GOLDBERG·ZOINO & ASSOCIATES, INC.
CONSULTING ENGINEERS/GEOLOGISTS/ENVIRONMENTAL SCIENTISTS

The GEO Building 320 Needham Street Newton Upper Falls, MA 02164
(617) 969-0050

August 9, 1988
File No. T-10632.2-C,PC
T-10632-C

Mr. J. Ronald Hosie
Hydra-Co Enterprises, Inc.
100 Clinton Square
Suite 400
Syracuse, New York 13202-1049

Re: Soil Management Plan
Proposed Cogeneration Facility
Pepperell, Massachusetts

Dear Ron:

This letter summarizes the proposed soil management plan for contaminated soils which could be encountered during the construction of the proposed cogeneration facility in Pepperell, Massachusetts.

PURPOSE

The purpose of the soil management plan is to:

1. Summarize areas of suspected contamination which have been identified to date.

2. Propose a methodology for observing, stockpiling, testing and identifying potentially contaminated soil encountered during construction.

3. Establish disposition guidelines for contaminated soils.

BACKGROUND

Site Description

The location of the site is shown on the Locus Plan (Figure 1). The site is at the north end of the James River-Pepperell, Inc. property along the Nashua River in Pepperell, Massachusetts. It is located in an area of mixed industrial and residential development. Immediate abutters of the site include the James River - Pepperell Paper Mill to the south, the Nashua River to the east, and residences along Mill Street which are 100 feet or more to the west and north. The DEQE Water Supply Protection Atlas indicates there are no public water supply wells or reservoirs within approximately one mile of the site.

Existing structures at the site consist of a single-story masonry storage building, a two-level metal building housing wastewater treatment dewatering equipment, and a 75-foot-diameter concrete clarifier for wastewater treatment.

Subsurface Conditions

The general soil stratigraphy at the site consists of 3 to 9 feet of surficial fill (consisting primarily of sands and gravels with trace amounts of bricks, cinders, and silty zones) underlain by 20 to 25 feet of natural stratified sands and silts. Glacial till is beneath the sands and silts.

Groundwater levels were observed to be approximately 15 to 19 feet below the ground surface based on previous explorations performed by GZA in October 1986 and May 1988. Groundwater flow direction appears to be east toward the Nashua River.

Proposed Construction

Proposed construction (Figure 2) includes the main power plant building, pipe bridge, cooling tanks and pump house, transformer pad with a transmission tower, 150,000-gallon oil storage tank, underground piping, and other ancillary structures.

The existing masonry storage building will be demolished. The two-story metal building and concrete clarifier will remain.

Proposed Soil Work

The proposed soil work consists primarily of excavating the existing fill to natural soils in the areas of proposed structures and piping. The construction intent is to reuse the existing fill under the structures for structural support. Existing fill is presently of variable density and is being

excavated so that it may be compacted to a uniform density under the structures. We understand a small amount of excavated fill which may be surplus to the backfill needs would be placed outside the structures under parking and roadway areas adjacent to Mill Street. Areas where excess fill may be placed are shown on Figure 4.

The approximate depth of fill anticipated in the main building area is shown on Figure 2. The depth of fill encountered in test pit or boring explorations performed at or near other proposed structures is noted next to the explorations on Figure 2. Fill depths of 3 to 7 feet are anticipated at the proposed main plant building and 3 to 9 feet at the other proposed structures.

Previous Studies

Previous environmental and geotechnical studies performed by GZA at the site are:

- Preliminary Geotechnical Report, Cogeneration Facility, Pepperell, Massachusetts - November, 1986.
- Environmental Site Assessment, Proposed Cogeneration Facility, Pepperell, Massachusetts - November, 1986.
- Supplementary Environmental Study, Proposed Cogeneration Facility, Pepperell, Massachusetts - April, 1988.
- Final Geotechnical Study, Proposed Cogeneration Facility, Pepperell, Massachusetts - June, 1988.

These reports are included in Volume II.

GZA's opinion in the environmental site assessment was that the available evidence did not indicate the presence of hazardous material and/or oil in the soil and groundwater at the site. However, oily stains were observed on the building slab of an existing brick storage building. Thus the possibility of contaminated soils below the building, in floor drains, and in the septic tank could not be dismissed.

Consequently, a supplementary environmental study was conducted in the brick storage building. Shallow auger holes were performed at selected locations where the floor slab was cored and soil samples were submitted for chemical analyses. Samples of sediments in existing floor drains and the septic tank adjacent to the storage building were also submitted for analyses. Figure 3 shows the sampling locations in the storage building.

Test pits were also excavated in the vicinity of former underground gasoline storage tanks at the southeast corner of the existing storage building. The purpose was to evaluate whether gasoline was likely to be encountered during excavation.

Recent Observations

The existing one-story storage building at the site is currently being demolished by Russo Contractors of Fitchburg, Massachusetts. A GZA representative visited the site on July 9, 13, and 14, 1988, to observe the soils beneath the floor slabs which were removed from Areas 1, 3, and 4 of the building. Zones of stained soils and cinder fill under the slab in these areas were observed and are shown on Figure 3. Thicknesses of stained soils were in the range of 2 to 3 inches. Thicknesses of cinder fill was observed to be up to 1.5+ feet. The majority of the former slab areas were observed to be underlain by apparently uncontaminated granular fill.

Anticipated Contamination

We conclude that the contaminated soil which will be encountered during the excavation will be localized and consist primarily of petroleum hydrocarbon compounds. We make that conclusion based on:

1. The relatively large number of explorations and visual observations performed at the site encountered mostly localized areas of potential or identified contamination. The noted areas were typically limited both in thickness and areal extent. Zones of substantially elevated contamination levels occurred in discrete areas. Specifically, elevated Petroleum Hydrocarbons (PHC) concentrations were identified in soils from floor drains; sludge in a septic tank; and under parts of the storage building floor slab which had evidence of oil staining on top of it.

2. Visual observations under the storage building floor slab (after full slab removal) and in floor drains indicate zones of soil which have a noticeably oily appearance. Previous PHC test results on the oily floor drain soils indicate substantially elevated PHC levels (identified as lubricating oil type compounds). However, these tests were performed on composite samples from a large number of locations under the building slab before the slab was completely removed. We conclude that samples from oily zones combined with samples from uncontaminated zones resulted in elevated concentrations measured in the composite samples. Observation after full slab removal substantiate localized contamination.

3. PCB concentrations may be encountered in zones of oily soil; however, concentrations are expected to be low. PCB concentrations in noticeably stained soils on the storage building slab and in the floor drains were measured at up to 1.6 parts per million (ppm). We expect that most stained soils will have substantially lower PHC concentration. Since the PCB source is likely to be the oil, PCB concentrations in most other soils are likely to be substantially lower.

4. Volatile organic compounds (VOC's) are not anticipated to be encountered at elevated levels. VOC screening results indicated concentrations from below the detection limits up to low levels (3 ppm) on samples of both oily and non-oily appearing soils.

5. Extractable priority pollutant metals measured using the EP toxicity analysis methods are also not anticipated. Six analyses performed on a combination of random and more probable locations for metals indicated levels from below the detection limit to less than 3 percent of the limit for classification of the materials as hazardous waste under federal regulations.

The present best estimate of the location and nature of zones with potential contamination is summarized as follows:

1. Floor Drains/Septic Tanks

   - Measured PHC concentrations in sediments of floor drains in storage building areas 3 and 4 of 65,000 and 110,000 ppm, respectively. Compounds are apparently lubricating type oils.

   - Paint thinner, fuel oil, and lubricating oil present in the soil/sludge in a septic tank at measured concentrations of 19,000 ppm.

   - One to four inches of dark stained soil was observed on the Area 1 floor and the Area 2 floor was darkly stained. The stain appeared to be black carbon dye. During recent site visits, the GZA representative noted that the dark stained soils and black carbon dye, which was on the existing floor slabs, has been removed and placed in 55-gallon drums for future evaluation and disposal as suggested by GZA.

2. Soils Under Storage Building Slab

- Measured PHC levels of soils directly beneath the floor slabs are 600 to 980 ppm based on tests on composite soil samples. Based on observations of the underlying soils after slab removal, elevated levels are probably concentrated in zones where oil-stained fill and/or cinders are present. Soils outside of these zones appear to be uncontaminated, brown sand and gravel fill having no staining or odor.

- An apparent localized zone of higher PHC concentration (23,000 ppm measured) adjacent to a former diesel generator foundation in Area 1 of the storage building. Observations after removal of the slab indicate a slight staining in that area.

3. Localized Areas Across the Site

- Test pits and test borings performed as part of a geotechnical study encountered dark-stained surficial soils at a few locations outside of the existing building and a localized zone of unidentified black and white material. Specific boring and test pit designations are:

Material Noted	Location Designation
Cinders	Test Pits GTP-3, GTP-4, GTP-8, GTP-9 Boring GB-3
Dark Stained Soils (Not oily appearing)	Test Pits GTP-4, GTP-8 Boring GB-3
Unknown Material (White and Black Soil Textured)	Test Pit GTP-4

PROPOSED FIELD CONTROL METHODS

Summary

A summary of the proposed method of identifying, stockpiling, testing, and evaluating excavated soils is:

1. Classification will be made during excavation by a qualified environmental engineer on the basis of visual observations and photoionization detector (PID) screening. Classify excavated soil for stockpiling as: apparently uncontaminated fill; stained soil; cinder fill; or unknown

material. Soils will be stockpiled separately according to classification. Apparently uncontaminated soil may not be stockpiled if it can be reused as fill at the time of excavation.

2. Samples of stockpiled stained soils will be tested in the laboratory for total petroleum hydrocarbons (PHC's) and PCB's. Samples from stockpiled cinder soils will be tested for PHC's. Appropriate tests will be selected for unknown materials based on visual characteristics and expected disposal location. At a minimum, the material will be tested to evaluate whether it is a hazardous waste according to RCRA (Resource Conservation and Recovery Act).

3. On the basis of contaminant concentrations measured for each soil stockpile, the soil will be designated suitable for use as:

   - fill anywhere on-site;
   - fill outside the building area;
   - or unacceptable for on-site use and designated for disposal in an approved, regulated disposal facility.

4. Concentration limits for designating disposition are given in Table 1.

5. Soils from the septic tank and floor drains (including sediments inside of tank and drains) should be disposed of off-site at an approved regulated disposal facility.

6. Soils and black carbon dye on the floor slab of the existing building have been removed and placed in 55-gallon drums for future disposal. Designation for disposal will be made following testing.

Septic Tank and Floor Drain Removal

Due to the high PHC levels found in the septic tank and floor drain sediments, the septic tank and floor drains and the sediments they contain should be removed by a qualified waste disposal contractor and disposed of at a regulated disposal facility. A scope of work is being developed for this work by GZA. GZA will review the soil handling disposal designation and disposition of the material. Removal of these materials is presently scheduled to occur prior to beginning of the general site excavation.

Soil Excavation/Stockpiling

Four classifications will be used for soil which is excavated and stockpiled on-site. These classifications will be based on visual observations and PID screening . The four classifications and general descriptions of the soils in these classifications are:

1. Apparently Uncontaminated Soil - Soil which is not stained based on visual observation and measures less than 10 ppm above background using at PID. Odor will not be a screening method but unnatural odor will be a basis for suspecting soils and submitting soils for further screening. Unnatural odors should also be a basis for initiating health and safety measures.

2. Stained Soil - Soil which appears to be oil stained and/or has an unnatural odor.

3. Cinders - Material which contains a significant amount of cinders.

4. Unknown Material - Material not meeting the other criteria but with an unnatural appearance.

The four material types will be excavated and stockpiled separately as they are encountered during construction. Materials of the same type excavated in the same general area may be combined in a single stockpile. However, materials excavated from inside the area of the one-story masonry storage building, which is being demolished, should be kept separate from those excavated outside the building. Apparently uncontaminated soil may not be stockpiled if it can be reused as fill at the time it is excavated.

Stockpile areas should be graded to shed surface water away from the stockpile and should be marked to restrict unauthorized entry.

Prior to stockpiling stained soils, cinders, or unknown materials in an area, polyethylene sheeting should be placed on the ground. Stockpiles of these materials should be covered with polyethylene sheeting until testing of the stockpile is complete and a determination has been made of contamination levels.

Stockpiles of soil with high contamination levels based on test results should remain covered. Excavation, identification, and stockpiling of excavated soils should be observed by a qualified environmental engineer.

Testing of Stockpiled Soils

The testing planned for stockpiles of the four material categories is outlined below:

Material Type	Testing
All Types	• Screening with portable photoionization detector in the field using headspace techniques. Estimate one sample will be obtained for each 10 to 20 cubic yards of excavated soil.
Apparently Uncontaminated Soils	• No other testing
Stained Soils	• Laboratory PHC and PCB testing.
Cinders	• Laboratory PHC testing
Unknown Material	• Appropriate testing needed for determining disposition of material.

PCB and PHC testing is recommended on stained soils because these contaminants were found in oil-stained soil samples tested during the supplementary environmental study. PHC testing alone is recommended on cinders since PCB's are not likely if they are not oily cinders. Total PHC analyses are recommended initially on the stained soils and cinders. If high concentrations of PHC's are measured in a stockpile, a PHC fingerprint analysis may be performed to evaluate the types of PHC compounds present.

The testing will be in accordance with the following testing method designations:

Test	Designation
Photoionization Detector Screening Using Headspace Analysis	Reference DEQE Procedure cited in Appendix A.
Petroleum Hydrocarbons Analysis Total Fingerprinting	EPA Method 418.1 -Solvent extraction using GC/FID.
PCB Analysis	EPA Modified Method 8080 (Procedure cited in Appendix B).

The number of samples tested from each stockpile will be based on the volume of material in the stockpile. A minimum of three samples from each stockpile, however, will be tested.

Disposition of Stockpiled Soils

The suitability of stockpiled soils for reuse on-site or the need to dispose of the soils off-site will be established on the basis of field and laboratory observations and testing. Table 1 presents the proposed disposition of stockpiled soils for given soil types and concentrations of contaminants.

The proposed review process sequence is summarized as:

1. Excavated soil is classified by GZA for placement into stockpiles for further testing. The exception is soil which appears uncontaminated and has VOC concentrations by PID analysis of less than 10 ppm above background. Those soils may be reused directly in the work without stockpiling.

2. Stockpiled soil (stained soil, cinders, or unknown material) is sampled and tested by GZA.

3. Upon receipt of test results, GZA will send a written summary to Hydra-Co with test results and recommendations for disposition of soil. Recommendations for further testing of soil which must be disposed of off-site will be made at that time.

Health and Safety Procedures

As a minimum, we would anticipate that workers coming into contact with potentially contaminated soil should be instructed to wear rubber boots and gloves. Soils should be kept moist to avoid wind-blown dust. However, the excavation contractor should be required to engage a qualified environmental professional to develop a health and safety plan for workers which may come into contact with contaminated soil.

We appreciate the opportunity to work with you on this project.

Very truly yours,

GOLDBERG-ZOINO & ASSOCIATES, INC.

for Charles A. Lindberg
Consultant Reviewer

John E. Lens
Project Manager

Steven J. Trettel
Senior Associate

JEL/SJT:mdkt
Enclosures: Tables
Figures
Headspace Analytical Screening
GZA PCB/Pesticides Screening of Soil Samples
Interim DEQE Policies for PCB and Virgin
Petroleum Oil Contaminated Soils
Volume II

TABLE 1
DISPOSITION OF STOCKPILED SOILS

Material Type	Test/Result	Disposition of Stockpile
1. Apparently Uncontaminated Soil	VOC concentration using portable PID	
	a. Less than 10 ppm above background.	a. Use as fill anywhere on-site
	b. Greater than 10 ppm above background.	b. Treat as stained soil: Submit for further testing.
2. Stained Soils	PHC concentration:	
	a. Less than 100 ppm	a. Use as fill anywhere on-site
	b. Less than 300 ppm but greater than 100 ppm	b. Use as fill anywhere outside of building areas
	c. Greater than 300 ppm	c. Dispose of off-site at an approved off-site disposal facility.
	PCB concentration:	
	a. Less than 0.6 ppm	a. Use as fill anywhere on-site
	b. Less than 50 ppm but greater than 0.6 ppm	b. Use as fill anywhere outside of building areas.
	c. Greater than 50 ppm	c. Dispose of at an approved off-site disposal facility.
3. Cinders	PHC concentration:	
	Same as given for stained soils.	Same as given for stained soils
4. Unknown Material	Appropriate testing to be done as needed for disposition	To be determined following testing

NOTE: Refer to Appendix C for Interim DEQE Policies for PCB and Virgin Petroleum Oil Contaminated Soils.