PLEASE NOTE:

RE:
Remedial Design/ Work Plan (02/10/1999)
Site # V00195 - Mineral Springs Road Site

The large Plan drawings in Appendix B: Figures 1, 2 , 3, 4, and 5, have not been scanned for this document.

They are available for review in the original document located in the NYSDEC Region 9 Division of Environmental Remediation library.

- **David Szymanski, EPS-1 (09/06/2011)**

Remedial Design / Work Plan

Mineral Springs Road Site
Buffalo, New York

Prepared For:

NATIONAL FUEL GAS DISTRIBUTION CORPORATION
10 Lafayette Square
Buffalo, New York 14203

Prepared By:

RETEC ENGINEERING, P. C.

Under Contract To:

REMEDIATION TECHNOLOGIES, INC.
1001 West Seneca Street, Suite 204
Ithaca, New York 14850

RETEC Project No.: 3-2075-680

February 10, 1999

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Statement of Limitations

Work for this project was performed, and this remedial design prepared, in accordance with generally accepted professional practices for the nature and condition of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of National Fuel Gas Distribution Corporation for specific application to the Mineral Springs Road former manufactured gas plant site in Buffalo (and West Seneca), New York. No other warranty, express or implied, is made.

1 Introduction

This document presents the Remedial Design / Work Plan and technical specifications for the remedy at the Mineral Springs Road former manufactured gas plant (MGP) site in Buffalo and West Seneca, New York. It has been prepared in accordance with the provisions of the Voluntary Cleanup Agreement (VCA) [National Fuel Gas, 1998] between the New York State Department of Environmental Conservation (NYSDEC) and National Fuel Gas Distribution Corporation (NFG).

This Work Plan has been prepared by RETEC Engineering, P.C., under contract to Remediation Technologies, Inc. (RETEC) on behalf of NFG. This Work Plan addresses surface soils, subsurface soils, historic MGP structures, surface water, and groundwater at the site. The proposed actions comprise the remedial action plan for the Mineral Springs MGP, which will be undertaken to protect human health and the environment, and will meet applicable regulatory requirements.

1.1 Site Description

The Mineral Springs Road former MGP site lies in a mixed industrial and residential area of Buffalo and West Seneca, New York.

The stratigraphy of the site consists of several feet of soil and fill, a nearly continuous upper confining clay layer (UCL), a groundwater bearing strata of silt, sand, and gravel, and a lower confining clay layer (LCL).

Approximately 3.0 acres of subsurface purifier residuals and approximately 3.0 acres of subsurface NAPL impacted soils have been delineated above the UCL. Approximately 4.3 acres of subsurface NAPL impacted soils have been delineated between the UCL and LCL. Analytical results indicate that the NAPL materials are non-hazardous hydrocarbons except for the interior contents of Separator Pit 2 which may be hazardous for benzene.

Except for on-site personnel performing excavations in impacted soil, the environmental risk to on- and off-site receptors associated with this site is negligible.

1.2 Project Responsibilities

The principal organizations involved in permitting, designing, and construction at the site will be NFG, NYSDEC, RETEC, and Contractors.

1.2.1 National Fuel Gas Distribution Corporation (NFG)

As the site Owner, NFG is responsible to NYSDEC for the remedial design, construction, and evaluation, in accordance with the VCA. NFG has the authority to monitor and control the quality of construction and related activities to ensure conformance with the engineering design plans and specifications. NFG has the authority to select and dismiss contractors to assist them with fulfilling these responsibilities. NFG also has the authority to select and accept or reject design plans and specifications, and materials and workmanship of the contractors and subcontractors.

1.2.2 New York State Dept. of Environmental Conservation (NYSDEC)

NYSDEC will review NFG's remedial designs, plans, and specifications for substantial compliance with the agency's regulations. Any substantial deviations from the requirements or approved design plans and their potential effect on the schedule must be approved by NYSDEC.

1.2.3 Remediation Technologies, Inc. (RETEC)

RETEC is the Engineer responsible to NFG for the remedial design in accordance with the contract between RETEC and NFG. RETEC will also be conducting field engineering during the work and will prepare the Construction Complete Report.

1.2.4 Contractor

The Contractor(s) referred to in this Work Plan will be selected by NFG from among qualified remedial construction companies. The Contractor(s) will be responsible for the performance of the work in accordance with the specifications incorporated in this Work Plan.

1.3 Project Approach

The objective of the work is to provide a remedy which, in the context of reasonably foreseeable land use, is protective of human health and the environment, does not damage structures or properties, and is financially practicable. Therefore, the remedy will integrate removal and isolation technologies to achieve this goal.

The scope of work is based on the results of several phases of previous investigative and remedial work at the site:

- An **oil-water separator** pit (Separator Pit 1) in the central area of the site was investigated and remediated by Keystone Environmental Resources, Inc.[Keystone, 1990]. Subsequent investigation and remediation of soil near the pit was performed by Empire Soils [Empire, 1995] and RETEC [RETEC, 1995]

- In 1997, a **Preliminary Site Assessment (PSA)** was conducted by RETEC. The PSA included sampling and analysis of surface soil, subsurface soil, sediment, surface water

and groundwater as well as RCRA hazardous characteristics testing of selected media. The results of the PSA are presented in the *Preliminary Site Assessment Report for the Mineral Springs Road Former Manufactured Gas Plant Site, West Seneca, NY* [RETEC, 1997].

- A follow-up investigation **(PSA Addendum)** was conducted in early 1998. The investigation included additional subsurface soil sampling, deep soil borings, monitoring well installation and separator pit sampling and analysis. The results of the investigation were presented in the *Addendum to the Preliminary Site Assessment Report, Mineral Springs Road Former MGP Site* [RETEC, 1998a]. During the conduct of the follow-up investigation, an interim remedial measure was completed at the site which consisted of the removal of a deposit of purifier box residuals from beneath an electrical transmission tower at the site. In the PSA Addendum, RETEC recommended several remedial actions for the site.

Upon further discussions between NFG, NYSDEC, NYSDOH, and RETEC, the elements of this Work Plan were developed and refined. The scope of work described in this Work Plan will consist of six major components:

- **Selective capping**, and limited off-site disposal, of four areas containing a total of approximately 4.5 acres of subsurface purifier box waste residuals. The details of this action are described in **Section 2** of this Work Plan.

- **Placement of a protective cap** within those areas of the Eastern Drainage Ditch where surface water is in contact with coal tar residuals. The details of this action are described in **Section 3** of this Work Plan.

- **Excavation, transport, and off-site disposal** of hydrocarbon contaminated soils and rubble from in and around Separator pits 2 and 3 and the subsurface deposit of tar around SB-26. The details of this action are described in **Section 4** of this Work Plan.

- **Installation of a NAPL recovery test well** and extraction system near DB-3. The details of this action are described in **Section 5** of this work Plan.

- **Continued groundwater sampling and analysis** to partially evaluate the effectiveness of the above remedial measures and to monitor against long term contaminant migration. The details of this action are described in **Section 6** of this work Plan.

- **Installation of additional chain link security fencing** along the site property line. The details of this action are described in **Section 7** of this work Plan.

General requirements and specifications for conducting the work are described in **Section 8** of this Work Plan.

Design Figures are included in the pockets in the appendix to this Work Plan.

2 Action A - Capping of Purifier Box Waste Areas

2.1 Performance Criteria and Design Basis

Capping contains and isolates contaminated soil through placement of clean materials over the existing substrate. Reduction of infiltration will reduce mobilization of contaminants to the groundwater. The cap will be placed over areas known to contain subsurface deposits of soil impacted by purifier box waste, effectively preventing direct contact by humans and environmental receptors.

NFG intends to maintain the existing site surfaces and usage. Three different capping systems will, therefore, be used to cap the purifier box waste areas:

- Seeded top soil over a compacted clay liner,
- Gravel and/or seeded top soil over a 40 mil HDPE synthetic liner,
- Asphalt pavement over a gravel subbase.

2.2 Technical Specifications

The Construction Drawings of the Purifier Box Waste Caps are presented in Figure 2 and Figure 3.

2.2.1 General

The Contractor shall submit to the Engineer for approval the manufacturer's literature for each synthetic material proposed by the Contractor.

The Contractor shall submit to the Engineer for approval the sieve analyses (ASTM D 422) of each earthen material proposed by the Contractor.

In the Technical Execution Plan referred to in Section 8, the Contractor shall describe the equipment and methods to be used to conduct this work.

The Contractor's sequence of activities shall be as follows:

1. Establish decontamination area and erosion controls.

2. Clear and grub areas shown on the Construction Drawings.

3. Excavate and/or grade existing surface material to design depth.

4. Dispose of excavated material off-site unless otherwise requested by NFG.

5. Roller compact exposed subgrade.

6. Place additional clean, compacted subgrade fill as necessary.

7. Conduct survey of as-built compacted subgrade.

8. Place cap and drainage materials as per Construction Drawings.

9. Restore site and complete as-built survey.

For the purpose of this work, clearing shall be defined as the off-site removal of all above ground vegetation. Grubbing shall be defined as the off-site removal of all woody plant root stocks. Grubbed materials shall be assumed contaminated unless otherwise specified by the Engineer.

The Contractor shall employ a licensed New York State land surveyor to conduct the as-built survey and to provide field verification of excavation depths as necessary and as requested by the Engineer. Surveyed points shall be on a 50 foot (maximum) grid.

The Contractor shall grade and redistribute only native materials deemed uncontaminated by the Engineer. Contaminated native materials above design depth shall be excavated and disposed of off-site. The Contractor shall stabilize, sample and analyze, transport and dispose of materials in compliance with the acceptance criteria of the selected disposal facility. NFG will provide temporary materials staging areas following consultation with the Contractor.

The Contractor shall compact all subgrades and imported gravel and clay by three passes with a vibratory steel-wheeled roller or by three passes with a walk-behind tamper.

2.2.2 Soil/Clay Cap

The Contractor shall construct the clay cap areas as shown in the Construction Drawings.

Clay materials shall conform with ASTM D2487 Group Symbol CL to CH for clay liner. Clay materials shall be free of lumps greater than 2 inches, rocks greater than 1 inch, organic matter and debris. Clay materials shall have a minimum of 40% passing a No. 200 sieve.

Clay shall be placed and compacted in lifts of 6 inches or less. Clay surfaces shall be scarified prior to placement of the following clay layer.

The Contractor shall demonstrate that the in-place clay has a permeability of less than $1x10^{-6}$ cm/s by conducting falling head permeability tests. These tests shall be conducted under the Engineer's observation and prior to placement of top soil.

Top soil shall be fertile, friable, natural loam, having the following approximate analysis:

Clay	10% - 30%
Sand	10% - 60%
Silt	30% - 70%
Organic matter	> 5%
Percent passing 2-inch sieve	100%
pH	5.5 - 7.0

Grass seed mixture shall be approved by NFG, shall compliment existing grass areas, and shall comply with the tolerance for purity and germination established by the Official Seed Analysts of North America. The surface of all disturbed areas of the site shall be seeded with the supplier's recommended lbs/acre of seed and maintained to NFG's satisfaction by the Contractor until a vegetative cover is established in the area.

The southern-most cap shall include a clay cut-off wall as shown in Figure 3. The cut-off wall shall extend the full southern perimeter of the cap to a depth of 4' to 8' as determined by the Engineer in the field.

2.2.3 Gravel/Soil/HDPE Cap

The Contractor shall construct the HDPE cap area as shown in the Construction Drawings.

HDPE liner shall be 40 mil thick. Contractor shall construct and test all seams as per manufacturer's recommendations. To prevent punctures, 8 oz/yd non-woven geofabric shall be placed above and below the HDPE.

Top soil shall conform to the specifications provided in Section 2.2.2.

Run of bank gravel shall be 100% passing a 3-inch sieve and free of organic matter and debris.

Other gravels specified in the Construction Drawings shall conform with section 703-02 of the NYSDOT Standard Specifications (NYSDOT, 1990).

Gravel shall be placed and compacted in lifts of 6 inches or less.

2.2.4 Asphalt Cap

The Contractor shall construct the asphalt caps as located in the Construction Drawings.

The asphalt caps shall be placed directly on native material except on the southern haul road where the Contractor shall place and compact an additional 6 inches of run-of-bank gravel as shown in Figure 3.

The Contractor shall smooth and re-compact those areas to be capped which are not currently paved.

Asphalt cap placed over existing pavement (as delineated in Figure 3) shall consist of:

- Petromat (or equivalent) placed to manufacturer's specifications over the old pavement, then
- A 1 ½ inch thick (minimum) asphalt wearing course placed over the Petromat.

Asphalt cap placed over existing gravel areas shall consist of:

- One layer of woven geofabric placed over compacted gravel, then
- A 4½ inch thick asphalt binder course, then
- Petromat (or equivalent) placed to manufacturer's specifications, then
- A 1 ½ inch thick (minimum) asphalt wearing course placed over the Petromat.

Petromat product literature is provided in the Appendix.

Woven geofabric shall have:
Chemical compatibility for the intended use,
Grab tensile strength greater than or equal to 300 lbs,
Puncture strength greater than or equal to 120 lbs, and
Percent elongation less than or equal to 15%.

Asphalt materials shall conform with Section 401-2 of the NYSDOT Standard Specifications (NYSDOT, 1990) for Type 3 (binder) and Type 7 (wearing) bituminous plant mixtures.

Asphalt shall be placed with a paving machine, then steel-wheel compacted (three passes). Perimeter edges of asphalt caps shall be sloped and buried to prevent damage from snowplows and to seal edges with adjacent clay caps, where applicable.

A seal coat of sprayed-on asphalt shall be applied to all finished asphalt surfaces.

3 Action B - Capping of Eastern Drainage Ditch

3.1 Performance Criteria and Design Basis

Capping contains and isolates contaminated soil through placement of clean materials over the existing substrate. The cap will be placed over sediment surfaces in the Eastern Drainage Ditch where the Upper Confining Clay Layer (UCL) is less than 12 inches thick. This action will effectively reduce the rate of exfiltration of coal tar residuals into the ditch water column.

Waves, groundwater currents and bioturbation are not expected to be of sufficient magnitude to cause cap erosion. Future maintenance of the ditch, however, must not include excessive dredging.

3.2 Technical Specifications

The Construction Drawing of the Eastern Drainage Ditch Cap is presented in Figure 4.

Contractor's sequence of activities shall be, to the extent practical, as detailed in Section 2.2.1.

The Contractor shall temporarily dam and dewater the Ditch prior to excavation and capping.

Contractor shall pump uncontaminated upstream water around the work area directly to the Class D stream. Work area water shall be discharged to the Class D stream following suitable in-line treatment (including, but not limited to, a baffled frac tank equipped with sorbent booms) to assure compliance with 6 NYSCRR 703.2.

The Contractor shall maintain, and the Engineer will monitor, surface water quality in the Class D Stream in accordance with 6 NYSCRR 703.2 which states in part:

> Regarding turbidity - "No increase that will cause a substantial visible contrast to natural conditions".
>
> Regarding oil and floating substances (sheen) - "No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease".

The Contractor shall remove all standing water from the work area prior to excavating sediments. It is anticipated that continuous discharges of infiltrating groundwater shall be minimized by damming, excavating and capping the Ditch in sections, as determined by the Engineer in consultation with the Contractor.

The Contractor shall assume all liability for environmental impacts to the Class D Stream, the Calais Avenue storm sewer and the Buffalo River resulting from this work during the period that this work is in process.

Contractor shall remove the existing 42 inch diameter (southern) culvert pipe and all associated road crossing fill material. These materials shall be stockpiled on-site if deemed by the Engineer to be uncontaminated.

The Contractor shall dewater excavated sediments, to the extent practical, by consolidating the material into stockpiles within the Ditch prior to removal from the Ditch. The Contractor shall then place excavated material directly into lined roll-off boxes.

The Contractor shall stabilize the material for disposal by adding kiln dust or an equivalent approved by the Engineer. The kiln dust may be added directly to the material in the Ditch or after the material is placed in the roll-offs, depending on site conditions and as directed by the Engineer in consultation with the Contractor. The Contractor shall maintain dust levels below NYSDEC TAGM 4031 requirements.

The Contractor shall stabilize, sample and analyze, transport and dispose of the sediments in compliance with the acceptance criteria of the selected disposal facility.

Approximately 650 cubic yards of in-situ sediments are to be removed (final volume to be field determined). The Contractor shall employ a licensed New York State land surveyor to conduct pre- and post-excavation surveys to calculate the volume of in-situ sediments removed. No payment to the Contractor will be made for dredging beyond limits requested by the Engineer.

The Contractor shall employ a licensed New York State land surveyor to conduct the as-built survey and to provide field verification of excavation depths as necessary and as requested by the Engineer.

Contractor shall excavate sediments to the design depth and laterally on both sides to the existing Upper Confining Clay Layer (UCL) and to the Engineer's satisfaction.

The Contractor shall provide and place one layer of woven geofabric below the clay cap. Clay shall then be placed and compacted in lifts of 6 inches or less. Additional (woven or non-woven) geofabric may be placed between clay lifts, at no additional cost to NFG, to facilitate stability of the clay during compaction. All geofabric seams shall overlap as per manufacturer's recommendation.

Contractor shall construct clay cut-off walls as shown in Figure 4.

Woven geofabric placed below the cap shall have:

a. Chemical compatibility for the intended use,
b. Grab tensile strength greater than or equal to 500 lbs,
c. Puncture strength greater than or equal to 120 lbs, and
d. Percent elongation less than or equal to 20%.

Clay materials shall conform with ASTM D2487 Group Symbol CL to CH for clay liner. Clay materials shall be free of lumps greater than 2 inches, rocks greater than 1 inch, organic matter and debris. Clay materials shall have a minimum of 40% passing a No. 200 sieve.

Contractor shall construct a road crossing as shown in Figure 4.

- HDPE liner shall be 40 mil thick. Contractor shall construct and test all seams as per manufacturer's recommendations. To prevent punctures, 8 oz/yd non-woven geofabric (not shown in Figure 4) shall be placed above the HDPE.

- Culvert material shall be 48 inch diameter corrugated metal pipe, galvanized and bituminous coated, 12 gage minimum wall thickness, two 20 foot lengths plus end sections.

- Backfill shall consist of run-of-bank gravel as specified in Section 2.2.3. Backfill shall be compacted to 95% standard proctor in 6 inch lifts. Lifts shall be added evenly on both sides of pipe. Other material available on-site may, upon approval from Engineer, be used as backfill.

- Woven geofabric placed within the road crossing above the HDPE shall have:

    a. Grab tensile strength greater than or equal to 300 lbs,
    b. Puncture strength greater than or equal to 120 lbs, and
    c. Percent elongation less than or equal to 15%.

Contractor shall install up to four identical signs at locations determined by NFG. Signs shall be yellow and black reflective and shall conform to NYSDOT dimensional sizes as appropriate for intended use. Signs shall warn of existence of cap and prohibit dredging, exact wording to be approved by NFG.

In the Technical Execution Plan referred to in Section 8, the Contractor shall describe the equipment and methods to be used to place the Eastern Drainage Ditch Cap.

4 Action C - Excavation of Separator Pits and Tar Boils

4.1 Performance Criteria and Design Basis

Excavation, removal and off-site transport of hydrocarbon impacted soils eliminates the environmental risk of the soils to on-site receptors.

The PSA [RETEC, 1997] and the PSA Addendum [RETEC, 1998a] roughly delineated the lateral impact of hydrocarbon residuals in and around the separator pits. Between Separator Pits 2 and 3, NAPL impacted soils extend to the Lower Confining Clay Layer (LCL) at a depth of 22 feet. Groundwater was encountered at approximately six feet below ground surface at the time of the sampling event. The material in the bottom three feet of Separator Pit 2 was determined to contain a hazardous petroleum and tar residual with 3.2 mg/L TCLP benzene. The material in the bottom one foot of Separator Pit 3 was determined to contain a non-hazardous petroleum hydrocarbon with only 0.12 mg/L TCLP benzene. The concrete bottoms of both Separator Pits were encountered at eight feet below ground surface.

The PSA Addendum recommended excavation and removal of up to 1800 cubic yards of the most impacted soil and debris from above the water table, including the contents of Separator Pits 2 and 3 (approximately 400 cubic yards). This action is consistent with the work previously performed for Separator Pit 1 in October, 1989 [Keystone, 1990].

4.2 Technical Specifications

The Construction Drawing of the Separator Pits and Tar Boils Excavation is presented in Figure 5.

4.2.1 General

Clean native fill and asphalt pavement material within the excavation area will be reused on site as appropriate by NFG. Native material will be determined to be clean by the Engineer using olfactory and visual observations and a photo-ionization detector (PID) and the "jar headspace" method.

Impacted materials shall be profiled, manifested, and transported to off-site disposal facilities as proposed by the Contractor and approved by NFG.

Maintenance of excavation sidewalls shall be the responsibility of the Contractor.

Approximate delineation of underground utilities will be provided by NFG. Protection of existing facilities and utilities shall be the responsibility of the Contractor.

In the Technical Execution Plan referred to in Section 8 (and to be approved by NFG), the Contractor shall describe the equipment and methods to be used for excavation, staging, and transportation of materials, and the location and name of off-site receiving facilities to be used.

4.2.2. Tar Boils

An accumulation of surface and subsurface tar-like material will be removed from the area shown on Figure 5 and as directed visually by the Engineer in the field.

The materials shall be excavated and direct-loaded into lined roll-off boxes or dump trucks for transport off-site. After removal, the condition of the excavated areas will be documented by the Engineer in the field logs and with photographs.

No confirmation sampling will be conducted.

The excavation shall be backfilled to restore the former ground surface with clean run-of-bank gravel. A 3-inch layer of topsoil shall be added to the excavated area. The top soil shall be seeded, fertilized, mulched and maintained until a vegetative cover, comparable with existing vegetation, is established in the area.

4.2.3 Separator Pits

The oils and sludges encountered in the pits shall be directly pumped or vacuumed into a tanker truck, or containerized as directed by the Engineer. Impacted solid material (fill and tar-like materials) shall be direct-loaded into lined roll-off boxes. Excavation within the separators shall proceed until the majority of the solid materials are removed. Excavation outside the separators shall proceed downwards to the water table and laterally to the satisfaction of NFG. Hand tools shall then be used as necessary to remove visible debris from the separators' surfaces. It is anticipated that significant staining will remain.

No confirmation sampling will be conducted.

Following the remediation of the separator pits, the floor of each separator shall be sufficiently fractured to ensure that infiltrated water will drain freely from the remediated structures.

Removal of the separators will not be required unless requested by NFG.

The excavation pit and cleaned separators shall then be backfilled with clean run-of-bank gravel. The gravel shall be compacted with an excavator bucket to 4 feet below ground surface (bgs). From 4 feet bgs to 6 inches from the surface, compaction shall be as per

Section 2.2.1 in 12-inch lifts. Six inches of asphalt pavement shall then be placed as per Section 2.2.4, the edges of which shall be blended into the adjoining existing pavement.

5 Action D - Installation of NAPL Recovery Test Well

5.1 Performance Criteria and Design Basis

NAPL recovery in contaminated soil, where feasible, would provide permanent removal of contaminant mass from the site. In the application of NAPL recovery technology, NAPL is drawn from the subsurface using specially designed pumps. The recovered NAPL is piped to a collection tank, from which it is periodically transported to a permitted disposal or recycling facility.

NFG believes that if tests show this technology to be feasible, it could effect partial mass removal of contaminants from the soil. Specifically, the test will determine the feasibility of contaminant mass removal from the subsurface area below the eastern drainage ditch and determine the flowable and pumpable characteristics of the NAPL.

The LCL below the area of interest slopes toward former soil boring DB-3 and this location is expected to act as a collection point for NAPL. The soil at this point was observed to be highly saturated with NAPL.

The test system will consist of a specialized (constant low flow) pump, a 6-inch-diameter black iron casing with 0.020 slot stainless screen advanced 2 feet into the LCL, a flow rate controller, a NAPL holding tank and an insulated shed.

Construction and operation of the test system will consist of the following activities:

- (By NFG/Engineer) Installation of the test well.
- (By Contractor/NFG/Engineer) Installation of all other components followed by mechanical and electrical checks and documentation of the as-built system.
- (By NFG/Engineer) Operation of the test system - Initially the production rate will be manually monitored, adjusted and optimized. Following a one year test period, the feasibility of continued NAPL recovery will be assessed. If further NAPL recovery is feasible, the system will be operated until a maximum quantity of 5 gallons or less per week of NAPL is recoverable over a period of four consecutive weeks. Recovered NAPL will be transported off-site to a permitted recycling/disposal facility.

The NAPL Recovery Test Well, as proposed, will provide recoverability data such as viscosity, density, and total NAPL recovered over time vs recovery pump rate. Disposal options will be evaluated based on analyses of BTU/lb, % ash, % water, and TCLP characteristics. If the test indicates that significant removal of NAPL is reasonably possible, additional mapping of the LCL contours and product lens thickness will be conducted to optimize placement of up to two more NAPL recovery systems; one near the Separator Pits, and one further downgradient of the test system.

5.2 Technical Specifications

The Construction Drawing of the NAPL Recovery Test system is presented in Figure 4.

The recovery test well will be installed by NFG and the Engineer prior to placement of the insulated shed. NFG will provide the following materials for installation by the Contractor:

- Pump - Pump Works model PW-2000 or equivalent, with mounting bracket.
- Pump controller - Pump Works PW-2000 Series Variable Rate Controller.
- Float switch - Flotect model L6 or equivalent with 1 inch NPTM fitting.
- Teflon tubing and connections.
- Electric space heater - 110 volt, appropriate wattage.
- Interior flourescent lights.

The Contractor shall provide and install the following:

A. Insulated Shed

d. General construction - Prefabricated *or* site-built.

e. Siding - Metal with baked enamel coating *or* T-111 with three coats exterior paint, both sides.

f. Roof - Metal with baked enamel coating *or* ½ inch CDX plywood with aluminum drip edge and 30# asphaltic roofing felt and shingles.

g. Foundation - 5½ inch concrete slab-on-grade with 4x4 welded wire mesh *or* prefabricated alternate capable of minimizing settlement and decay and approved by Engineer.

h. Insulation - 2 overlapping layers of 2 inch thick extruded polystyrene ("blue board" or equivalent) screwed to interior walls and ceiling.

i. Dimensions - Minimum 7'-6" ceiling clearance, minimum 2 foot clearance all around holding tank and secondary containment, minimum 2'-6" clearance between

ceiling and holding tank manway, minimum 4' x 8' clear work area around well head.

j. Access - One insulated pedestrian door, approximately 3' x 7', lockable.

k. Window - one double glazed, 18" x 24", fixed pane.

B. 2000 gallon holding tank

a. Material - HDPE

b. Dimensions - Shall comply with A.f above.

c. Manway - Factory installed.

d. All other tank wall penetrations - Vapor and water proof bung fittings.

e. Vent - 2 inch diameter PVC pipe through shed roof or wall, outlet screened against insects.

f. Secondary containment - 2200 gallon.

C. Electrical

a. Overhead power line and utility poles - Approximately 600 linear feet , 208 volt / 100 amp service, from a location identified by NFG to the vicinity of the insulated shed. Minimum 18 feet ground clearance.

b. Power drop - Utility pole placed in vicinity of the insulated shed, with transformer, weather-proof circuit breaker box, duel 150 watt flood lights, and minimum of four 110 V / 20 amp weather-proof GFI outlets.

c. Labor - Contractor shall employ a licensed electrician to install *and test* overhead power line, power drop, pump, pump controller, float switch, lights and heater to the satisfaction of the Engineer. Electrical contractors currently approved by NFG are: CIR (822-1416), BM&G (854-4588) and CVM (824-2200).

d. Project coordination - All electrical work is to be coordinated with the NFG electrical department.

6 Action E - Groundwater Monitoring Plan

This section describes actions to be taken by NFG during the long term study of groundwater quality which will occur concurrently with, and following completion of, the other actions detailed in this Work Plan.

6.1 Performance Criteria and Design Basis

The groundwater monitoring plan will provide information regarding off-site and on-site groundwater quality. This information will be used to partially evaluate the effectiveness of the remedial actions described in Sections 2, 3, 4, and 5. This information will also be used to monitor any significant migration of MGP residuals at the site. The groundwater monitoring plan was designed based on the locations of these actions, the constituents of interest established for the site, and the hydrogeologic characteristics of the site.

The following performance criteria for groundwater monitoring apply to this plan:

- Provide reliable and relevant data regarding groundwater flow direction and groundwater quality.
- Provide a set of data over an extended time period so that changes in groundwater quality or migration of MGP residuals can be observed.
- Provide information regarding groundwater quality immediately beyond the National Fuel Gas property line, downgradient of the site.
- Provide information regarding groundwater quality downgradient of each of the areas identified for action in this Work Plan.

The implementation of groundwater monitoring will consist of installing new groundwater monitoring wells, periodic collection and laboratory analysis of groundwater samples, periodic reporting and interpretation of results, and evaluation and modification of the monitoring program itself.

These activities will be performed by NFG and the Engineer and are detailed in the remainder of this section.

6.2 Installation of Additional Wells

Four new groundwater monitoring wells will be installed. The proposed locations are shown in Figure 1. MW-19 is downgradient of the NAPL impacted area below the Eastern Drainage Ditch. MW-20, MW-21 and MW-22 are at the locations of the highest cyanide concentrations detected during RETEC's off-site groundwater study (*Groundwater Testing for Cyanide* [RETEC, 1998b].

The wells will be constructed of 2-inch PVC well materials and will be installed in accordance with standard procedures. The depth interval to be screened will be determined during installation based on split spoon or macrocore samples; based on previous work the interval is currently assumed to be 12 or 15 feet bgs to 22 or 25 feet bgs. Care will be taken to seal the perforation of the upper confining clay layer with bentonite to eliminate the potential for downward migration of perched groundwater, if any. The borings will be double cased if either perched contaminants or "running sand" are encountered.

6.3 Sample Collection and Laboratory Analysis

The following descriptions provide the locations and rationale for the selected groundwater monitoring points:

- Upgradient Site Perimeter: MW-17 and MW-18.

  These wells will indicate the quality of groundwater coming onto the site. Samples from these two wells will be analyzed for cyanide (total and weak acid dissociable), BTEX, and PAHs.

- Downgradient Site Perimeter: MW-13, MW-14, MW-20, MW-21 and MW-22.

  These wells will indicate groundwater quality downgradient of the Mineral Springs site. MW-20, MW-21 and MW-22 will be located just beyond the site perimeter. MW-13 and MW-14 are located just inside the property line. Samples from these five wells will be analyzed for cyanide (total and weak acid dissociable).

- On-Site Purifier Box Waste Impacted Areas: MW-12 and MW-16.

  These wells will indicate groundwater quality below subsurface deposits of purifier box wastes. These deposits will be capped as part of the work described in Section 2. Samples from these two wells will be analyzed for cyanide (total and weak acid dissociable).

- On-Site Hydrocarbon Impacted Areas: MW-7, MW-10, MW-11 and MW-19.

These wells will indicate groundwater quality downgradient of subsurface deposits of hydrocarbon NAPL which are in direct contact with groundwater. MW-7 and MW-10 are downgradient of the separator pits action area described in Section 4. MW-11 and MW-19 are downgradient of the Eastern Drainage Ditch action area described in Section 3. Samples from these four wells will be analyzed for BTEX and PAHs.

In order to monitor the effectiveness of the Eastern Drainage Ditch Cap (Section 3), surface water quality will be monitored for cyanide (total and weak acid dissociable), BTEX and PAHs. Water samples will be collected from within four inches of the Ditch bottom near former (sediment) sampling locations SB-109 and SB-101. Another water sample will be collected from mid-depth near former (sediment) sampling location SB-96. The surface water samples will be collected, analyzed, and evaluated in conjunction with the groundwater sampling schedule.

Laboratory analysis will be done by a NYSDOH ELAP approved laboratory, with the following methods:

Cyanide (total)	Method SW 846 9010
Cyanide (weak acid dissociable)	Method SM 4500
BTEX	Method SW 846 8260
PAHs	Method SW 846 8270

One in twenty samples submitted for analysis will be a "blind blank" consisting of only de-ionized water but not labeled as such. Another one in twenty samples submitted for analysis will be a "blind duplicate" consisting of additional groundwater from a sampled location but not labeled as such. One "equipment blank" will be submitted per sampling event. In this manner, QA/QC samples will comprise greater than ten percent of the samples submitted for analysis.

Sampling will occur during the three fair weather quarters: spring (March or April), summer (July) and fall (October or November). Spring and fall quarters will provide data during high groundwater conditions, and summer will provide data during low groundwater conditions. Sampling will be conducted using standard procedures.

Water levels at all sampled wells will be measured to monitor and map the groundwater flow direction across the site.

6.4 Reporting and Evaluation

Reports of findings will be submitted to NYSDEC following the receipt of the laboratory results for each sampling round. An annual report will then be submitted summarizing and interpreting the results.

The groundwater monitoring program will continue for five years. After two years of sampling and again after five years, the program will be evaluated with regard to the

number and location of wells sampled, the parameters for laboratory analysis, and the frequency of sampling. This evaluation and any proposed changes will be included in the relevant annual reports.

7 Action F - Installation of Chain Link Security Fence

This section describes the installation of additional chain link security fence around the site boundary. This work will be conducted by NFG with the assistance of a specialized fencing contractor.

7.1 Performance Criteria and Design Basis

The Madison Wire property to the south of the Mineral Springs site is scheduled to be redeveloped as a public space. With this redevelopment comes an increased risk of trespassing. Additionally, NYSDEC has requested that improved site security be included in the Voluntary Clean-Up Agreement.

7.2 Technical Specifications

The Contractor shall install chain link fence approximately as shown on Figure 1.

The fence will pass between the electric transmission towers and the toe of the active railroad embankment near the southern property line (subject to discussions with Conrail and NMPC). The fence will continue along the centerline of the abandoned railroad embankment near the eastern property line. The fence will pass between MW-18 and an existing row of spruce trees near the northern edge of the active C&D landfill.

The fence will make three stream crossings and will include four 10' swing gates.

The total length of fence to be installed is approximately 4350 feet, length to be verified by Contractor in consultation with NFG.

All fence shall be 6 foot chain link fabric with a 1.25 inch (nom.) top bar and three barbed wire strands (angled out). All line posts shall be 2 inch (nom.) Sch 40 galvanized at 10 feet on center. Corner and gate posts shall be 2.5 inch (nom.).

All posts shall be directly driven without soil auguring.

8 General Requirements

This section describes the general requirements for conducting the work, including health and safety requirements, the Technical Execution Plan, environmental monitoring and control, and project reporting.

8.1 Health and Safety

A health and safety plan (HASP) shall be prepared by the Contractor prior to the start of work. It shall satisfy the requirements of industry standards for work at hazardous waste sites (29 CFR 1910.120), standards for the construction industry (29 CFR 1926), general industry standards (29 CFR 1910), and standards for specific hazardous materials (29 CFR 1900.1000). Subjects covered in the HASP shall include:

Health & Safety Risk Analysis
Personal Protective Equipment
Air Monitoring & Action Levels
Site Control
Decontamination
Emergency Response Plan
Lockout/Tagout
Heavy Equipment Operations
Excavation and Trenching
Material Safety Data Sheets
Health and Safety Records and Reports

The Engineer will make available to the Contractor for review a copy of the Engineer's HASP. The Contractor's HASP shall be at least as stringent as the Engineer's.

Prior to the work, the Contractor shall provide to the Engineer evidence (photocopies) of the following items for each person who will be entering the work zone:

Respirator fit test
OSHA 40 hour training or 8 hour refresher training
Annual physical

Persons without these items both on-file and up-to-date with the Engineer will not be allowed to enter the work zone.

Approximate delineation of underground utilities will be provided by NFG. Protection of existing facilities and utilities shall be the responsibility of the Contractor.

Hours of operation shall be daylight hours between 8 AM and 5 PM, Monday through Friday, unless otherwise allowed in writing by NFG.

8.2 Technical Execution Plan

A Technical Execution Plan shall be prepared by the Contractor(s) during the bidding process for this work and submitted with the Contractor(s)' bid for the Engineer's review and for NFG's approval. It shall describe the materials, equipment, methods and schedules to be used to perform the work. It shall provide resume's of key project personnel. It shall provide the names, addresses, contact persons, and other information relevant to the Contractor's proposed off-site disposal facilities for hazardous and non-hazardous solids and water. The selected Contractor(s) may be required by the Engineer to provide additional clarifications to their Plan prior to, and during the course of, the work.

8.3 Environmental Monitoring and Control

Environmental monitoring and mitigation procedures will be followed to manage impacts during construction and to control fugitive emissions.

8.3.1 Erosion and Sedimentation Control

The Contractor shall comply with the following erosion and sedimentation control measures:

- All work will be conducted in such a manner as to minimize the disturbance of vegetated areas in order to prevent erosion.
- All erosion and sedimentation control will be continuously inspected and maintained.
- All disturbed areas will be graded to promote sheet flow of runoff water and to prevent erosion.
- Erosion caused by site work will be repaired immediately.
- Seeding and mulching will be completed soon after remediation is completed.

The Contractor shall propose methods in the Technical Execution Plan to control turbidity and sheen in the Class D Stream.

8.3.2 Dust, Vapor, and Odor Monitoring

In accordance with 29 CFR 1910.120(h), an on-site air monitoring program will be implemented by the Engineer to identify and quantify airborne levels of hazardous substances to determine the appropriate level of employee protection required for personnel working on-site. Methods for monitoring work area air quality will be addressed in the Engineer's HASP.

In addition to the work area monitoring program, the Engineer will monitor community air quality upwind and downwind of the work area to provide real-time estimates of total hydrocarbons, odor and particulate releases to the community as a result of remedial activities.

The results of the monitoring will be used by the Engineer to ensure that all action levels outlined in the HASP are followed. As the remediation proceeds, it may be necessary for the Contractor, at the Engineer's request, to control compounds or odors which are released due to the Contractor's activities. Either the rate of excavation shall be reduced or engineering controls such as vapor suppressing foam or polyethylene sheeting shall be used as necessary to cover the exposed materials.

8.3.3 Monitoring and Control of Water Turbidity and Sheen

Stream water quality will be monitored by the Engineer. If a downstream sheen or increased turbidity is noted, the Contractor shall modify their construction methods.

The Contractor shall propose methods in the Technical Execution Plan to control turbidity and sheen during all phases of the work.

8.3.4 Mobilization, Demobilization, Decontamination

NFG will provide designated equipment lay down areas to the Contractor. The Contractor shall confine their operations to the areas designated by NFG.

During the remedial activities, the work areas shall be secured and barricaded (temporary fencing, cones and caution tape) to ensure the safety of the NFG facility workers, visitors and Contractor's personnel.

During the course of this work, the Contractor shall :

- Avoid (or repair) damage to existing structures, and
- Avoid adverse effects to human health and the environment.

Contractor shall not disrupt or hinder the work of others.

All work shall be conducted in accordance with all OSHA and local regulations.

Trucking of all materials both on- and off-site shall be done in accordance with applicable DOT standards. Trucks hauling materials to and from the site shall use only designated haul roads and shall ensure that the remedial activity does not conflict with other NFG site operations.

Equipment and personnel which come in contact with impacted materials shall be cleaned prior to demobilization from the site. Equipment decontamination procedures shall consist of a high pressure hot water wash to the Engineer's satisfaction on a decontamination pad with a sump.

All decontamination water shall be containerized on-site. Prior to transport and disposal, the water shall be tested by the Contractor according to the acceptance criteria of the Contractor's receiving facility.

Soil collected on the decontamination pad shall be combined with other excavated soil and disposed of at the Contractor's receiving facility.

Small quantities of visibly contaminated PPE, plastic and miscellaneous materials shall be containerized, tested by the Contractor and shipped off-site to the Contractor's receiving facility.

8.4 Project Reporting

Upon completion of the remedial activities, the Engineer will prepare a Final Engineering Report, approved by a professional engineer licenced in the state of New York. The following items will be included in the report:

- A description of all field work,
- As-built drawings,
- All pertinent analytical results,
- Copies of the bills of lading and manifests from the disposal of materials,
- Status of the site upon completion,
- A post-remedial Operations and Maintenance Plan, and
- Certification of the activities completed to date.

During the course of the work, the Contractor shall regularly provide to the Engineer:

- Daily field logs,
- Weekly progress reports,
- Equipment and material testing records, including analytical results,
- Weigh tickets,
- Surveyor's records, and
- Record drawings.

During the course of the work, the Engineer shall regularly provide Monthly Progress Reports to NFG which will include:

- The previous month's actions,
- Next month's planned actions,
- Sampling and analytical results,

- Reports and other deliverables submitted during the previous month,
- Design changes and other modifications to the workplan, and
- Revised project schedules and estimates of percent complete.

9 References

Empire, 1995. Site Investigation Summary Report, Mineral Springs Road Facility. June 13, 1995.

Keystone, 1990. Final Report, Cement Kiln Decommissioning, Mineral Springs Road Site, January, 1990.

National Fuel Gas, 1998. Application for Voluntary Cleanup Agreement, Mineral Springs Road Site, Buffalo, New York. August 4, 1998.

NYSDOT, 1990. Standard Specifications, Construction and Materials. Office of Engineering. January 2, 1990 with Addendum No. 1, November 18, 1993.

RETEC, 1995. Supplementary Environmental Investigation, Mineral Springs Road Former MGP Site. September, 1995.

RETEC, 1997. Preliminary Site Assessment Report for the Mineral Springs Road Former Manufactured Gas Plant Site, West Seneca, NY. November 5, 1997.

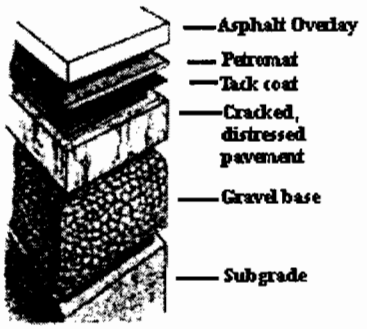
RETEC, 1998a. Addendum to the Preliminary Site Assessment Report, Mineral Springs Road Site, Buffalo, New York. May 5, 1998.

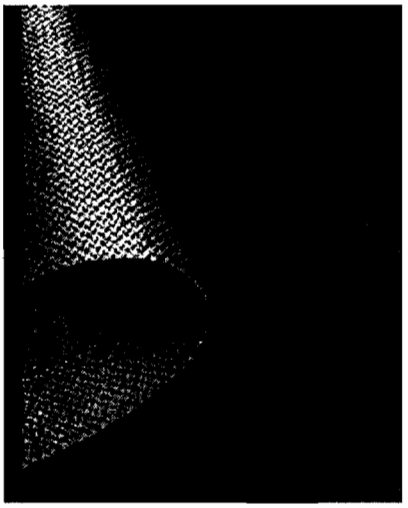
RETEC, 1998b. Groundwater Testing for Cyanide, letter report to Mr. Charles Burke, September 2, 1998.

Introduction

The Amoco Petromat® System extends the life of new asphalt pavements and asphalt overlays. The Petromat System consists of Amoco's Petromat nonwoven polypropylene fabric saturated with an asphalt tack coat. When placed between the original pavement and an asphalt overlay forming a barrier to water infiltration and reducing reflective cracking of the new asphalt surface.

Petromat is one product in a complete line of Amoco fabrics designed to improve roadway performance. Amoco Petrotac® and ProGuard® pavement repair composites are engineered specifically for localized repair of potholes joints and cracks. Amoco also manufactures a full line of both woven and nonwoven geotextiles for subgrade reinforcement stabilization and drainage





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PETROMAT PRODUCT LITERATURE

Material Properties

Petromat fabric **Petromat is a needle-punched, nonwoven polypropylene geotextile. The fabric is heat-bonded, meaning the fibers are fused, on one side to prevent bleed-through of the tack coat. The properties of Petromat 4599 are listed in the table below.**

Petromat 4599 Specifications			
Property	**Test Method**	**Units**	**Value**
Grab tensile strength	ASTM D 4632	lbs	90
Grab tensile elongation	ASTM D 4632	%	50
Mullen burst	ASTM D 3786	psi	180
UV resistance[2]	ASTM D 4355	%[3]	70
Asphalt retention	TX DOT 3099	gal/yd^2	.20
Asphalt retention	TX DOT 3099	oz/ft^2	3.0
One side heat-bonded			4

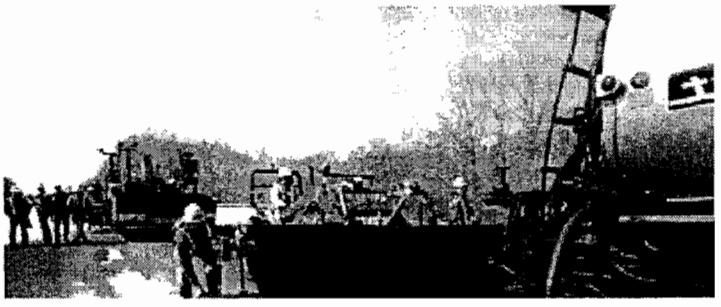
Notes:

1 Minimum average roll values

2 Fabric conditioned for 150 hours per ASTM D 4355

3 Percent of minimum grab tensile after conditioning

Tack coat **Uncut asphalt cement is strongly preferred for the tack coat. Asphalt emulsions can be used, but require considerable cure time, which delays construction. Cutbacks or emulsions which contain solvents are not recommended. Your Petromat distributor can provide more detailed information on tack coats, including material specifications and guideline construction specifications.**



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Installation

Proper installation of the Petromat System and asphalt overlay is important in assuring successful long-term performance. Detailed guide specifications and installation guidelines for paving fabric are available from your local Amoco geotextile distributor

EQUIPMENT

Asphalt distributor The distributor truck must be metered and capable of spraying the tack coat at the specified uniform application rate. It should be equipped with a hand spray nozzle to distribute tack coat in locations unaccessible by truck.

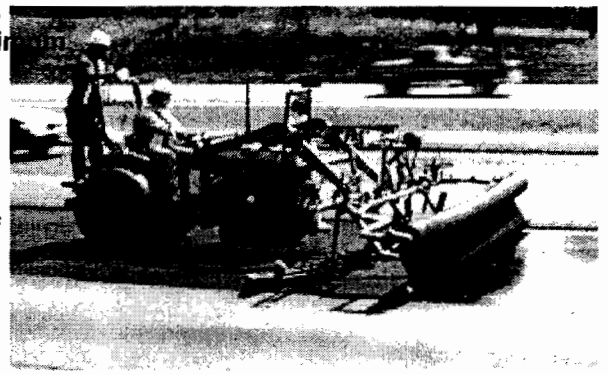
Fabric lay down equipment The fabric can be installed with a mechanical unit mounted on the front of a tractor or backhoe, or on the back of a distributor truck. This method requires only two laborers and an operator. The crew will easily outpace the paving operation. Manual units can be used for small jobs.

Miscellaneous equipment Stiff bristle brooms or pneumatic rollers are used to smooth the fabric. Scissors or blades are needed for cutting.

PROCEDURES

Surface preparation Clean the old pavement of dirt, water, oil, and foreign materials. Fill cracks, as directed by the engineer, with suitable filler (such as asphalt emulsion slurry or light-grade emulsified asphalt mixed with sand). Repair larger cracks and potholes with a properly compacted slurry, hot mix, or similar filler. Badly broken or rough pavement may require milling or placement of a leveling course before installation of the Petromat System and overlay.

Application of tack coat The tack coat must be applied uniformly at the specified rate with a calibrated distributor truck. The application temperature should be high enough to assure uniform distribution (e.g., minimum 290°F for asphalt cements, up to 160°F for heavier grade emulsions). The application width should be 6" wider than the width of the fabric.



The optimum amount of tack coat will fully saturate the fabric but not provide excess tack coat that could mix with the overlay asphalt. The optimum amount depends on the porosity of the old

pavement, ambient temperature, fabric weight, tack coat material, and other variables. Typically, 0.2 to 0.3 gal/yd² of tack coat is used with Petromat 4599. Emulsion tack coat application rates are greater than those required for ACC tack coat. Your Amoco distributor can provide more detailed information regarding tack coat application rates.

If asphalt emulsions are used, the water in the emulsion must be allowed to evaporate completely before the fabric is placed. Otherwise, bonding may be inadequate as moisture is trapped between pavement layers. Required cure time varies with emulsion type, humidity, ambient temperature, and other factors.

Fabric placement Place the Petromat fabric, smooth side up, while the tack coat is still tacky. The key to successful fabric laydown rests with the operator. Driving the vehicle straight will assure a wrinkle-free installation. Turns should be made gradually For sharp curves or corners, the fabric may need to be cut to

size and placed by hand.

Hand brooming or pneumatic rolling will eliminate small wrinkles. Large wrinkles (with a height of I " or more) should be slit and laid flat in the direction of paving. Joints should be overlapped 2" to 4". Additional tack coat must be applied to joints and between overlapped fabric layers to ensure proper fabric saturation. The tack coat temperature should not exceed 325°F

Hot mix overlay Standard paving operations should closely follow fabric laydown. All areas in which paving fabric has been placed should be paved during the same day If the fabric becomes wet, it must be allowed to dry completely before paving. A minimum compacted asphalt thickness of 1 " to 1.5" is required depending on roadway volume.

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Other Considerations

Ambient temperatures Air and pavement temperatures during installation should be warm enough for the tack coat to remain tacky after placement. Ambient temperatures should be at least 50°F and rising for asphalt cement tack coat or 60°F and rising for asphalt emulsions.

Traffic precaution Light vehicle traffic will not damage the exposed fabric. However, as a safety precaution, traffic should not be permitted directly on the Petromat fabric. If local conditions require traffic on the fabric, and if approved by the engineer, flag persons and warning signs should be posted to alert drivers that the surface may be slippery. Signs should also post the safe speed.

Pavement recycling The presence of Petromat fabric in the pavement section does not affect cold milling operations, drum-dryer recycling, or subsequent use as paving material.

Limitations The Petromat System is not a structural replacement for inadequate aggregate base or ACC. Structurally distressed pavements should be repaired prior to using the Petromat System.

The Petromat System may not retard reflective cracking in old portland cement pavement sections where there is differential vertical deflection at the joints. In such cases, the pavement slabs should be stabilized before applying the fabric. The Petromat System will also likely not be effective in preventing thermal cracking that can develop in severe climates.

In both of these limiting cases, however, the Petromat System will still provide a beneficial waterproofing layer. Through this function, the membrane will minimize secondary cracking that would otherwise occur as water infiltrates the pavement structure.

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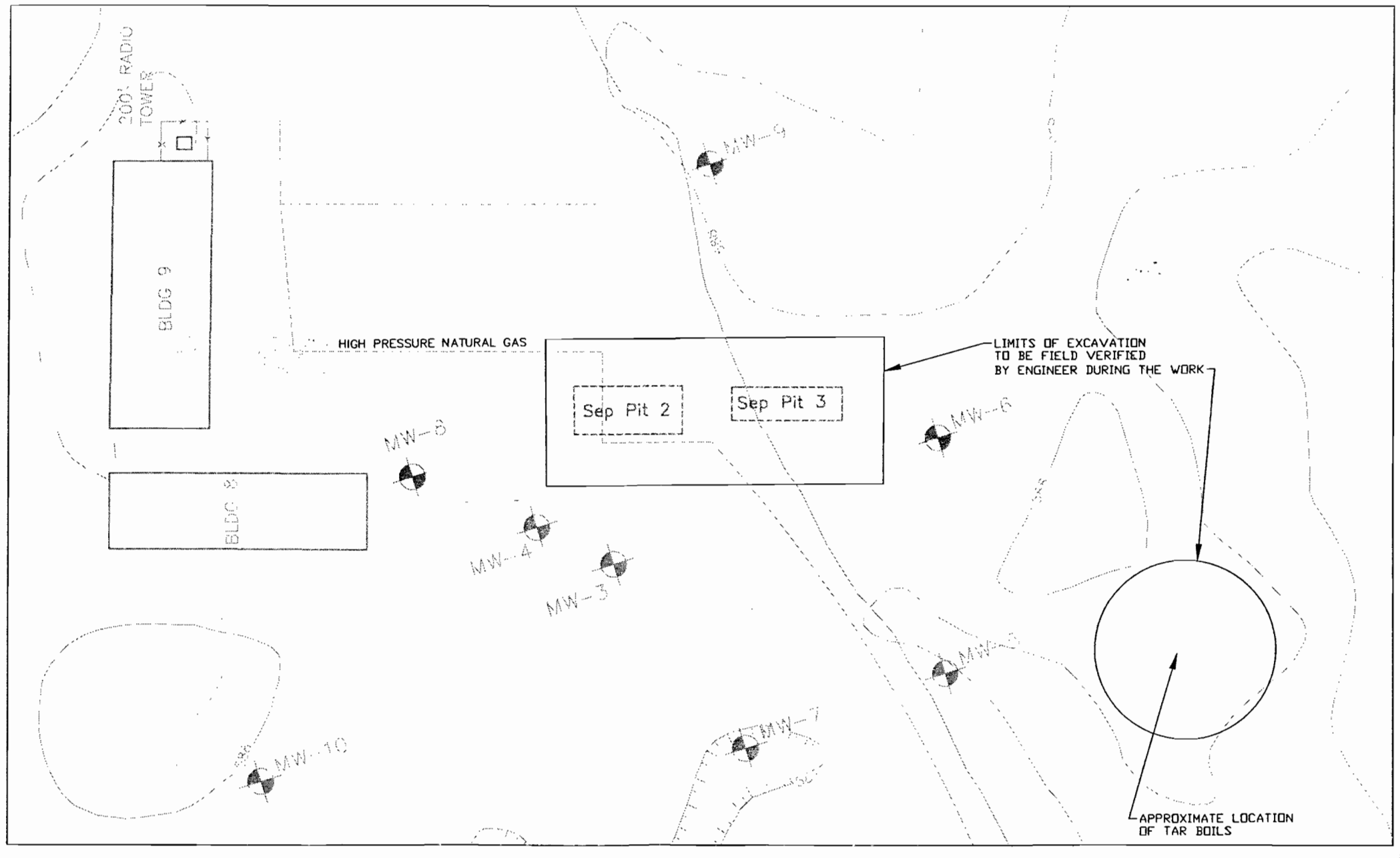

Note:
HIGH PRESSURE NATURAL GAS LINE TO BE DECOMMISSIONED BY OWNER

STATE OF NEW YORK
JOHN T. FINN
073034
PROFESSIONAL ENGINEER

REFERENCE DWG	DESCRIPTION	NO	DRAWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
		6							
		5							
		4							
		3							
		2							
		1							
		0	SC	2/9/99	FOR BID	MRH	2/9/99	JJT	2/10/99

National Fuel Gas
Buffalo, N.Y.
3-2075-680

CURRENT DATE: 2/9/99
CAD FILE: FIGURE5.DWG

Separator Pits and Tar Boil Area
Mineral Springs Road MGP Site

RETEC
RETEC ENGINEERING, P.C.
DRAWING NO. Figure 5
REV. 0