

**REMEDIATION/CONSTRUCTION REPORT
ENFORCEMENT CASE LS 2836**

**100 Bosworth Street
Providence, Rhode Island**

REMEDIATION/CONSTRUCTION REPORT

100 Bosworth Street, Providence, R.I.
Project #9248

prepared for

Piero Maggiacomo
46 Kent View Drive
Hope Valley, Rhode Island 02831

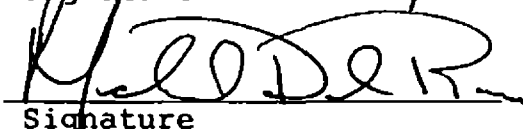
issued:

May 17, 1993

Jonathan E. Twining
Project Manager


Signature

Michael A. DelRossi, P.E.
Principal


Signature

Prepared By:

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May 14, 1993

Mr. David Sheldon, CPG, Senior Engineer
Leaking Tank Enforcement Program
Division of Water Resources
Department of Environmental Management
291 Promenade Street
Providence, Rhode Island 02908-5767

RE: Property located at 100 Bosworth Street
Providence, RI
Leaking Tank Enforcement Case LS 2836
Construction of Passive Groundwater Remediation System

Dear Mr. Sheldon:

On 4 May, 1993, the owner of the referenced property, Mr. Piero Maggiacomo, received a letter from your department stating that the remediation plan proposed by Triangle Environmental for the referenced property had been approved. On Monday, May 10, 1993, Taraco Environmental Services initiated the construction of the passive groundwater remediation system with oversight provided by Triangle Environmental. The purpose of this report is to document the actions taken during the construction of the system.

1.0 Proposed Groundwater Remediation System

The following paragraphs have been excerpted from the UST Removal and Proposed Remediation Report prepared by Triangle Environmental in October of 1992. The paragraphs describe the proposed remediation plan for the site.

"The remediation method recommended by Triangle Environmental would be the installation of a recovery trench - product recovery system. A trench would be installed between MW #2 & MW #5. An intercepting trench would be installed downgradient of the excavation. Within this trench would be a 24" corrugated pipe lined with an impermeable material."

"The remediation procedure would begin by excavating a trench approximately 10' - 14' deep into the groundwater at an area north of MW's #2 & #5 and south of the existing water hydrant. The digging would continue southerly until the oil saturated soil was no longer encountered. During the excavation, all oil saturated soil would be removed and placed on poly for proper disposal. As the trench is extended southerly, the previously excavated area would be lined with crushed stone. At the end of the excavation an intercepting crushed stone trench lined with an impermeable material would be installed. This trench would contain a 24" corrugated/perforated pipe, and would extend from the groundwater surface to grade. The gravel lined trench would, over a period of time, collect and divert oil toward the 24" pipe w/intercepting trench..."

"Initially this pipe would be monitored on a periodic (at least monthly) basis for free floating oil. The accumulated oil would be pumped into a vac truck for removal..."

2.0 Construction of the Interceptor Trench

The following is a chronological discussion of the interceptor trench construction between May 10-12, 1993.

May 10, 1993

Construction of the trench was initiated at approximately 1:30 P.M., May 10, 1993. Prior to the commencement of excavation activities, Triangle Environmental personnel checked MW-2 and MW-3 for the presence of floating petroleum product. As anticipated, there was approximately one inch of petroleum product in MW-2 and no petroleum product in MW-3. Based on this information, and the fact the MW-3 is downgradient of MW-2, it was reasonable to assume that the leading edge of the petroleum plume was between these two monitoring wells.

At the direction of Triangle Environmental, Taraco Environmental Services excavated a small test trench starting five feet north of MW-3, and extending Northeast for approximately 10-15 feet (parallel to the building). The purpose for excavating this trench was to determine the approximate location of the leading edge of the petroleum plume.

The excavator began to encounter a shale-type ledge at a depth of approximately 13 feet below surface elevation. The surface of the ledge appeared to be uneven, with ridges and depressions or valleys. Triangle Environmental personnel first noted the presence of petroleum seeping into the bottom of the excavation from the ledge in the valleys. The petroleum was seeping in on the Northern and Western sides of the excavation, or from the direction of the building. No petroleum was observed seeping into the excavation from the Eastern or Southern sides. No groundwater was encountered in this excavation.

Due to time constraints and safety concerns, Triangle Environmental personnel directed Taraco Environmental Services to fill the excavation.

May 11, 1993

On the morning of May 11, Triangle Environmental directed Taraco Environmental Services to excavate a second test trench perpendicular to the building and to the trench excavated on May 10. At approximately 13 feet of depth, Triangle Environmental encountered ledge. It was at this depth that groundwater containing petroleum product began to infiltrate the excavation a West-Southwesterly direction. Because of the ledge, excavation beyond thirteen feet was not possible with the equipment available. Approximately 10-15 cubic yards of petroleum contaminated soil and ledge were removed from the excavation.

Within one hour, approximately 1-2 feet of water had accumulated in the bottom of the excavation. The layer of petroleum on top of the groundwater was continuous, but its thickness was estimated at less than 0.1 inch.

Triangle Environmental personnel directed Taraco Environmental Services begin the actual interception trench excavation within ten feet Southeast of the second test trench. It was the intent of Triangle Environmental to install the recovery well at the Southeast end of the interceptor trench, and then continue excavating Northwest, through the second test trench, to an endpoint approximately five feet west of the corner of the building.

Taraco Environmental Services proceeded to excavate the interceptor trench beginning at what would be the Southeast corner of the trench. At a depth of approximately six feet below grade, the excavator struck and ruptured a four inch water line and a six inch drainage line. Triangle Environmental personnel immediately contacted the Providence Water Supply Board to turn off the valve in the street to eliminate the water flow. The water was turned off at approximately 10:30 A.M.

It was necessary to restore water to the nearby buildings before continuing with the excavation. Taraco employees had repaired the break by 2:30 P.M.

Due to time constraints, Triangle Environmental personnel decided to sink the recovery well at the Southeasternmost corner of the second test trench, and continue excavating the interceptor trench on the following day. Due to the apparent unavailability of 24 inch perforated pipe, an 18 inch perforated pipe was installed in the test trench. A 1-2 foot layer of crushed stone was placed in the excavation surrounding the perforated pipe. The remainder of the excavation was filled in with material originally excavated from the test trench.

May 12, 1993

On the morning of May 12, 1993, Triangle Environmental personnel directed Taraco Environmental Services to excavate the remainder of the interceptor trench from the recovery well Northwest to a point within five feet of the corner of the building. Excavation farther to the Northwest was not possible due to the presence of a water main in that area.

As the interceptor trench was excavated, Triangle Environmental personnel observed petroleum product in the cracks of the ledge beginning at a depth of approximately nine feet. The excavator was only able to excavate to a depth of thirteen feet, due to the presence of ledge. Approximately 10-15 cubic yards of contaminated soil were removed from the bottom of the excavation.

Triangle Environmental personnel noted that petroleum did not seep into the excavation from the North and Northwest sides of the excavation. Groundwater and petroleum did, however, infiltrate the bottom of the excavation from the South and Southeast corners of the excavation, from the direction of the building and the recovery well. The petroleum on the North and Northwest sides of the excavation seemed to be confined to the cracks in the ledge, and did not appear to be mobile.

A 1-2 foot layer of crushed stone was placed in the bottom of the excavation. The remainder of the trench was filled with non-contaminated soil removed from the trench.

Rationale For The Location And Construction Of The Trench

A diagram depicting the location of the interceptor trench is included in Appendix A. The rationale for the location and construction of the trench is as follows:

- (1) Groundwater flows in a Southeasterly direction at the site. Since floating petroleum product was found previously in MW-2 and MW-5, but not in MW-3, it was assumed that the leading edge of the plume was between MW-2 and MW-3.
- (2) Further excavation to the West was not possible without risking potential damage to the building and the smoke stack.
- (3) Further excavation to the North and East was not possible due to the presence of water mains and the property line (East side).
- (4) Further excavation of the trench in a Southerly direction did not appear to be necessary, due to the lack of petroleum in that area.

Monitoring Schedule

The following monitoring schedule is recommended for the recovery well:

- (1) Triangle Environmental personnel will inspect the recovery well for the presence of floating petroleum product once per month between the fifteenth and the thirtieth of the month. Triangle Environmental will prepare a status report letter to inform the RIDEM and Mr. Maggiacomo of the condition of the well. The letter will be submitted by the first of the month following the date of inspection.
- (2) Within fifteen (15) days of the date of inspection, Mr. Maggiacomo will arrange for the well to be pumped out or skimmed to remove any petroleum product from the well, if recommended by Triangle Environmental.
- (3) It is the opinion of Triangle Environmental that the amount of petroleum which will be pumped from the well each month will be in small quantities. Based on this assumption, the petroleum should be pumped from the well into drums which can be stored on site until they are full of product. The drums must be properly labeled and stored in accordance with the RIDEM hazardous waste regulations. Storage of full containers on-site will not exceed ninety days from the date that the drum becomes full.
- (4) It will be at the discretion of Triangle Environmental, based on the monthly reduction of petroleum in the well, to determine if future pumping of the well is necessary. Triangle Environmental will schedule a meeting with the RIDEM to discuss cessation of the pumping when, in the opinion of Triangle personnel, minimal oil is being removed from the well.

Work Remaining At The Site

As of Friday, May 14, 1993, Taraco Environmental Services had not completed the installation of the manhole cover over the recovery well. In addition, there is approximately 50 cubic yards of petroleum contaminated soil stockpiled and covered at the site which must be removed for disposal.