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LETTER OFFERING RECOMMENDATIONS FOR INTERIM REMEDIAL ACTION FOR BUILDING 566 NWS EARLE NJ
10/11/1995
BROWN AND ROOT ENVIRONMENTAL

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BRPH\51-10-5-41

October 11, 1995

Project Number 5085

Mr. Brian Helland
Northern Division, Code 1812
Naval Facilities Engineering Command
10 Industrial Highway, Mailstop No. 82
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62472-90-D-1298
Contract Task Order (CTO) No. 206

Subject: Building 566 Septic Field - Interim Remedial Action
Naval Weapons Station Earle
Colts Neck, New Jersey

Dear Mr. Helland:

Based on the conclusions resulting from the teleconference conducted on October 4,1995 between Northern Division Naval Facilities Engineering Command and Brown & Root Environmental (B&R Environmental), B&R Environmental offers the following recommendations for interim remedial actions for the septic system and underground storage tank (UST) area located at Building 566, NWS Earle in Colts Neck, New Jersey. The interim remedial action discussion memorandum is presented in two sections, project summary and recommended interim remedial actions. The attached Figure 1 provides a plan view of current site conditions and proposed interim action site modifications.

1.0 PROJECT SUMMARY

1.1 SITE HISTORY AND HISTORICAL DATA

Historical data relating to Building 566 operations indicate that the USTs and associated piping have resulted in releases of product to the surrounding soil and groundwater. These releases were partially remediated during the replacement of tanks. The data also indicate that release of petroleum has occurred through the piping of the septic system leach field. Data from sampling conducted during later removal of the USTs (designated as 556/1 and 556/2) indicate that petroleum and chlorinated organic solvents were present in the soil surrounding the USTs.

1.2 RECENT SITE INVESTIGATION ACTIVITIES

Field investigations were conducted by B&R Environmental during the period August 1994 through August 1995. Samples were collected and analyzed during May 1995 to confirm the presence of petroleum in soil and groundwater immediately downgradient of the septic leach field. Petroleum products were found to be present in the samples analyzed during this event. The presence of "free product" was observed approximately 50 feet downslope of the septic leach field in test borings and at seeps at the soil surface. It is believed that a high groundwater table contributed to movement of free product to the surface of the site. Additionally, a leaking water main was discovered upgradient of the site. The presence of chlorinated solvents in soil or groundwater at the site under current conditions has not been confirmed.

Three site visits conducted by B&R Environmental in January, May, and July and August 1995 suggested that groundwater was artificially raised as a result of a leaking underground water main and precipitation events occurring prior to the time of sampling. It is likely that the shallow groundwater found at the site was the result of the defective water line combined with precipitation runoff from Building 566 and the adjoining parking lot. Soil borings installed during January 1995 indicate that shallow groundwater is likely to be confined to a surficial layer of gravelly sandy soil due to the presence of an underlying confining clay layer. The thickness of the surface sand decreases from a maximum of approximately 10 feet in the UST area to a minimum thickness of a few inches just above the wetland area. The clay appears to be flat or to slope slightly upgradient toward the southwest and south. The clay layer is apparently greater than 1 foot thick. Dark stains from apparent seeps have been observed immediately upslope of the area where the clay layer reaches the surface.

2.0 DISCUSSION OF REMEDIAL ALTERNATIVES

2.1 REMEDIAL ALTERNATIVES

B&R Environmental considered seven remedial alternatives after compiling a site history and the data generated during field investigations. Alternatives such as air sparging and groundwater pump and treat systems were eliminated from consideration due to a highly variable groundwater elevation and the assumption that containment of the product plume can be achieved by controlling the flow of groundwater. (Groundwater flow is assumed to be controllable with surface runoff management mechanisms and repair of leaking pipes.) The five remaining alternatives are soil vapor extraction, bioventing, biosparging, excavation (in combination with biopiles and/or off-site disposal), and natural attenuation. Table 1 provides a summary of the results of the preliminary screening of these alternatives.

2.2 EVALUATION CRITERIA

The five remaining alternatives require the generation of additional site-specific data to determine their applicability. This information will be obtained as part of the RI proposed under CTO 226, incorporating the Building 566 area as one or the sites investigated under this CTO scope of work. The following information must be generated in order to complete the evaluation:

- Development of a current and complete fingerprint of the contaminants and concentrations.
- Determination of groundwater elevation, gradient, and flow rate throughout the site.
- Evaluation of groundwater quality upgradient of the UST area.
- Delineation (vertical and horizontal) of the clay layer that underlies the site.
- Evaluation of the impact of man-made influences that contribute to contaminant generation, release, or migration [such as leaking water pipes, leaking fuel lines (within the building or connecting the building to the USTs), building foundations, internal floor drains, and utilities].
- Determination of site soil properties including but not limited to permeability, density, pH, gradation, soil chemistry, void space, and compaction (density) parameters.
- Determination of soil microbial characteristics such as total microbial count and petroleum-consuming microbial count.
- Determination of site-specific costs for each alternative (developed after evaluation of site technical data).

3.0 RECOMMENDED INTERIM REMEDIAL ACTIONS

3.1 SUMMARY OF RECOMMENDED ACTION

B&R Environmental proposes a two-phase approach to implementing remediation activities at the subject site. The two phases are design and implementation of surface water and groundwater management interim remedial action mechanisms for control of contaminant migration and implementation of a remedial investigation (RI) provided for in CTO 226. Final remedial response action, if any, will be based on the results of the RI.

3.2 PHASE I - CONTROL OF CONTAMINATION MIGRATION

Mechanisms to control contaminant migration will be designed and implemented to minimize or prevent off-site migration of contaminated groundwater and soil until the final remedial action. Surface water runoff will be diverted away from the septic field and UST area by installing temporary curbs and redirecting flow from roof drains. Elimination of surface water run-on to the septic field area from the parking lot and roof drains will minimize erosion of soil from the UST and septic leach field areas of the site and minimize infiltration of surface water. Leaking water utilities contributing to local groundwater flow will be isolated or repaired. By controlling the flow of groundwater, it is anticipated that both the horizontal and vertical flow rate of subsurface contamination will be reduced, stabilized, and largely contained.

Reducing surface water and groundwater flow through the site may impact the downgradient wetland area. Man-made flow from leaking pipes will be eliminated. Flow diverted around the leach field will be directed to the downgradient wetland areas. Naturally occurring flow volume to the wetlands should remain relatively unchanged.

3.3 RECOMMENDED PHASE I INTERIM REMEDIAL ACTION ACTIVITIES

B&R Environmental recommends the following interim remedial actions:

1. Isolate all leaking pipes that contribute to localized groundwater flow by closing valves or repairing the leaks. If it is determined that repairs to the pipes cannot occur, the leaking pipes should be isolated until final remediation is completed.

2. Install piezometers upgradient of the USTs and downgradient of the septic leach field. The piezometers or monitoring wells should be installed using "push-point" methods. A minimum of seven piezometers will be required. Figure 1 shows the proposed location of the piezometers.

3. Survey the entire site for topography and significant features and for the development of site drawings. The development of two drawings is recommended, one showing the building and surrounding area and one showing the building area and adjoining areas. These drawings could be developed using previously proposed Geographic Inventory System (GIS) technology described under CTO 231. A soil erosion and sediment control plan used to manage storm water runoff (discharge to wetlands) would be developed using these drawings.

4. Conduct sampling from the piezometers (conducted as part of the RI). A minimum of three rounds of sampling are recommended. The first round of sampling would occur as soon as possible after the new piezometers were installed and prior to repair of leaking water utilities. Sampling parameters would include groundwater elevation, groundwater quality parameters, and soil quality parameters. Groundwater and soil would be sampled and analyzed for the presence of volatile and semivolatile organic compounds including chlorinated solvents and petroleum hydrocarbons. Two subsequent rounds of sampling for groundwater elevation only would also be required. The first round of sampling would be conducted during or immediately after the isolation or repair of the leaking pipe. The subsequent round of sampling would be conducted a sufficient time after isolation or repair of the leaking pipe is completed or nearing completion.

What is additional? Nothing

5. Install surface water management mechanisms. The mechanisms would include a temporary curb located immediately upgradient of the USTs at the edge of the asphalt paving. The curb would divert surface water from the paved parking lot around the USTs and septic leach field. The curb could be constructed from sand bags or installed as a permanent feature using asphalt or concrete. The surface water management mechanisms would also include diverting flow from the roof drain downspouts away from the UST and septic leach field area. The downspout flow can be redirected using polyvinyl chloride (PVC) or corrugated polyethylene drainage pipe. Minor removal and replacement of asphalt paving may be necessary if disruption of traffic flow around the building is a concern. This removal and replacement would be associated with installation of pipe under the driveway to minimize impact to traffic over the long term. Rip-rap would be installed at the discharge location of the curb and redirected roof downspout outfalls. Since rip-rap currently exists on the southwest slopes leading away from the building, it is likely that only one outfall to the east would require design and installation.

6. Empty the septic settling tank by pumping if it is not already empty and isolate flow from the building into the tank. This should be done after isolation or repair of the leaking water supply pipe.

In summary, B&R Environmental recommends immediate implementation of interim remedial actions described above and the initiation of RI work under CTO 226.

B&R Environmental appreciates the opportunity to submit the recommendations detailed above. If you agree with the approach, please contact us immediately. We will then revise and re-issue applicable CLEAN contract scope of work, schedule, and budget documents. If you have questions or comments, please contact me at your earliest convenience.

Sincerely,

Richard Gorrell

Richard Gorrell
Proiect Manager

RM/vb

c: Richard McGuire (B&R Environmental)
John Trepanowski, P.E. (B&R Environmental)
Michael Turco, P.E., DEE (B&R Environmental)
Russell Turner (B&R Environmental)

TABLE 1
COMPARISON OF ADVANTAGES AND DISADVANTAGES FOR INITIAL SCREENING OF REMEDIAL ALTERNATIVES

Alternative No. 1 - Soil Vapor Extraction

Advantages

- Proven performance; readily available equipment; easy installation
- Minimal disturbance to site operations
- Treatment time usually 6 to 24 months
- Can be combined with other technologies
- Can be used under and around structures where excavation cannot be conducted

Disadvantages

- Concentration reduction greater than 90 percent difficult to achieve
- Likely to require treatment for discharge of extracted gases
- Air emissions permit required
- Appropriate for unsaturated (vadose) zone soils only

Alternative No. 2 - Bioventing

Advantages

- Proven performance; readily available equipment; easy installation
- Minimal disturbance to site operations
- Treatment time usually 6 to 24 months
- Can be combined with other technologies
- Can be used under and around structures where excavation cannot be conducted
- Off gases may not require pre-discharge treatment

Disadvantages

- High constituent concentrations may initially be toxic to microorganisms.
- Cannot always achieve clean-up standard requirements.
- Permits may be required for nutrient injection.
- May require installation of downgradient containment mechanisms such as a cut-off trench for control of injected nutrients and other runoff.

Alternative No. 3. - Biosparging

Advantages

- Proven performance; readily available equipment; easy installation
- Minimal disturbance to site operations
- Treatment time usually 6 to 24 months
- Can be combined with other technologies
- Can be used under and around structures where excavation cannot be conducted
- Can accommodate a wider range of contaminants than air sparging

Disadvantages

- Should be used where free phase product is not present
- Potential for inducing migration of constituents, possibly below existing structures

Alternative No. 4a - Excavation and On-Site Treatment Using Biopiles

Advantages

- Proven performance; readily available equipment; easy installation.
- Treatment time usually 6 months or less for on-site concerns.
- Can be combined with other technologies.
- Off-site discharges are controlled or eliminated during remediation.
- Contamination liability is generally limited to the site property.
- Biopile treatment can be engineered to accommodate a range of constituents and concentrations.
- Effective on organic constituents with slow biodegradation rates.
- Can be designed to be a closed system with vapor emission collection.

Disadvantages

- Extensive disruption to site activities and site in general.
- Requires use of significant area near site for biopile.
- Incorporates all disadvantages and only some advantages of soil treatment technology.
- Potential for worker contact with contaminated materials.
- Can generate contaminated liquids requiring management and treatment if dewatering is necessary.
- May require air emissions permit.
- May not be effective for high constituent concentrations (>50,000 ppm TPH).
- May require bottom liner in biopile area if leaching is a concern.

Alternative No. 4b - Excavation and Off-Site Treatment

Advantages

- Proven performance; readily available equipment.
- Treatment time usually 6 months or less for on-site concerns.
- Off-site discharges are controlled or eliminated during and after remediation.
- Can be combined with other technologies.
- Can achieve remediation to very low concentrations of contaminants.
- High concentrations of contaminants are easily treated through other off-site technologies such as incineration.

Disadvantages

- Extensive disruption of site activities and site in general.
- Potential for worker contact with contaminated materials.
- Increased liability for transportation and internment of constituents in landfills.
- Can generate contaminated liquids requiring management and treatment if dewatering is necessary.
- May required traffic management plan for high volume of truck traffic.
- May require use in combination with other technologies if contamination is located in areas that cannot be excavated.

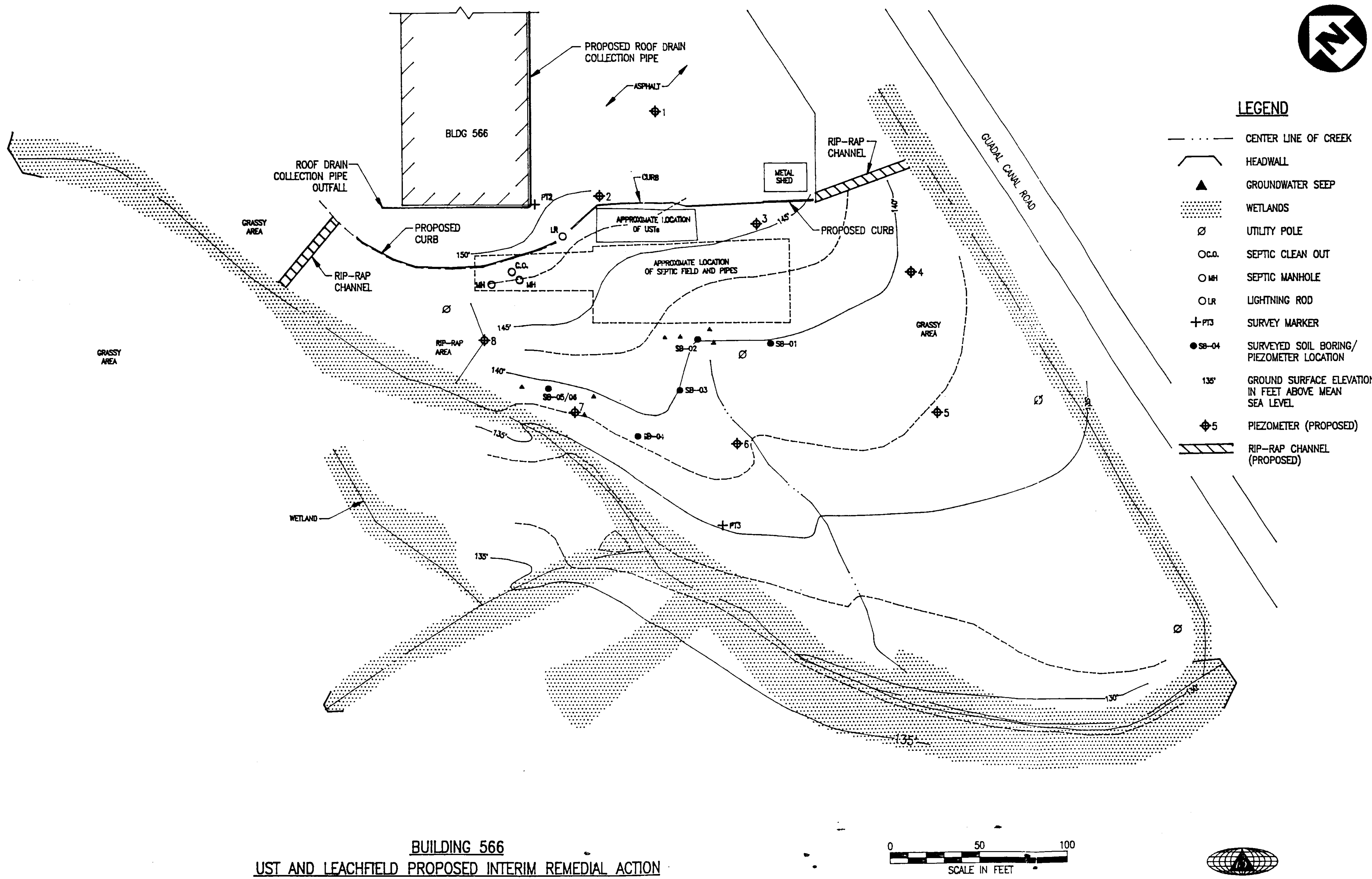
Alternative No. 5 - Natural Attenuation

Advantages

- Minimal impact to site operations
- Potential use below buildings and other areas that cannot be excavated
- Low cost

Disadvantages

- Not usually effective where constituent concentrations are high (>20,000 ppm TPH)
- Not usually suitable when free product is present
- Significant potential for off-site migration of contamination during treatment
- Longer treatment time required than for more active treatment measures
- May not always achieve desired clean-up levels within a reasonable length of time
- Requires long-term monitoring



BUILDING 566
UST AND LEACHFIELD PROPOSED INTERIM REMEDIAL ACTION
NWS EARLE, NEW JERSEY

Brown & Root Environmental

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