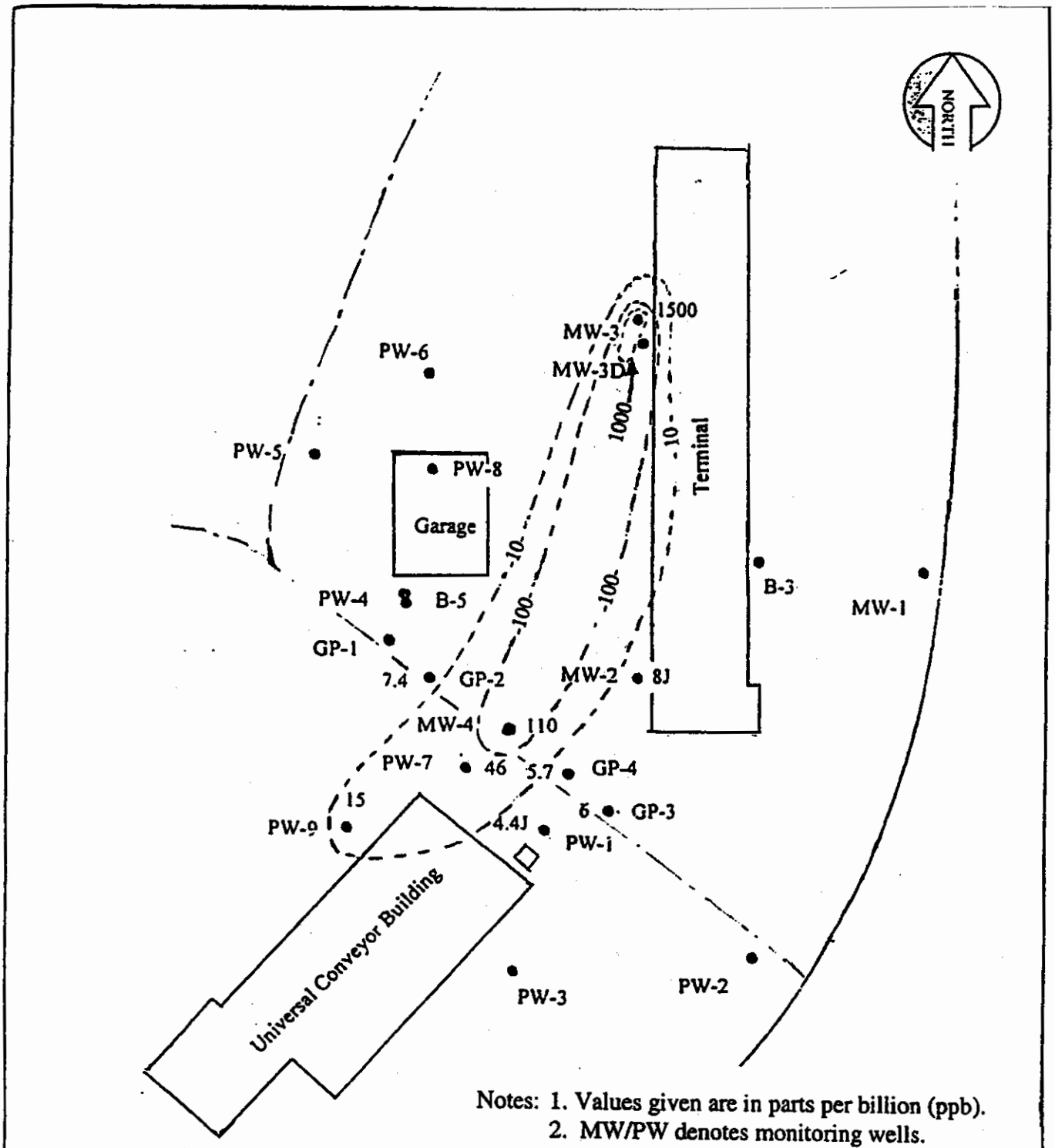
4.3: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site.

The TNT Red Star Express Site and the areas surrounding the Site are primarily industrial. The direction of groundwater flow is to the south, towards the Susquehanna River which is approximately one-half mile south of the site. The nearest water way is Park Creek, a small tributary to the Susquehanna River. The creek runs north-south approximately 350 feet to the east of the site. Approximately 1500 feet south of the site, Park Creek bends west across the direction of groundwater flow from the site. Groundwater contamination associated with the site extends a few hundred feet south of the site. Since contaminated groundwater does not reach surface water bodies, there are no fish and wildlife concerns at this site. However, if site is not remediated, the contaminated groundwater will continue to migrate towards Park Creek and Susquehanna River.

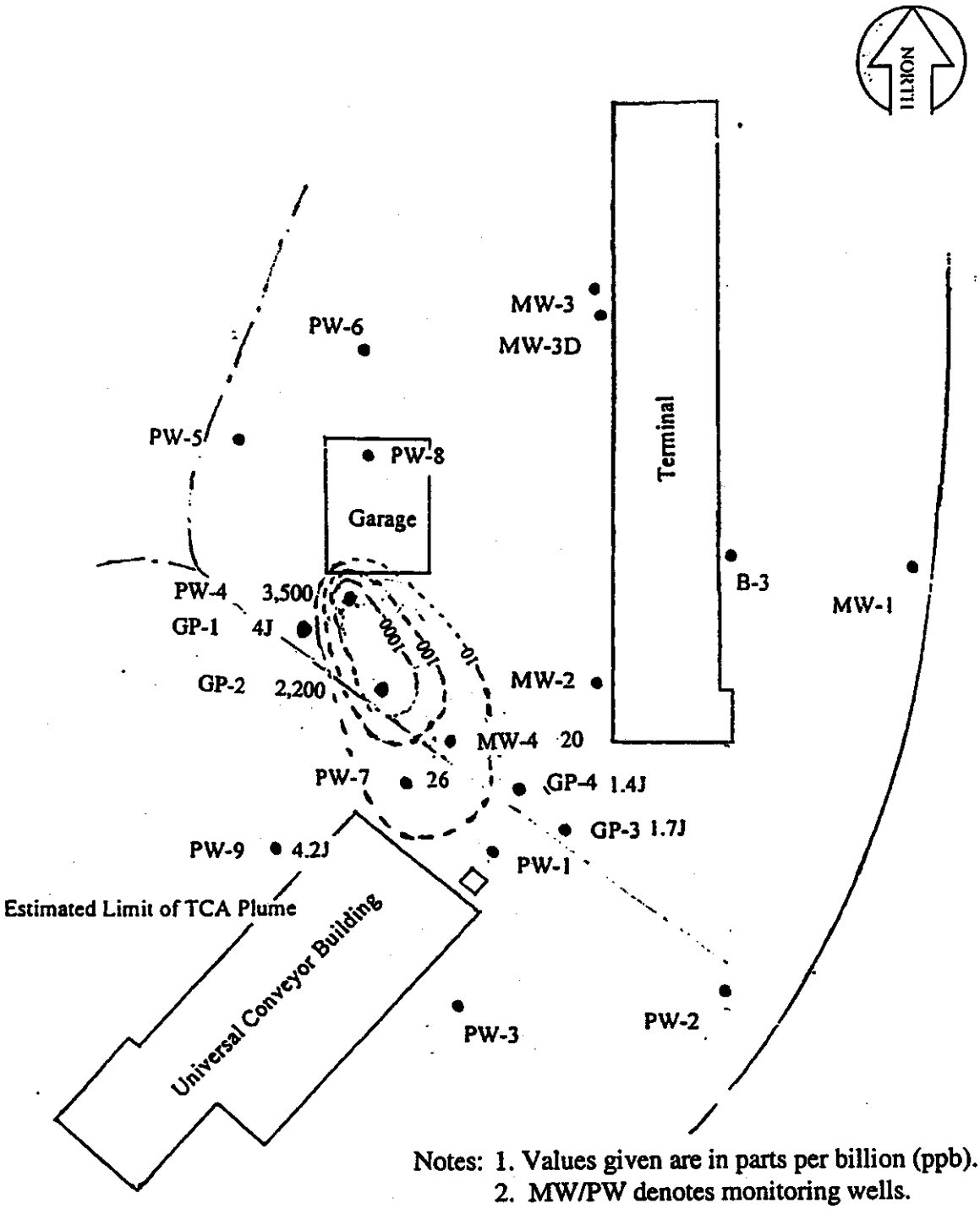
SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.



Notes: 1. Values given are in parts per billion (ppb).
2. MW/PW denotes monitoring wells.
3. GP denotes Geoprobe wells.

TNT RED STAR EXPRESS SITE 97 Industrial Park Drive Town of Kirkwood, New York	PCE CONCENTRATIONS CONTOUR MAP FIGURE - 3 (NOT TO SCALE)



Notes: 1. Values given are in parts per billion (ppb).
2. MW/PW denotes monitoring wells.
3. GP denotes Geoprobe wells.

TNT RED STAR EXPRESS SITE
97 Industrial Park Drive
Town of Kirkwood, New York

TCA CONCENTRATIONS
CONTOUR MAP
FIGURE - 4
(NOT TO SCALE)

The Potentially Responsible Parties (PRP) for the site, documented to date, include: USF Red Star Express, Inc., 400 Delancy Street, Newark, New Jersey.

On August 20, 1998 USF Red Star Express entered into an Order on Consent, Index # B7-0521-97-09, with the NYSDEC to complete a Remedial Investigation/Feasibility Study at the Site.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria and NYSDOH drinking water standards.
- Eliminate, to the extent practicable, future direct contact with the contaminated groundwater.
- Reduce, to the extent practicable, the level of groundwater contamination on-site and off-site, particularly in the designated source areas.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the TNT Red Star Express site were identified, screened and evaluated in the report entitled Feasibility Study Report TNT Red Star Express Site, dated October 2000.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy. The time to implement is an estimation of the time to achieve the remedial objectives. The actual time to achieve the clean up objectives may vary considerably.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminants of concern in groundwater at the site.

Alternative 1. *No Action*

Present Worth: ..... *$ 0*
Capital Cost: ..... *$ 0*

Annual O&M: ..... *$ 0*
Time to Implement ..... *N/A*

The No Action alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2. ***Limited Action***

Present Worth: ..... *$ 25,600*
Capital Cost: ..... *$ 8,100*
Annual O&M: ..... *$ 2,010*
Time to Implement ..... *10 Years*

The Limited action alternative is the same as No Action alternative except that it requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. This alternative assumes that annual groundwater monitoring would be conducted in existing on-site wells for 10 years. During each monitoring event, six wells would be purged and sampled, and water levels in all the on-site wells would be measured. Groundwater samples would be analyzed for VOCs. Although the time of implementation is assumed to be 10 years, it is unlikely that the remedial objectives would be achieved in 10 years.

Alternative 3. ***Air Sparging/Vapor Extraction***

Present Worth: ..... *$ 169,000*
Capital Cost: ..... *$ 82,000*
Annual O&M: ..... *$ 26,000*
Time to Implement ..... *4 years*

This alternative would involve placement of air sparging wells and vapor extraction wells or trenches for the removal of the VOCs from groundwater. The air sparging system would pump air into the groundwater to strip the VOCs from the groundwater. The temperature of air would be increased if necessary to facilitate the removal of the VOCs. The off gas from the sparging process would then be collected by a vapor extraction system. Vapor extraction is a process which creates air flow through the soil above the water table by applying a vacuum to collection piping in the soil. The collected vapor is treated to remove contaminants prior to discharge to the atmosphere. Four air sparging wells would be installed to cover approximately 2,500 square-feet in each of the two source areas. A pilot test would have to be completed to determine the correct spacing and number of wells. Air sparging would be done at a depth of approximately 20 feet below ground surface or 7 to 10 feet below water table.

Alternative 4. ***In-Situ Bioremediation***

Present Worth: ..... *$ 98,500*
Capital Cost: ..... *$ 83,500*

Annual O&M: ..... *$ 8,500*
Time to Implement ..... *3 years*

This alternative involves installation of wells or injection points to introduce nutrients or microbes ("additives") into the groundwater to enhance the biodegradation of contaminants. Contaminants would biodegrade in-place by the microbes digesting or mineralizing the contaminants as a part of their food source producing carbon dioxide and water. The presence of breakdown products of TCA in the oil water/separator area suggests that microbial digestion is already occurring in Source Area 2. Approximately 25 to 30 boreholes spaced at 10 foot intervals would be installed in each source area. Each borehole would require about 60 pounds of additive. Introducing nutrients and microbes into the groundwater would require monitoring during the treatment phase to evaluate the progress of the treatment and to make any needed adjustments. A treatability study would be required to determine the correct mixtures to stimulate biological activity. The remediation is expected to take 1.5 to 3 years.

Alternative 5. ***Groundwater Collection and Treatment***

Present Worth: ..... *$ 123,500*
Capital Cost: ..... *$ 61,500*
Annual O&M: ..... *$ 19,000*
Time to Implement ..... *5 years*

This alternative involves the installation of extraction wells to collect contaminated groundwater in the vicinity of the 1991 PCE spill area and the oil/water separator area. The collected groundwater would be treated and discharged to the nearby drainage ditch. It is estimated that two extraction wells each pumping at the rate of 0.4 gallons per minute (gpm) would be needed in the 1991 PCE spill area and two extraction wells each pumping at the rate of 0.26 gpm would be needed in the oil/water separator area. A water treatment system (likely air stripping) would be used to remove the contaminants from the extracted groundwater before discharge to surface water. If needed, the air stream from the water treatment system would also be treated prior to release to the atmosphere.

Alternative 6. ***In-Situ Bioremediation and Groundwater Collection***

Present Worth: ..... *$ 120,500*
Capital Cost: ..... *$ 84,500*
Annual O&M: ..... *$ 19,500*
Time to Implement ..... *2 years*

Like Alternative 4, this alternative also involves the installation of wells or injection points to introduce nutrients or microbes ("additives") into the groundwater to enhance the biodegradation of contaminants. Groundwater collection would also be used to increase the flow of groundwater through the contaminated source areas. Pumping groundwater from the center of the source areas would assist in the spread of additives into contaminated zones and assist in shortening the remediation time. One or more groundwater extraction wells would be placed in each source area and located with the intent to capture contaminated groundwater which exceeds a total concentration of 1 ppm VOCs (see Figures 5 and 6). Extracted groundwater would be treated using a biological reactor using the same types of microbes introduced in the ground through the injection wells. A portion of the treated groundwater would be re-introduced into the

groundwater zone. Contaminants would be biodegraded in-place by microbes producing carbon dioxide and water.

The presence of breakdown products of TCA in the oil water/separator area suggests that biodegradation is already occurring in Source Area 2. Introducing nutrients and microbes into the groundwater would require monitoring during the treatment phase to evaluate the progress of the treatment and to make any needed adjustments. A treatability study would be required to determine the correct mixtures to stimulate biological activity. The remediation is expected to take 1.5 to 3 years.

By removing the source, the remainder of the plume is expected to attenuate over time. Monitoring would be required to confirm that the concentrations of contaminants in the plume are declining satisfactorily. If not, additional action (e.g., pump-and-treat at the leading edge of the plume) would be needed.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

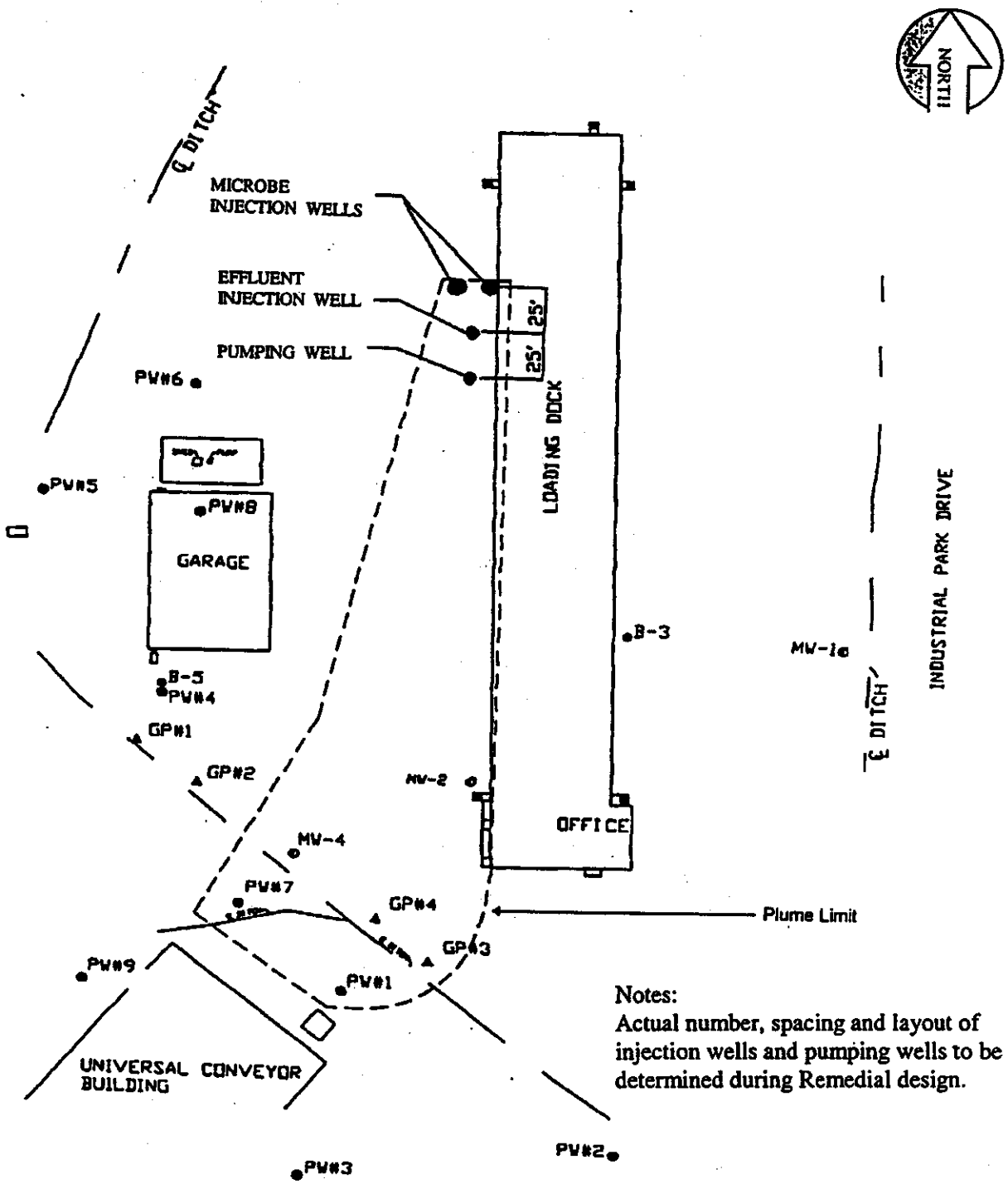
1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

The site-specific SCGs are identified in Section 4 of the FS report. The main SCGs identified for this site are: NYSDEC Class GA Groundwater standards as promulgated in 6 NYCRR 703, dated June 1998; NYSDEC Part 212 (air emission controls), and Air Guide-1 ("Guidelines for the Control of Toxic Ambient Air Contaminants).

Alternatives 1 and 2 would not achieve compliance with the chemical-specific SCGs for groundwater in a reasonable amount of time. Alternatives 3 to 6 are expected to eventually achieve compliance with the chemical-specific SCGs. Since Alternative 6 would combine bioremediation with pump and treat, it would have a better chance of achieving SCGs in a reasonable amount of time. By removing the source, the remainder of the plume is expected to attenuate over time. Monitoring would be required to confirm that the concentrations of contaminants in the plume are declining satisfactorily. If not, additional action (e.g., pump-and-treat at the leading edge of the plume) would be needed.

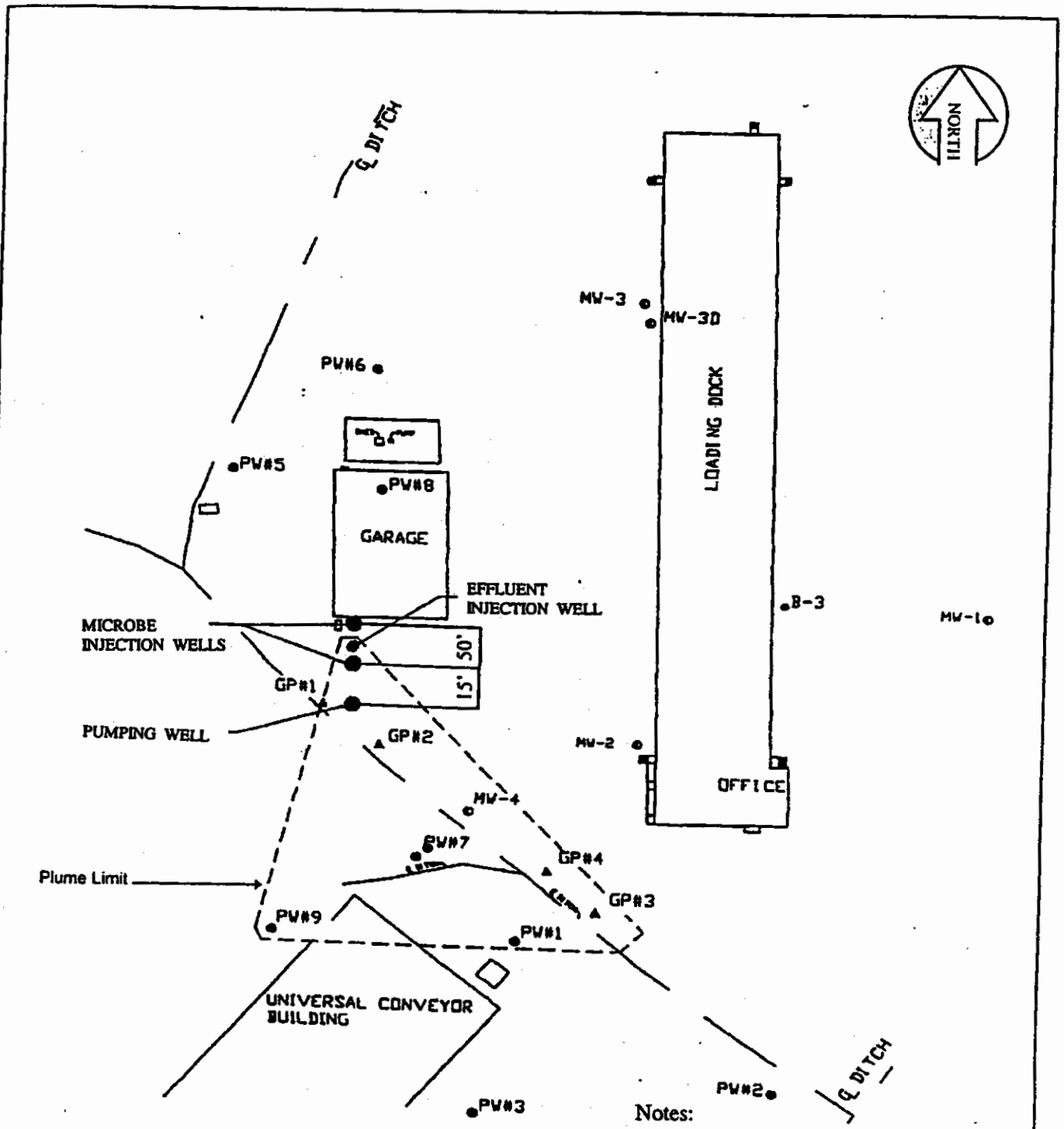
Each alternative evaluated would comply with action-specific SCGs; approvals necessary for implementing these alternatives would be obtained before initiating the remedial action. No location-specific SCGs were identified.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.



Notes:
Actual number, spacing and layout of injection wells and pumping wells to be determined during Remedial design.

Title: Layout of Alt. 6 for PCE Spill Source Area, TNT-Red Star Express Site - Kirkwood, New York Prepared For: USF Red Star, Newark, New Jersey	LEADER Leader Environmental, Inc 6400 Krueg Road-Suite 3000 Pittsford, New York 14534 (716) 248-2413 FAX (716) 248-2834	Project: 250.001 Date: 8-25-00 Scale: 1" = 85'	Drawn: PVS Checked: MPR File Name:	Figure: 5



Notes:
Actual number, spacing and layout of injection wells and pumping wells to be determined during Remedial design.

Title
Layout of Alt.6 for Oil/Water Separator-Waste Oil Tank Source Area
TNT-Red Star Express Site - Kirkwood, New York

Prepared For
USF Red Star
Newark, New Jersey

LEADER
Leader Environmental, Inc
640 Krog Road-Suite 300
Pittsford, New York 14534
(716) 248-2413
FAX (716) 248-2834

Project 250.001
Date 8-25-00
Scale 1" = 85'

Drawn PVS
Checked MPR
File Name

Figure 6

Alternatives 3 through 6 would be protective of human health and the environment by removing contaminants from the groundwater. The different methods used in these alternatives have implications for the overall effectiveness and time needed to achieve the remedial objectives. The presence of fine materials (e.g., silt) in the formation could reduce the effectiveness of air sparging. This results in the estimate that Alternative 3 would take longer to complete compared to Alternatives 4 and 6. Alternative 4 would take approximately 3 years to implement. Any byproducts under Alternative 4 would stay in the ground. Alternative 5 would take about 5 years to implement whereas Alternative 6 would take about two years to implement.

Alternatives 1 and 2 do not provide for adequate protection of the environment regarding on-site contaminated groundwater.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternatives 3, 4, 5 and 6 involve intrusive work, which could cause releases of contamination during installation of the remedial systems. Under Alternatives 3, 4, 5, & 6, installation of injection and extraction wells could generate dust and vapors that could migrate around the site causing potential risks to the workers via the inhalation pathway. Suppression measures would be used to decrease the generation of dust, and air quality monitoring would be used to determine if additional personal protective equipment would be necessary.

During the design of the remedy, a Community Health and Safety Plan would be developed to insure that persons living or working in the vicinity would not be affected by remedial activities. Alternatives 1 and 2 would not cause releases of contamination.

Under Alternative 3, air sparging and vapor extraction would strip the contaminants from groundwater. A decision about the need to treat the extracted vapors would be made during the design phase.

Alternatives 3 to 6 would take approximately one to two months to construct. The time to implement and achieve remedial action objectives for Alternatives 3, 4, 5 and 6 is estimated to be 4, 3, 5 and 2 years respectively.

Alternatives 5 and 6 rely, in part, upon the long-term operation of the groundwater pumping system to achieve the remedial action objectives. Although these systems are reliable, they can break down and require regular inspection and maintenance.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternatives 1 and 2 would rely upon natural attenuation as the only mechanism for achieving the remedial goals. Since this would not occur in a reasonable amount of time and releases of contaminated groundwater to off-site areas would continue, these alternatives are not considered effective or permanent.

Alternatives 3 through 6 employ permanent treatment by the removal and destruction of contaminants to achieve the remedial goals for the site. These alternatives are considered to be effective and permanent.

Under Alternative 3, the air sparging would strip the contaminants from groundwater. A soil vapor extraction system would then collect the contaminants sparged from the groundwater. Some of the contaminants might be adsorbed by the overlying soil during this process. Sampling and monitoring after remediation would be needed to determine if this occurred and if it presented a threat to groundwater.

Under Alternative 4, the contaminants would biodegrade in place. If the biodegradation is not complete, the remaining contamination and byproducts could present a threat to groundwater quality. In this case, additional steps would need to be taken to address the threat.

Alternatives 5 and 6 both include extracting contaminated groundwater for treatment and are considered to be effective and permanent. Alternative 6 would achieve the remedial action objectives in lesser time than Alternative 5.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 1 and 2 would not reduce the toxicity, mobility or volume of on-site contaminants, except as occurs through natural attenuation.

Alternative 6 would provide for the greatest reduction of toxicity and volume (mass) of on-site contaminants by combining groundwater extraction and treatment with bioremediation.

Alternatives 5 and 6 provide for the greatest reduction of mobility of on-site contaminants, as the groundwater pumping would reduce or eliminate, to the extent practicable, off-site migration of the contaminated groundwater.

Alternative 3 would provide moderate benefit for the reduction of toxicity, mobility and volume of on-site contaminants, as the alternative would reduce contaminant concentrations in groundwater in Source Areas 1 and 2.

Each of the treatment technologies in Alternatives 3-6 are irreversible. Once the groundwater is treated, the contamination would be removed from the site or destroyed. In some cases, the concentration of contaminants in groundwater *rises* after treatment has apparently reduced levels to low concentrations. This effect, sometimes called "rebound," (recontamination) occurs because soils are often non-uniform and contain pockets of low conductivity (tight soils that do not transmit water or air easily) that slowly leach out trapped contaminants over time. This is most common with groundwater pump-and-treat remedies. The problem can be minimized with careful design and operation of the system.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to

monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and equipment is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternatives 1 and 2 are easily implementable.

Alternatives 3, 4, 5 and 6 are technically implementable with available methods, equipment, materials and services. Under Alternatives 3, 5, and 6, it would be necessary to treat the vapors from the treatment systems to meet the NYSDEC requirements for allowable concentrations of VOCs in air. Alternatives using in-situ bioremediation (Alternatives 4 and 6) would require a treatability study to be conducted to select the proper amounts and types of nutrients and/or microbes.

Alternatives 3, 4, 5 and 6 all are administratively implementable.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. A "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised. No significant public comments were received.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 6, In-Situ Bioremediation and Groundwater Pumping and Treatment as the remedy for this site.

This selection is based on the evaluation of the six alternatives developed for this site. The site groundwater is contaminated with VOCs (PCE and TCA in particular). The contaminated groundwater is migrating off-site. The first two alternatives, the "No Action" or the "Limited Action" alternatives, will not comply with the threshold criteria and are not protective of the environment. Therefore, the "No Action" or the "Limited Action" alternatives are not selected.

The tight soil conditions at the site make the effectiveness of Alternative 3 (Air-Sparging) uncertain. A pilot study would be needed to determine the effectiveness of the system and design details (e.g., the correct spacing for the air sparging and vapor extraction wells). Under the air sparging alternative, it would be necessary to treat the air emissions to meet the NYSDEC requirements for allowable concentrations of VOCs in air. There is also a potential for sparged contaminants to adsorb onto the overlying soils creating a recontamination threat.

The remaining three alternatives are similar with respect to the majority of the balancing criteria. Alternative 4 provides for the treatment of the contaminated groundwater within Source Areas 1 and 2 using in-situ

bioremediation. The presence of 1,1-DCA and DCE in Source Area 2 suggests biological breakdown of TCA and favorable conditions for bioremediation. Alternatives 4 and 6 would both require implementation of a treatability study to determine the correct mixtures needed to stimulate biological activity.

Alternative 5 (Groundwater pumping and treatment) is used extensively for the remediation of VOCs. However, it is likely that, by itself, this approach would have to be continued for a long time before SCGs could be achieved. Alternatives 5 and 6 provide for the greatest reduction of mobility of on-site contaminants, as the groundwater pumping would eliminate, to the extent practicable, migration of the groundwater from the source areas.

Alternative 6 - In-Situ Bioremediation and Groundwater Pumping, combines the advantages of Alternatives 4 and 5. The time to implement Alternative 6 is estimated to be 2 years as compared to 5 years for Alternative 5 and 3 years for Alternative 4. The cost to implement Alternative 6 is less than Alternative 5 and only slightly more than Alternative 4. At this site, bioremediation will help to reduce the amount of contamination in saturated soils to concentrations below what is possible with pump and treat alone.

The estimated present worth cost to implement the remedy is $120,500. The cost to construct the remedy is estimated to be $84,500 and the estimated average annual operation and maintenance cost for 2 years is $19,500.

The elements of the proposed remedy include the following:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved.

2. The installation of a groundwater extraction and treatment system. An extraction well centered around monitoring well MW-3 will remove contaminated groundwater from the 1991 PCE spill area for treatment. An extraction well centered around the oil/water separator will remove TCA contaminated groundwater for treatment and provide for the containment of the groundwater on-site. Extracted groundwater will be treated using a biological reactor. A portion of the treated groundwater will be re-introduced into groundwater through injection wells.

3. A treatability study to effectively design the bio-remediation system.

4. The installation of injection wells around the two source areas to introduce nutrients and/or microbes into groundwater for in-situ treatment of the contaminants.

5. Implementation of a long-term monitoring program to evaluate the effectiveness of the system will be instituted as a component of the O&M Plan for the site. Existing and/or newly installed monitoring wells will be used to monitor the groundwater quality periodically for VOCs. By removing the source, the remainder of the plume is expected to attenuate over time. Monitoring will be required to confirm that the concentrations of contaminants in the plume are declining satisfactorily. If not, additional action (e.g., pump-and-treat at the leading edge of the plume) will be needed; and

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
1. No Action	$0	$0	$0
2. Limited Action	$8,100	$2,010	$25,600
3. Air Sparging/Vapor Extraction	$82,000	$26,000	$169,000
4. In-Situ Bioremediation	$83,500	$8,500	$98,500
5. Groundwater Pumping and Treatment	$61,500	$19,000	$123,500
6. In-Situ Bioremediation and Groundwater Pumping and Treatment	$84,500	$19,500	$120,500

Notes: 1. Total Present Worth costs calculated at 5% discount rate are based on 0, 10, 4, 3, 5 and 2 years for the Alternatives 1 through 6 respectively.

2. The annual O&M costs shown are for the first year. The annual costs for subsequent years may be different depending upon frequency of sampling, and are factored in total present worth calculations. For detailed cost break down refer to appendix "A" of the FS report.

6. To prevent future exposures to contaminated groundwater, the Department will seek to have restrictions placed upon the use of groundwater at the site. This will help to prevent future exposures to any residual groundwater contamination.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A repository for documents pertaining to the site was established.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- A fact sheet was mailed in November 1998.
- A fact sheet and a notice of public meeting to present the proposed remedial action plan was mailed in December 2000.
- A public meeting to present the proposed remedy was held on December 19, 2000.
- In February 2001, a Responsiveness Summary was prepared to address the comments received during the public comment period for the PRAP.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

TNT RED STAR EXPRESS SITE
Kirkwood, Broome County, New York
Site No. 7-04-028

The Proposed Remedial Action Plan (PRAP) for the TNT Red Star Express Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on December 5, 2000. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated groundwater at the TNT Red Star Express Site. The preferred remedy included installation of a groundwater extraction and treatment system in Source Areas 1 and 2 to remove contaminated groundwater for treatment; installation of injection wells to introduce nutrients/microbes to enhance the biodegradation of contaminants; and a long term operation, maintenance, and monitoring program.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on December 19, 2000 which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. No written comments were received. The public comment period for the PRAP ended on January 8, 2001.

This Responsiveness Summary responds to all questions and comments raised at the December 19, 2000 public meeting.

The following are the comments received at the public meeting, with the NYSDEC's responses:

1. Q. How significant is the spill? Should residents panic?

   A. At this site, contamination exists in shallow groundwater about twenty feet below the ground surface and has not traveled far from the site in the ten years since the spill. The conditions are such that no one, either on site or off site, is currently being exposed to contamination. By regulation, New York State seeks to protect our groundwater resources, especially in areas where groundwater is used as a source of potable water. There is a potential threat to local water supplies and this warrants an action to clean up the site.

2. Q. How do the concentrations of contaminants compare with groundwater standards?

   A. The main contaminants of concern at this site are tetrachloroethene (PCE) and 1,1,1-trichloroethane (TCA). The highest concentrations of PCE in site groundwater was 1,500 parts per billion (ppb), which is 300 times the standard (groundwater standard for PCE is 5 ppb). The highest concentration of TCA near the garage was 3,500 ppb, which is 700 times the groundwater standard of 5 ppb for TCA. The groundwater concentration of both of these

compounds rapidly decreases downgradient and is approximately 100 ppb at the southern property line.

3. Q. How soon do you plan to start the cleanup?

   A. The various steps before the cleanup can start involve negotiation with the potentially responsible party (PRP), completion of the remedial design, and bidding and construction. The negotiations may take 3 to 6 months, the design may take about 6 to 9 months and bidding and construction may take 3 to 6 months. Therefore, the total time before clean-up may range from 12 to 21 months.

4. C. A Town of Kirkwood official indicated that the Town should be informed in advance of any action taken at the site. The Town agrees with the remedy.

   R. We will keep the Town officials informed about the activities at this site.

APPENDIX B

Administrative Record

Administrative Record
Remedial Investigation/Feasibility Study
TNT Red Star Express Site
Site I.D. No. 7-04-028

1. File Index

2. Record of Decision - February 2001

3. Proposed Remedial Action Plan (PRAP), dated December 2000

4. Notice of site classification dated December 18, 1996, and Inactive Hazardous Waste Disposal Report Form.

5. Order on Consent, Index No. B7-0521-97-09, dated August 20, 1998

6. Citizen's Participation Plan - November 1998

7. Work Plan for RI/FS of the TNT Red Star Express Ste, Dated November 1998

8. Remedial Investigation (RI) Report dated October 2000 (Volume 1)

9. Remedial Investigation (RI) Report dated October 2000 (Volume 2)

10. Feasibility Study (FS) Report dated October 2000

11. Fact Sheets dated November 1998, and December 2000

12. Letter dated June 22, 1999 from NYSDEC to Leader Environmental, Inc., regarding additional field work.

13. Letter dated October 7, 1999 from NYSDEC to Leader Environmental, Inc., regarding oil water separator.

14. Letter dated May 22, 2000 from NYSDEC to Leader Environmental, Inc., regarding comments on RI report.

15. Letter dated May 22, 2000 from NYSDEC to Leader Environmental, Inc., regarding comments on FS report.