Columbia Mills Site

Minetto (T), Oswego County, New York

Site No. 7-38-012

RECORD OF DECISION

March 1992

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NEW YORK STATE

Prepared by:
New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

DECLARATION STATEMENT - RECORD OF DECISION (ROD)

Columbia Mills Site
Minetto, Oswego County
Site No. 07-38-012

Statement of Purpose

The Record of Decision (ROD) sets forth the selected Remedial Action Plan for the Columbia Mills inactive hazardous waste site. This Remedial Action Plan was developed in accordance with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the New York State Environmental Conservation Law (ECL). The selected remedial plan complies to the maximum extent practicable with the National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR Part 300, of 1985.

Statement of Basis

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Columbia Mills site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix 5 of the ROD.

Description of Selected Remedy

The selected remedial action plan will control the potential contaminant routes of exposure to human health and the environment through excavation, capping and containment, and treatment of the source waste. The remedy is technically feasible and complies with the statutory requirements. Briefly, the selected remedial action plan includes the following:

A) Stabilize and cap wastes in the former plant disposal area and collected and treat groundwater from the area of capped wastes. Wastes in the landfill area will be stabilized to prevent leaching of metals followed by containment. Containment will consist of the construction of a single membrane barrier cap in conjunction with a barrier drain to collect and transport for treatment, the leachate from the fill. In addition a second trench system will drain three ponds which currently form the edges of the landfill and will serve to direct surface water and groundwater away from the containment area. The contaminated pond and stream sediments, as well as soils and sediments from the main plant also contaminated with metals will also be included in this on-site containment system.

This containment system will eliminate the infiltration of precipitation into the landfill waste, prevent migration of contaminants into the surrounding environment, and will prevent the direct contact by both people and wildlife with the waste. Leachate will be collected and is expected to be treated on site and discharged to surface water or collected for off-site treatment, as appropriate. Treatment will meet the appropriate permit requirements for its discharge.

A groundwater monitoring program will be implemented to monitor the effectiveness of this system. Since the selected remedy results in hazardous wastes remaining on site, at a minimum, a five-year review of the effectiveness of the remedy is required. This review will be conducted to evaluate whether the implemented remedy continues to provide adequate protection of human health and the environment.

B) Extraction and treatment of the volatile organic compound contaminated groundwater in the UST Area 1 with vapor extraction treatment of soil hot spots. Groundwater treatment will commence first and will control contaminant migration in the aquifer. The vacuum extraction will be used only as necessary to remediate contaminated soil hot spots. Groundwater will be treated as necessary to meet the appropriate permit requirements for its discharge. Treatment is expected to be accomplished with air stripping or carbon absorption, and will be discharged to surface water. Groundwater and soils treatment design will incorporate proper controls so that all air discharge and water quality standards or criteria for discharge will be met.

C) Remove the sediments from the plants sewers and dispose of in the on-site landfill or off-site facility followed by the abandonment of sewer lines. This remedy will project the public health by eliminating the possibility of future contact with these materials and will eliminate current discharges to the Oswego River. It is expected that most sediments will be disposed of on the on-site landfill. However, any sediments which test as characteristic hazardous waste or contain high levels of organic contamination will be disposed of in an off-site facility.

New York State Department of Health Acceptance

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

Declaration

The selected Remedial Action Plan is protective of human health and the environment. The remedies selected will meet the substantive requirements of the Federal and State laws, regulations and standards that are applicable or relevant and appropriate to the remedial action. The remedies will satisfy, to the maximum extent practicable, the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element. This statutory preference will be met in the landfill by eliminating the mobility of contaminant pathways of exposure to human health and the environment through the installation of a containment system for the source waste at this site. In UST Area 1, the toxicity, mobility and volume of contaminants in the soil and groundwater will be reduced by the treatment system to be implemented, while in the sewer systems, the mobility of the contaminants will be addressed by their removal from an area of active migration on the sewers and contained either on or off site.

3-25-92
DATE

Edward O. Sullivan
Deputy Commissioner

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Minetto (T), Oswego County, New York
Site No. 07-38-012

<u>Section</u>

SECTION 1: SITE LOCATION AND DESCRIPTION

The Columbia Mills site is an abandoned manufacturing plant located along Route 48 near to its intersection with Route 25, in the Town of Minetto, Oswego County. The site consists of approximately 100 acres of land, 10 of which constitute the main plant area, and 90 acres of wooded area, part of which is the site of the former plant landfill. The site is bounded on the east by Route 48, which runs parallel to the Oswego River, by Benson Avenue (Route 25) to the south, on the north by Snell Road (Route 42) and to the west by a Conrail track right-of-way (Figures 1 and 2). The area surrounding the site consists of both residential and agricultural areas. The Oswego River is approximately 100 feet northeast of the site.

The main plant area is comprised of nine standing structures, several partially and completely demolished buildings, rubble and a 200-foot tall radial brick chimney. Several underground tunnels, including one that crosses Route 48, still exist in the main plant area along with the abandon plant sewer systems. Two ponds which were used to store process water for the plant are located to the north and northwest of the main plant area.

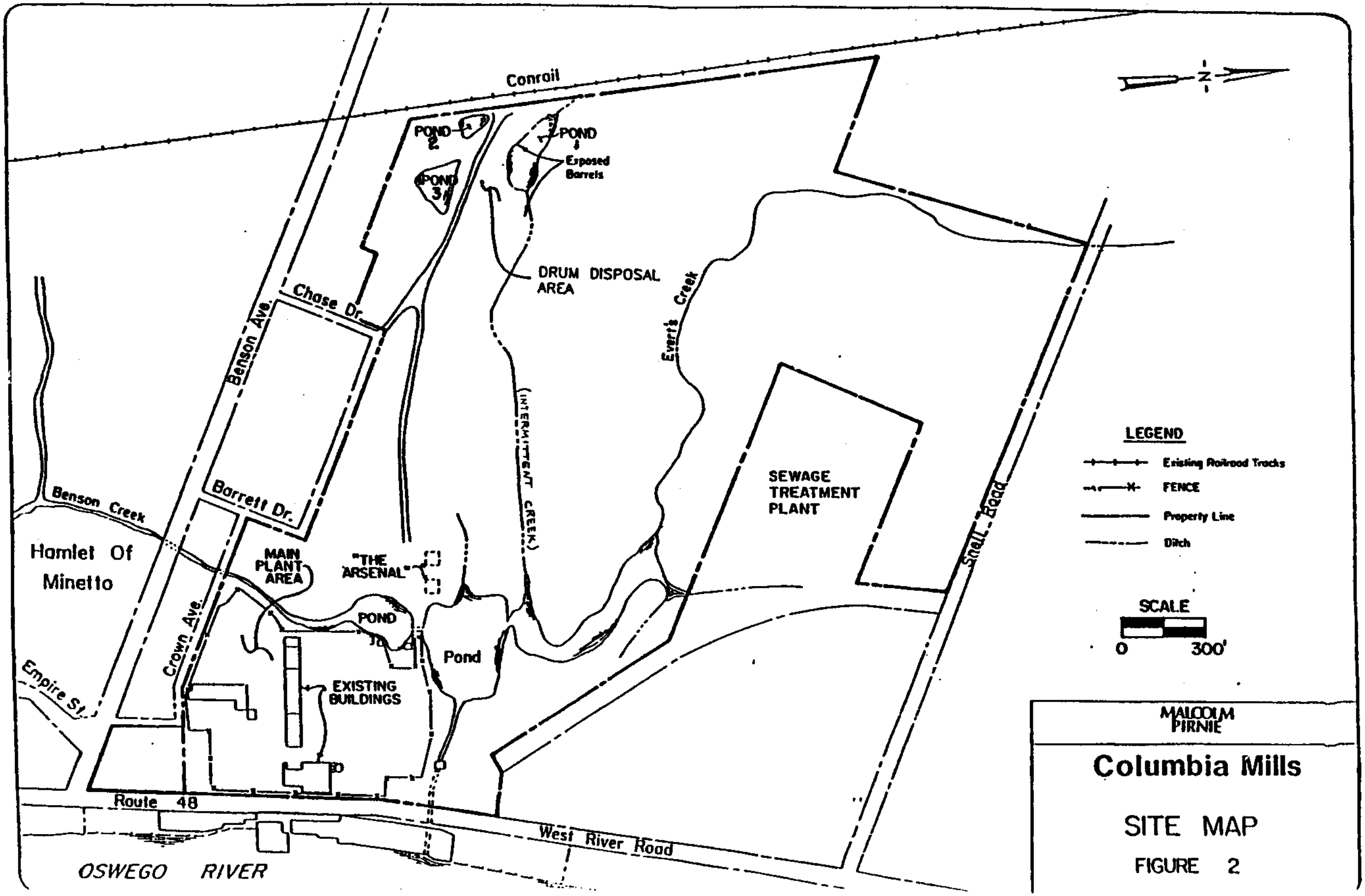
To the west of the main plant area there exists approximately 90 acres of undeveloped land. This area includes several ponds, streams, and the former plant landfill. The landfill is approximately five acres in area and consists of drums, ash, and debris. It is partially bordered by three ponds, designated ponds 1, 2 and 3. Pond 1 discharges into an unnamed creek which runs toward the main plant and discharges into the larger of the former process ponds. The landscape of this area is gently rolling and is predominantly heavily wooded. Ten acres of the property to the far north consists of low lying marshy areas, which includes a NYSDEC designated wetland area.

SECTION 2: SITE HISTORY

The Columbia Mills Company was a manufacturer of coated cloth and vinyl products from 1887 until the plant closed in 1976. After the plant ceased to operate, the property was sold to Columin Development Corporation, who initiated salvage operations. During the salvaging process asbestos (from pipe wrappings and other sources) was left exposed and buried in rubble. This salvaging operation ended prematurely and Columin defaulted on property taxes. There is currently a dispute regarding ownership and the property belongs to Oswego County and/or the Town of Minetto.

2.1: PREVIOUS INVESTIGATIONS

Site Reuse Investigation: In 1984, Calocerinos & Spina (C&S) was retained by Oswego County to evaluate the potential for site reuse. During this investigation several potential hazards were identified on site. Containers of chemicals and underground storage tanks were identified as well as physical hazards due to the lack of site security measures.



Conrail
POND 2
POND 3
POND 1
Exposed Barrels
DRUM DISPOSAL AREA
Evert's Creek
(INTERMITTENT CREEK)
Chase Dr.
Benson Ave.
Barrett Dr.
Benson Creek
Hamlet Of Minetto
MAIN PLANT AREA
"THE ARSENAL"
POND
Pond
Crown Ave.
Empire St.
EXISTING BUILDINGS
SEWAGE TREATMENT PLANT
Snell Road
Route 48
West River Road
OSWEGO RIVER
N
LEGEND
Existing Railroad Tracks
FENCE
Property Line
Ditch
SCALE
0
300'
MALCOLM PIRNIE
Columbia Mills
SITE MAP
FIGURE 2

due to off site migration. Samples were taken at the site boundary downwind of debris piles. Asbestos levels detected were all at or below expected ambient concentrations.

SECTION 3: CURRENT STATUS

Upon review of the draft RI report it was determined that additional work was necessary to define the nature and extent of contamination resulting from the various areas of the site. An order on Consent was signed on March 20, 1989 between Columbia Mills, Inc. and the NYSDEC. This document set forth the time frame for the development and implementation of a supplemental RI and Feasibility Study (FS). Due to known contamination at elevated levels in three areas of the main plant area, Columbia Mills signed a second consent order for three IRMs.

3.1: INTERIM REMEDIAL MEASURES (IRMS)

Prior to the supplemental RI the following IRMs were undertaken at the site:

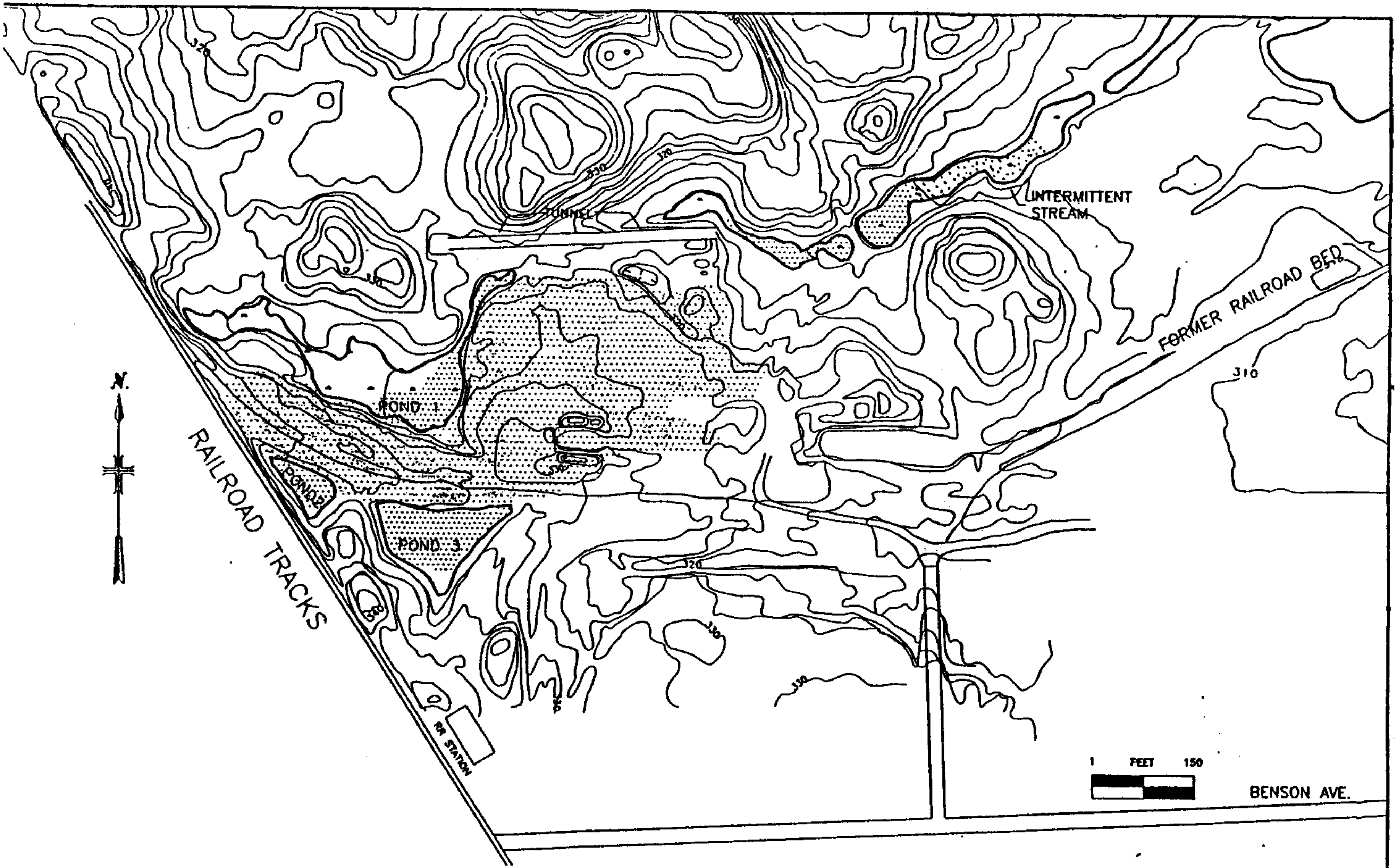
- A fence was secured around the main plant area in 1985.
- In the fall of 1987 over 100 containers of chemicals were removed from the main plant area.
- Eight underground storage tanks were removed from the site in the summer of 1988. Contaminated soils were excavated and staged in piles on site.
- In June 1988 the accessible part of the most contaminated area of the drum disposal area was covered with a six inch soil cover to prevent contact with surface soils.

The more current IRM program under the IRM Order on Consent addressed three locations with known contamination in the main plant area:

Building 8 IRM: Results of the 1987 and 1988 PCB sampling in Building 8 identified soil contaminated with up to 43,000 ppm of PCBs. Removal of these soils was undertaken during September 20 - 21, 1989.

Stockpiled Soil IRM: This IRM involved spreading and aerating the contaminated soil piles from the 1988 tank excavations, to reduce the VOC levels. This remediation occurred during July through September 1990 and resulted in levels of less than 1 ppm well below the clean-up goal of 10 ppm.

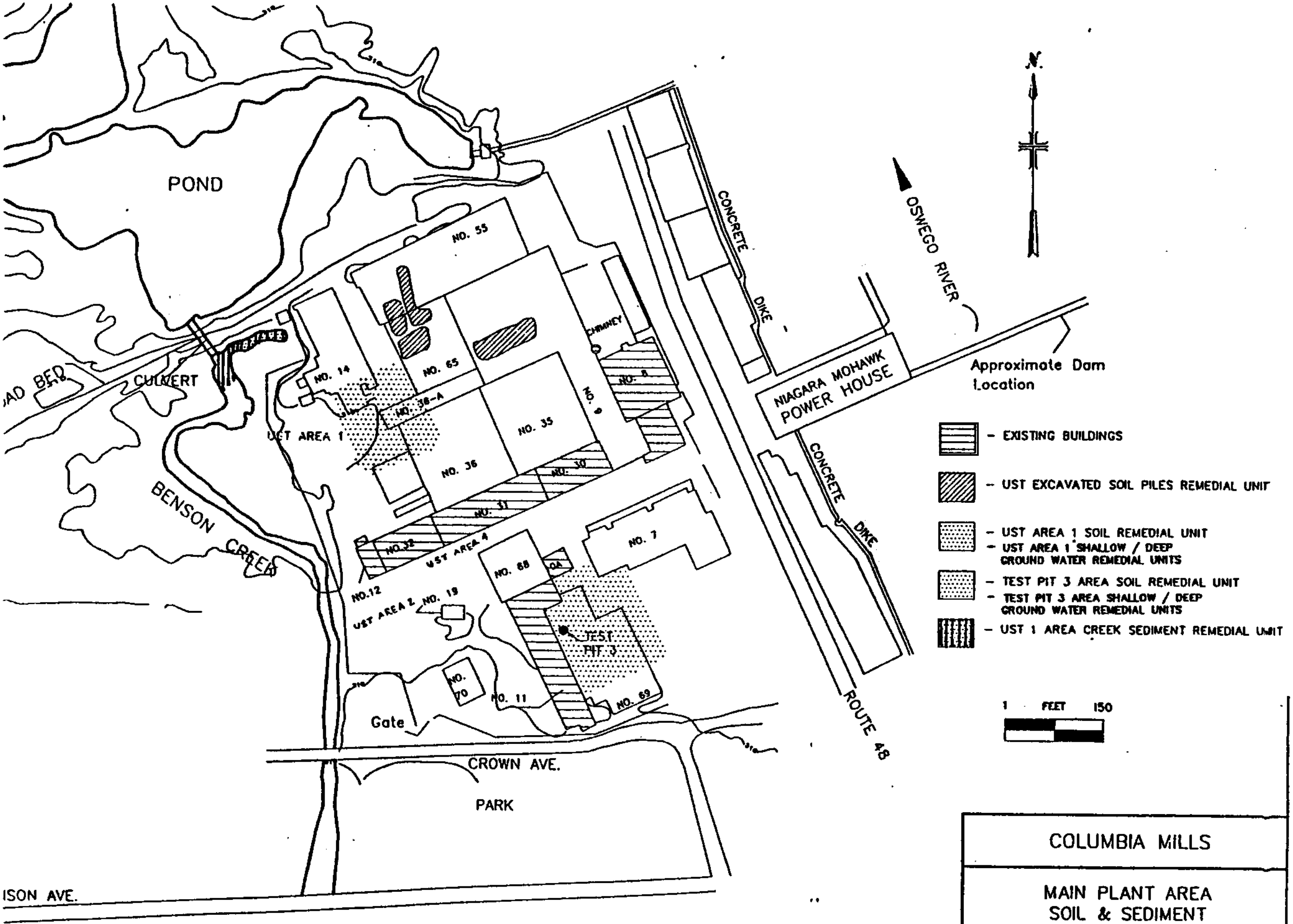
Test Pit 3 IRM: No tanks were unearthed in the UST area 3 in 1987, but soil sampling in the test pit indicated the presence of toluene (11,000 ppb), ethylbenzene (4,800 ppb) and xylenes (59,000 ppb). A small scale pilot vapor extraction test was conducted during September 1990 on the VOC contaminated surface soils in the



-SOIL / FILL REMEDIAL UNIT

-POND & CREEK SEDIMENT REMEDIAL UNIT

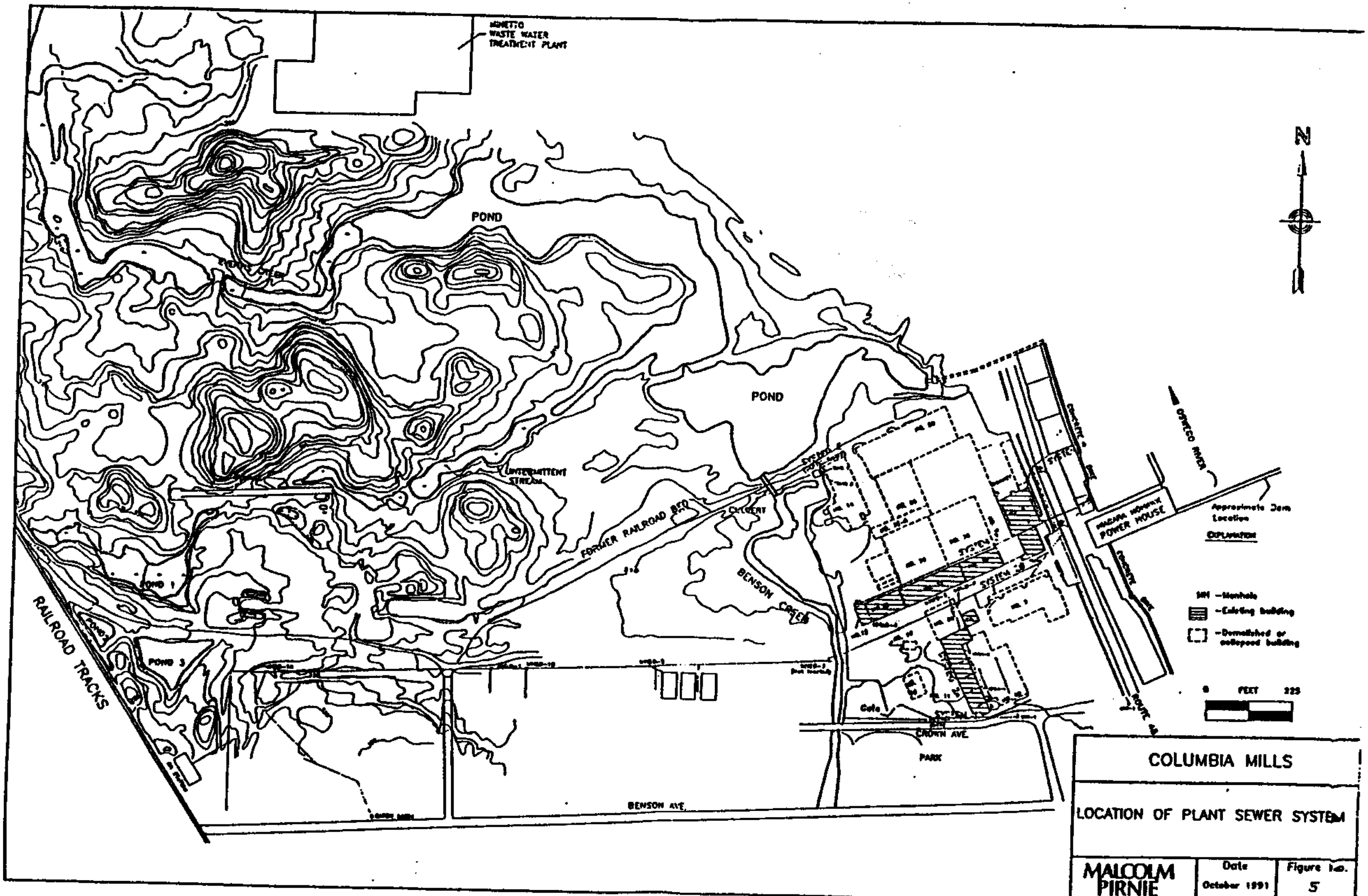
COLUMBIA MILLS		
DRUM DISPOSAL AREA SOIL / FILL & SEDIMENT REMEDIAL UNIT LOCATIONS		
MALCOLM PIRNIE	Date October 1991	Figure No. 3



COLUMBIA MILLS

MAIN PLANT AREA
SOIL & SEDIMENT
REMEDIAL UNIT LOCATIONS

MALCOLM PIRNIE	Date	Figure No.
	October 1991	4



COLUMBIA MILLS

LOCATION OF PLANT SEWER SYSTEM

MALCOLM PIRNIE | Date: October 1991 | Figure No. 5

tank excavations, and the building 8 area PCBs. To date, the RI/FS is complete and the Building 8 and soil pile IRMs have been completed. The construction activities associated with the pit 3 IRM will soon be completed and it is expected to be in operation in early 1992. It will operate for several years until contaminants present have been treated and reduced to below action levels.

SECTION 5: GOALS FOR THE REMEDIAL ACTIONS

Remedial action objective are established under the broad guidelines of meeting all standards, criteria, and guidances (SCGs) and for protecting human health and the environment. Human health risks are based on comparison to health remediation goals. Data relevant to the exposure levels of trespassers to the site is presented in the Baseline Risks Assessment Reports prepared by Malcolm Pirnie, Inc. The sediment criteria guidance document and the soil background levels will be used as guidelines for the remediation of pond and creek sediments and soils.

The media of concern identified for the Columbia Mills site are the soils/wastes, sediments and groundwater in the main plant area and drum disposal area. The remedial action objectives for the site are as follows:

1) Reduce contamination in site soils and sediments, including sewer sediments, to prevent unacceptable risks to human health and the environment.

2) Prevent direct exposure to surface soils sediments and contaminated groundwater.

3) Prevent releases from contaminated areas that would result in groundwater or surface water contaminant levels in excess of SCGs.

4) Reduce contaminant levels in the groundwater in order to achieve groundwater standards.

SECTION 6: SUMMARY OF THE EVALUATION OF THE ALTERNATIVES

The Columbia Mills site consists of two remedial areas: the main plant area and the drum disposal area. Three contaminated areas in the main plant area have been remediated or are being remediated by implementing Interim Remedial Measures (IRMs). The IRMs were discussed in Section 4.1. Within the two remedial areas the following remedial units, which are subject of this PRAP, have been identified:

1) Drum disposal area remedial units

   - drums/fill

   - shallow groundwater between ponds 1 and 3

   - pond and creek sediments

All action alternatives would be expected to comply with applicable SCGs. They would all be equally protective of human health and the environment, although off-site disposal of the waste would allow for unrestricted use of the land in that area. The two alternatives involving lime stabilization are more effective than just capping the material in place since an additional step would be taken to prevent the leaching of metals into the groundwater. The least difficult alternative to implement would be Alternative 2, since this alternative would not involve any additional treatment or excavation. The most difficult to implement would be Alternative 4 which involves excavation, lime stabilization in place and capping in the railroad right-of-way. Alternatives 3 and 5 are comparable in difficultly. The most cost effective alternative was determined to be Alternative 2 which involves capping the material in place. Disposing of the Drum Disposal Area fill material off site would be approximately ten times more expensive than Alternatives 2 or 3. (The estimated costs for each alternative in the detailed analysis are listed in Appendix 3.)

UST Area 1 Soils

Alternative 1: No action

Alternative 2: Excavation/on site disposal.

Alternative 3: Excavation/off site disposal.

Alternative 4: Soil washing (in situ)

Alternative 5: Vapor extraction

Except for the no action alternative all alternatives would be expected to achieve applicable SCGs and all would be protective of human health and the environment. The two in-situ alternatives of soil washing and vapor extraction would be more effective in the short term, mainly because they do not involve excavation. Excavating the soils would result in short term impacts from dust generation and possible VOCs becoming airborne. Also, the two in-situ treatment alternatives would be more effective in the long term, as the contamination would be destroyed rather than being moved from one location to another. Vapor extraction would be the least difficult alternative to implement, while excavation and on site disposal would be the most difficult to implement. This is because construction of an on site landfill would be necessary. Looking at relative costs, vapor extraction appears to be the most cost effective of the four alternatives.

UST Excavated Soil Piles

Alternative 1: No action

Alternative 2: Disposal in off-site landfill.

Alternative 3: Cap in railroad right-of-way.

Alternative 4: Lime stabilization/cap in railroad right-of-way.

Alternative 6 involving lime stabilization and capping with other on-site fill is considered to provide the greatest reduction of toxicity and mobility of contamination and is the most implementable. In terms of relative cost Alternative 6, would be the most cost effective alternative followed by an on site landfill while the least cost effective alternatives would be the off site disposal options.

C. Contaminated Groundwater

Drum Disposal Area - Shallow Groundwater

Alternative 1: No action

Alternative 2: Containment

Alternative 3 : **Extraction/treatment/ discharge to surface water.**

Alternative 4: Divert pond water/ lower groundwater table/collect and treat leachate/discharge to surface water.

Containment consists of vertical barriers, such as slurry walls, to restrict groundwater migration through the fill. The extraction alternative involves installing recovery wells in the drum disposal area. Alternative 4 involves the construction of two trenches one to divert surface water and groundwater around the landfill so they would not contact the fill. The second trench would collect groundwater from the fill for treatment.

With the exception of the no-action alternative, all alternatives will comply with applicable SCGs, including GA standards/guidance values and surface water discharge limits. The three action alternatives would be equally protective of human health and the environment.

The alternatives of containment and extraction/treatment would be equally effective in the short term impacts to the environment. In the long term, Alternative 4, divert pond water, would be the most effective. This alternative has the longest expected lifetime and a minimal amount of long term monitoring would be required. Diverting the pond water and discharging to surface water was determined to be the most implementable action alternative, while the remaining two alternatives, containment and extraction and treatment, were determined to be the least.

The most cost effective action alternative was determined to be Alternative 4. Alternative 3, extraction and treatment of the groundwater, was estimated to be the highest in cost.

Shallow Groundwater - UST Area 1/ Deep Groundwater (Well B-19D Area)

Alternative 1: No action

Alternative 2: Extraction/discharge to sanitary sewer.

long term.

Sewer System 5

Sewer System 5 is discussed separate from the other sewer systems since it involves two small buried septic tanks containing sediments. The alternatives evaluated are as follows:

Alternative 1: No action

Alternative 2: Close system in place (fill with concrete).

Alternative 3: Excavate tanks and sediment/cap in railroad right-of-way.

Although no SCGs are applicable to the sediments in Sewer System 5, the sediments in Tank 2 may be contributing to the slight contamination of water present in that tank. This water may be conveyed to Benson Creek. All alternatives would provide for the protection of human health and the environment. The no action alternative would provide no reduction in contaminant toxicity, mobility or volume since no action would be taken. Closing the system in place would provide for the greatest reduction in contaminant mobility, while excavating the tanks and sediment and disposing of them in the Drum Disposal Area would provide slightly less.

In terms of cost effectiveness, the no action alternative was rated the highest. the most cost effective action alternative was determined to be closing the system in place. Excavating and capping the material in the railroad right-of-way would involve a slight incremental increase in costs.

SECTION 7: SUMMARY OF THE GOVERNMENT'S DECISION

All of the remedial units discussed above are summarized under three preferred alternatives which are presented in Table 1. Each remedial measure is described below along with the rationale for its selection. All remedial units are shown in Figures 3, 4, and 5. These remedies do not address the asbestos problem in the main plant area. Asbestos cannot be addressed under the inactive hazardous waste remedial program.

A. Stabilize and Cap Wastes in the Railroad Right-of-Way/Collect and Treat Groundwater from the Area of Capped Waste.

Wastes in the landfill area will be stabilized to prevent leaching of metals followed by containment. Containment will consist of the construction of a single membrane barrier cap in conjunction with a barrier drain to collect and transport for treatment the leachate from the fill. In addition a second trench system will drain the three ponds which currently form the edges of the landfill and will serve to direct surface water and groundwater away from the landfill. The contaminated pond and stream sediments as well as soils and sediments from the main plant will also be included in this on-site containment system, after treatment, to stabilize metals.

This alternative will be required to meet the action specific SCGs determined to be applicable for an air discharge. This alternative is protective of human health and the environment since contaminants will be removed from the site. Short term risks will be mitigated by treating the contaminated air stream and groundwater as applicable. This alternative is considered to be a permanent remedy, as well as, the most easily implemented and the most cost effective.

C. Remove Sewer Sediments/ Abandon Sewer Lines/Dispose In On-site Landfill

No one alternative evaluated in the FS is considered by the NYSDEC to provide adequate long term protection to human health. To provide long term protection of human health, and address public concerns, the State has required that the sediments in the sewer lines be removed and the lines plugged to prevent discharge of groundwater. All accessible systems will have sediments removed by either excavation or flushing and collection. Systems which are not accessible by these techniques will be excavated in their entirety. It is expected that most sediments will be disposed of in the on-site landfill. However, any sediments which test as a characteristic hazardous waste or contain high levels of organic contamination will be disposed at an off-site facility.

Applicable SCGs will be met with this alternative. This alternative is protective of human health and the environment. No short term risks are posed. Although this remedy is not classified as a permanent remedy, it will be effective in the long term since sediments will be removed. This alternative is more difficult to implement than sealing lines in place, and is not quite as cost effective, but it is the only remedy which provides long term protection of human health.

APPENDIX 1

APPENDIX 1

This Appendix presents a more detailed description of the steps which will be undertaken to implement the preferred alternative defined in the PRAP.

A. Stabilize and Cap Wastes in the Railroad Right-of-Way/Collect and Treat Groundwater from the Area of Capped Waste.

The selected remedial measure for the soil and fill in the Drum Disposal Area will also incorporate the following: 1) the sediments which will be dredged from the Drum Disposal Area ponds and a portion of the intermittent creek, 2) the sediments which will be dredged from the ponded area in Benson Creek adjacent to UST Area 1, 3) the stockpiled soils from the former UST areas and 4) the excavated tanks and surrounding fill from Sewer System 5. The wastes will be stabilized by the application of lime or other acceptable stabilization material and covered with a single barrier cap. A barrier trench will be constructed to collect groundwater generated from the landfill for treatment.

Also included within the same remedial measure will be the draining of the Drum Disposal Area ponds and diversion of the intermittent creek that drains Pond 1 away from the Drum Disposal Area. The drainage of the ponds and creek serves to lower the groundwater table below the bottom of fill and to divert the surface water away from the contaminated fill, facilitating the remediation of the shallow groundwater between Ponds 1 and 3 and surface water drainage in this area. The upstream portion of Sewer System 2B will be diverted to Benson Creek and will provide the drainage for Ponds 2 and 3 and surface water in this area. The system will serve as a permanent conveyance for the diverted water away from the fill. A pond will be constructed along the creek of similar area to the three removed.

The remedial measure consists of the following work tasks to be carried out in the approximate order listed below:

1. Diversion of Sewer System 2B

This system will serve to drain the former area of ponds 2 and 3 and surface runoff. As shown in Figure 6, a new connection will be made to Sewer system 2B at a point near the former apartment buildings. The new piping will convey water from this point to the ponded area of Benson Creek behind the Main Plant Area. The existing pipe leading toward the Main Plant Area will be broken and plugged to prevent water from flowing into the Main Plant Area portion of the sewer.

2. **Catchment Areas**

Catch basins will be constructed to collect and treat water and sediments from the ponds. Pond sediment will not be dredged until after the landfill barrier drain is installed. Treatment of water from catch basins will be ongoing during construction of the capped area. Contaminated sediments will be removed from catch basins on a regular basis and placed on the area to be capped.

Two separate catchment areas will be constructed as shown in Figure 6. One will serve to collect water and sediments from Pond 1 and the intermittent creek for treatment, and the other will collect the same from Ponds 2 and 3. The treated water from each catchment area will be pumped to the intermittent stream downstream of the area or to MH2B-1A, depending on the catchment used. Construction of the catchment areas may begin prior to completion of the diversion of Sewer System 2B. However, the trench from Ponds 2 and 3 cannot be connected to the catchment area until the diversion of sewer System 2B is complete.

3. **Lime Stabilization of Contaminated Fill Left in Place**

The use of lime as an appropriate stabilization material will be confirmed during a pilot test. The application of lime to the contaminated fill is expected to raise the pH of any percolating waste sufficient to prevent the leaching of metals from the fill material. The treatment will not involve mixing the lime into the material which is to be capped, but rather will involve the application of lime to the surface of the material. Each addition of material from other areas of the Columbia Mills site will be similarly stabilized by the application of lime.

4. **Construction of Trench at West End of Capped Area**

A wide trench will be constructed at the west end of the Drum Disposal Area as shown in Figure 6. The trench will divert groundwater flow to Trenches A and B on either side of the area to be capped and away from the fill material, thus preventing contact with the contaminated fill. It will also act to limit access to the capped area. The trench will be excavated to a depth of approximately three feet below the lower limit of the fill material (approximately 15 feet below the land surface) and will be an estimated 50 to 60 feet wide at land surface. The trench length will be approximately 500 feet.

5. **Excavation of Contaminated Fill Outside of the Capped Area**

Some of the contaminated fill is currently located outside of the boundaries of the area to be capped. For this reason, it will be necessary to excavate a small quantity of the fill and place it inside the limits of the area to be capped as shown on Figure 6. The excavated fill will then be stabilized by the application of lime as ponds to sufficiently lower the groundwater table in the capped area. The trench on the north side of the capped area will originate near the culvert which allows water to flow under the existing railroad tracks into Pond 1 and will continue, as shown in Figure 7, around the capped area to a point in the intermittent stream beyond the tunnel. The trench on the south side of the capped area will originate near the culvert which allows water to flow under the existing railroad tracks into Pond 2 and continue through Pond 3 to MH-1A of Sewer System 2B. The trenches will be lined with a geotextile filtering membrane which will allow water to flow into the trench and provide stabilization for the side walls. The trenches will be filled with crushed stone to allow for water to flow through the trenches and to prevent the trenches from becoming filled with debris. The existing contours of the ponds will remain except for where stabilization of slopes are necessary.

9. **Regrading of Capped Area with Stockpiled Soils**

The soils which were previously excavated from the former UST areas and stockpiled in the Main Plant Area will be used to approximate the contours of the final capped area. The soil will be loaded onto trucks and transported to the Drum Disposal Area where it will be systematically placed and compacted to form a base for the final cover. Fill material from the main plant area will be brought in, if necessary, to complete the final grading as shown in Figure 7.

10. **Construction of Single Barrier Cap**

When final grading of the fill materials and stockpiled soils is complete, the construction of the single membrane cap will begin. The landfill cap system detailed below was chosen to (1) eliminate the infiltration of precipitation into the landfilled waste materials, (2) prevent erosion of contaminated soils and (3) to prevent the direct contact by both people and wildlife with the waste.

The landfill cap will cover the area of waste deposition which contains lead in surface soils above a clean-up goal to be established during the remedy design phase. Surface run-off and water from the drainage layer of the cap will be channeled to the adjacent drainage trenches with discharge ultimately to the Oswego River. Leachate within the landfill will run into a passive drainage system trench under the cap which will be directed to catchment areas for treatment and discharged to the river.

The components of the landfill cap will be, as required by 6NYCRR Part 360-2.13, and are presented here, in order, starting from the existing landfill surface to the surface of the cap. (Also see Figure 8.)

- A minimum 12 inch compacted layer. This layer may be constructed utilizing some or all of the following: consolidated waste soils from other locations on site or "clean fill" brought

Access restrictions at landfill sites are intended to prevent or reduce exposure to on-site contamination. They include actions such as fencing, signage, and property deed covenants to prevent development of the site or use of groundwater below the site. Access restrictions may also be used to protect the integrity of the landfill cap system.

Signs will be posted on the site to advise people that intrusive activities into the soils are not allowed. This warning will serve to prevent potential damage to the buried geomembrane or filter fabric.

B. Extraction and Treatment of Groundwater in the UST-1 Area with Vapor Extraction Treatment of Soil Hot Spots

Remediation of the UST area groundwater will consist of pumping and treating of the groundwater utilizing the test pit 3 area treatment system. In addition, vapor extraction will be implemented similar to the test pit 3 area remediation if field conditions deem it necessary.

The following plan for the cleanup of the UST Area 1 soil and groundwater remedial units will be implemented:

1. Install groundwater recovery wells in the are of groundwater contamination and commence pumping operations to prevent the contaminant plume in this area from migrating. Pipe the withdrawn groundwater to the groundwater treatment system which will be in operation in the Test Pit 3 Area unless hydraulics or contaminant loadings prohibit such a set up. Should this be the case, a separate treatment system or modifications to the Test Pit 3 system would be necessary.

2. During recovery well installation, sample soil from borings and submit for analysis to determine if any areas containing high levels of volatile organic compound (VOC) contamination exist in the unsaturated zone.

3. Depending on the analytical results of the soil sampling, implement one of the following:

   a. **Very low VOC concentrations or no VOCs detected in soil.**

      Vapor extraction would not be implemented in UST Area 1. Remediation of the soil would not be necessary if no VOCs were detected or if VOC concentrations were near the established clean-up level of 1 ppm.

APPENDIX 2

SUMMARY OF GENERAL RESPONSE ACTIONS

Main Plant Area		
Contaminated Medium	Contamination Concern	General Response Action
Soils	VOCs Semivolatiles Metals	No Action/Access Restrictions Excavation/Treatment/Disposal In-Situ Treatment Containment
Sediments (including sewers)	VOCs Semivolatiles Pesticides/PCBs Metals	No Action/Access Restrictions/Monitoring Removal/Treatment/Disposal In-Situ Treatment Containment
Shallow and Deep Ground Water	VOCs	No Action/Monitoring Containment Collection/Treatment/Discharge In-Situ Ground Water Treatment
Building and Debris Piles	Asbestos	No Action/Access Restrictions Containment Removal/Treatment/Disposal

Drum Disposal Area		
Contaminated Medium	Contamination Concern	General Response Action
Soil/Fill Material	Metals Semivolatiles	No Action/Access Restrictions Containment Excavation/Treatment/Disposal In-Situ Treatment
Sediments	Metals Semivolatiles	No Action/Access Restrictions/Monitoring Excavation/Treatment/Disposal In-Situ Treatment Containment
Shallow Ground Water	Metals	No Action/Monitoring Containment Collection/Treatment/Disposal In-Situ Ground Water Treatment

SUMMARY OF APPLICABLE REMEDIAL TECHNOLOGIES

Contaminated Sediments

General Response Action	Applicable Remedial Technology	Process Options	Applicable: Main Plant Area	Applicable: Drum Disposal Area
No Action/Institutional Actions:	**No Action/Institutional Options:**			
	No Action		Yes	Yes
No action.	Deed restrictions.		Yes	Yes
Access restrictions to monitoring.	Fencing.		Yes	Yes
Excavation Actions:	**Removal Technologies:**			
Excavation.	Excavation.	Sediments excavation.	Yes	Yes
	Containment Technologies:			
	Capping.	Removal with clay cap, multi-layer, asphalt.	Yes	Yes
	Vertical barriers.	Slurry wall, sheet piling.	Yes	Yes
	Horizontal barriers.	Liners, grout injection.	Yes	Yes
	Sediment control barriers.	Coffer dams, curtain barriers, capping barriers.	Yes	Yes
Excavation/Treatment Actions:	**Treatment Technologies:**			
Removal/disposal.	Solidification, fixation, stabilization.	Sorption, pozzolanic agents, encapsulation,	Yes	Yes
Removal/treatment/disposal.	Dewatering.	Lime Stabilization, dewatering and drying beds.	No	Yes
	Physical treatment.	Sedimentation, dewatering and drying beds.	Yes	Yes
		Water/solids leaching (with subsequent treatment).	Yes	Yes
	Chemical treatment.	Neutralization, oxidation, electrochemical reduction.	No	No
	Biological treatment.	Landfarming.	Yes	No
	Thermal treatment.	Incineration pyrolysis.	Yes	No

SUMMARY OF APPLICABLE REMEDIAL TECHNOLOGIES

Contaminated Structures

General Response Action	Applicable Remedial Technology	Process Options	Applicable Main Plant Area	Applicable Drum Disposal Area
No Action/Institutional Actions:	**No Action/Institutional Options:**			
No action.	No Action		Yes	N/A
Access restrictions.	Deed restrictions.		Yes	N/A
	Fencing.		Yes	N/A
Treatment Actions: Removal/Disposal.	**Removal Technologies:**			
	Excavation.	Excavation, debris removal	Yes	N/A
	Removal	Asbestos removal	Yes	N/A
Containment Actions:	**Containment Technologies:**			
	Barriers.	Encapsulation	Yes	N/A
		Seal Buildings	Yes	N/A

N/A - Not Applicable - No contaminated strutures in Drum Disposal Area.

TABLE 4-1
DETAILED ANALYSIS RESULTS
REMEDIATION OF DRUM DISPOSAL AREA FILL MATERIAL
METALS AND SEMIVOLATILE ORGANICS

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
Drain Ponds & Reroute Creek/ Cap in Place	10	20	9	6	2	12	15	74
Drain Ponds & Reroute Creek/Lime Stabilization/Cap in Place	10	20	9	11	8	11	14	83
Drain Ponds & Reroute Creek/Excavate/Lime Stabilization/Cap in Railroad Right-of-Way	10	20	8	11	8	9	12	78
Drain Ponds & Reroute Creek/Excavate/ Dispose in Off-Site Landfill	10	20	6	11	2	10	2	61

TABLE 4-4
DETAILED ANALYSIS RESULTS
REMEDIATION OF UST EXCAVATED SOIL PILES
METALS AND SEMIVOLATILE ORGANICS

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
Dispose in Off-Site Landfill	10	20	6	12	2	11	15	76
Cap in Railroad Right of Way	10	20	8	10	2	11	14	75
Lime Stabilazation/Cap in Railroad Right-of-Way	10	20	8	13	8	11	12	82

TABLE 4-6
DETAILED ANALYSIS RESULTS
REMEDIATION OF UST AREA 1 CREEK SEDIMENTS
METALS AND SEMIVOLATILE ORGANICS

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
Excavation/Off-Site Disposal	10	20	6	11	2	12	8	69
Excavation/Treatment/On-Site Disposal	10	20	8	11	8	9	8	74
Excavation/Treatment/Off-Site Disposal	10	20	6	14	8	10	7	75
Excavation/Lime Stabilization/Cap in Railroad Right-of-Way	10	20	8	11	8	11	15	83

TABLE 4-9
DETAILED ANALYSIS RESULTS
REMEDIATION OF SHALLOW GROUND WATER
IN MAIN PLANT AREA (UST 1 Area)
VOLATILE ORGANICS

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
No Action	6	8	6	6	0	13	15	54
Extraction/Discharge to Sanitary Sewer	3	11	9	6	0	12	15	56
Extraction/Pretreatment/Discharge to Sanitary Sewer	10	17	9	8	6	9	8	67
Extraction/Treatment/Discharge to Surface Water	10	17	9	7	6	11	8	68

TABLE 4-12
DETAILED ANALYSIS RESULTS
REMEDIATION OF SEWER SYSTEM SEDIMENTS
SEWER SYSTEM 1

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
No Action	10	17	10	9	0	13	15	74
Institutional - Monitoring, Access Restrictions	10	20	10	7	0	13	11	71
Excavation/Off-Site Disposal	10	20	6	12	2	10	5	65
Close Sewer Line In Place	10	20	10	11	5	11	15	82

TABLE 4-14
DETAILED ANALYSIS RESULTS
REMEDIATION OF SEWER SYSTEM SEDIMENTS
SEWER SYSTEM 2B

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
No Action	10	17	10	9	0	13	15	74
Flush Sediments/Off Site Disposal	10	20	6	12	2	11	15	76
Close Main Plant Section of Line in Place/ Divert Upstream Flow Into Benson Creek	10	20	8	11	5	12	13	79

TABLE 4-16
DETAILED ANALYSIS RESULTS
REMEDIATION OF SEWER SYSTEM SEDIMENTS
SEWER SYSTEM 4

Alternative	Compliance with SCGs (10)	Protection of Human Health and Environment (20)	Short Term Effectiveness (10)	Long Term Effectiveness (15)	Reduction of Toxicity, Mobility or Volume (15)	Implementability (15)	Cost (15)	Total (100)
No Action	6	17	10	9	0	13	15	70
Monitoring/Permitting	6	17	10	7	0	13	12	65
Close Line in Place	10	20	10	11	5	12	15	83
Flush Sediments/Dewater/ Off-Site Disposal	10	20	6	12	2	11	10	71

APPENDIX 3

COST ANALYSIS
DRUM DISPOSAL AREA FILL

ALTERNATIVE #1 -	**Cap In Place**	
	Construction Costs	$2,143,000
	Contingency (15%)	$321,450
	Total Construction Costs	$2,464,450
	Engineering (10%)	$246,445
	Total Project Cost	$2,710,895
	Annual O & M Cost	$23,500
	Present Worth - O & M (30 yrs)	$221,535
	Total Present Worth	**$2,932,400**
ALTERNATIVE #2 -	**Lime Stabilize, Cap In Place**	
	Construction Costs	$2,245,000
	Contingency (15%)	$336,750
	Total Construction Costs	$2,581,750
	Engineering (10%)	$258,175
	Total Project Cost	$2,839,925
	Annual O & M Cost	$23,500
	Present Worth - O & M (30 yrs)	$221,535
	Total Present Worth	**$3,061,500**
ALTERNATIVE #3 -	**Excavate, Lime Stabilize, Cap in RR Right-of-Way**	
	Construction Costs	$2,585,000
	Contingency (15%)	$387,750
	Total Construction Costs	$2,972,750
	Engineering (10%)	$297,275
	Total Project Cost	$3,270,025
	Annual O & M Cost	$23,500
	Present Worth - O & M (30 yrs)	$221,535
	Total Present Worth	**$3,491,600**
ALTERNATIVE #4 -	**Excavate, Dispose Off-Site**	
	Construction Costs	$30,716,000
	Contingency (15%)	$4,607,400
	Total Construction Costs	$35,323,400
	Engineering (10%)	$3,532,340
	Total Project Cost	$38,855,740
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$38,855,700**

COST ANALYSIS
UST AREA 1 SOIL

ALTERNATIVE #1 -	**No Action**	
	Construction Costs	$0
	Contingency (15%)	$0
	Total Construction Costs	$0
	Engineering (10%)	$0
	Total Project Cost	$0
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$0**
ALTERNATIVE #2 -	**Excavate, Dispose On-Site**	
	Construction Costs	$1,975,000
	Contingency (15%)	$296,250
	Total Construction Costs	$2,271,250
	Engineering (10%)	$227,125
	Total Project Cost	$2,498,375
	Annual O & M Cost	$14,590
	Present Worth - O & M (30 yrs)	$137,540
	Total Present Worth	**$2,635,900**
ALTERNATIVE #3 -	**Excavate, Dispose Off-Site**	
	Construction Costs	$4,037,500
	Contingency (15%)	$605,625
	Total Construction Costs	$4,643,125
	Engineering (10%)	$464,313
	Total Project Cost	$5,107,438
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$5,107,400**
ALTERNATIVE #4 -	**Soil Washing**	
	Construction Costs	$1,250,000
	Contingency (15%)	$187,500
	Total Construction Costs	$1,437,500
	Engineering (10%)	$143,750
	Total Project Cost	$1,581,250
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$1,581,300**

COST ANALYSIS
UST EXCAVATED SOIL PILES

ALTERNATIVE #1 -	**Dispose Off-Site**	
	Construction Costs	$303,000
	Contingency (15%)	$45,450
	Total Construction Costs	$348,450
	Engineering (10%)	$34,845
	Total Project Cost	$383,295
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$383,300**
ALTERNATIVE #2 -	**Cap in RR Right-of-Way**	
	Construction Costs	$187,000
	Contingency (15%)	$28,050
	Total Construction Costs	$215,050
	Engineering (10%)	$21,505
	Total Project Cost	$236,555
	Annual O & M Cost	$1,550
	Present Worth - O & M (30 yrs)	$14,612
	Total Present Worth	**$251,200**
ALTERNATIVE #3 -	**Lime Stabilize, Cap in RR Right-of-Way**	
	Construction Costs	$190,700
	Contingency (15%)	$28,605
	Total Construction Costs	$219,305
	Engineering (10%)	$21,931
	Total Project Cost	$241,236
	Annual O & M Cost	$1,550
	Present Worth - O & M (30 yrs)	$14,612
	Total Present Worth	**$255,800**

COST ANALYSIS
DRUM DISPOSAL AREA POND & CREEK SEDIMENTS

ALTERNATIVE #5 - **Excavate, Lime Stabilize, Cap in RR Right-of-Way**	
Construction Costs	$470,000
Contingency (15%)	$70,500
Total Construction Costs	$540,500
Engineering (10%)	$54,050
Total Project Cost	$594,550
Annual O & M Cost	$4,600
Present Worth - O & M (30 yrs)	$43,364
Total Present Worth	**$637,900**

COST ANALYSIS
DRUM DISPOSAL AREA SHALLOW GROUND WATER

ALTERNATIVE #1 -	**No Action**	
	Construction Costs	$0
	Contingency (15%)	$0
	Total Construction Costs	$0
	Engineering (10%)	$0
	Total Project Cost	$0
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$0**
ALTERNATIVE #2 -	**Containment**	
	Construction Costs	$1,943,400
	Contingency (15%)	$291,510
	Total Construction Costs	$2,234,910
	Engineering (10%)	$223,491
	Total Project Cost	$2,458,401
	Annual O & M Cost	$4,850
	Present Worth - O & M (30 yrs)	$45,721
	Total Present Worth	**$2,504,100**
ALTERNATIVE #3 -	**Extract, Treat, Discharge to Surface Water**	
	Construction Costs	$169,000
	Contingency (15%)	$25,350
	Total Construction Costs	$194,350
	Engineering (10%)	$19,435
	Total Project Cost	$213,785
	Annual O & M Cost	$20,600
	Present Worth - O & M (30 yrs)	$194,196
	Total Present Worth	**$408,000**
ALTERNATIVE #4 -	**Divert Ponds, Discharge to Surface Water**	
	Construction Costs	$254,000
	Contingency (15%)	$38,100
	Total Construction Costs	$292,100
	Engineering (10%)	$29,210
	Total Project Cost	$321,310
	Annual O & M Cost	$450
	Present Worth - O & M (30 yrs)	$4,242
	Total Present Worth	**$325,600**

COST ANALYSIS
SEWER SYSTEM 2A SEDIMENTS

ALTERNATIVE #1 -	**No Action**	
	Construction Costs	$0
	Contingency (15%)	$0
	Total Construction Costs	$0
	Engineering (10%)	$0
	Total Project Cost	$0
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$0**
ALTERNATIVE #2 -	**Close Line In Place**	$5,750
	Construction Costs	$500
	Contingency (15%)	$75
	Total Construction Costs	$575
	Engineering (10%)	$58
	Total Project Cost	$633
	Annual O & M Cost	$500
	Present Worth - O & M (30 yrs)	$4,714
	Total Present Worth	**$5,300**
ALTERNATIVE #3 -	**Flush Sediments/Off-Site Disposal**	
	Construction Costs	$35,000
	Contingency (15%)	$5,250
	Total Construction Costs	$40,250
	Engineering (10%)	$4,025
	Total Project Cost	$44,275
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$44,300**
ALTERNATIVE #4 -	**Flush Sediments, Lime Stabilize, Cap in RR R.O.W**	
	Construction Costs	$26,900
	Contingency (15%)	$4,035
	Total Construction Costs	$30,935
	Engineering (10%)	$3,094
	Total Project Cost	$34,029
	Annual O & M Cost	$5
	Present Worth - O & M (30 yrs)	$47
	Total Present Worth	**$34,100**

COST ANALYSIS
SEWER SYSTEM 3 SEDIMENTS

ALTERNATIVE #1 -	**No Action**	
	Construction Costs	$0
	Contingency (15%)	$0
	Total Construction Costs	$0
	Engineering (10%)	$0
	Total Project Cost	$0
	Annual O & M Cost	$0
	Present Worth - O & M (30 yrs)	$0
	Total Present Worth	**$0**
ALTERNATIVE #2 -	**Close Line In Place**	
	Construction Costs	$34,000
	Contingency (15%)	$5,100
	Total Construction Costs	$39,100
	Engineering (10%)	$3,910
	Total Project Cost	$43,010
	Annual O & M Cost	$500
	Present Worth - O & M (30 yrs)	$4,714
	Total Present Worth	**$47,700**
ALTERNATIVE #3 -	**Flush Sediments, Off-site Disposal, Fill Trenches**	
	Construction Costs	$68,700
	Contingency (15%)	$10,305
	Total Construction Costs	$79,005
	Engineering (10%)	$7,901
	Total Project Cost	$86,906
	Annual O & M Cost	$500
	Present Worth - O & M (30 yrs)	$4,714
	Total Present Worth	**$91,600**
ALTERNATIVE #4 -	**Flush Sediments, Lime Stabilize, Cap in RR Right-of-Way, Fill Trenches**	
	Construction Costs	$60,700
	Contingency (15%)	$9,105
	Total Construction Costs	$69,805
	Engineering (10%)	$6,981
	Total Project Cost	$76,786
	Annual O & M Cost	$545
	Present Worth - O & M (30 yrs)	$5,138
	Total Present Worth	**$81,900**

COST ANALYSIS
SEWER SYSTEM 4 SEDIMENTS

ALTERNATIVE #5 -	Flush Sediments, Lime Stabilize, Cap in RR R.O.W	
	Construction Costs	$24,350
	Contingency (15%)	$3,653
	Total Construction Costs	$28,003
	Engineering (10%)	$2,800
	Total Project Cost	$30,803
	Annual O & M Cost	$5
	Present Worth - O & M (30 yrs)	$47
	Total Present Worth	**$30,800**

COLUMBIA MILLS
REMEDIAL MEASURE COST ANALYSES

Sewer System 2B -- Flush Sediments in Main Plant Area, Lime Stabilize, Cap in Railroad Right-of-Way, Divert Upstream Flow

Construction Costs	$54,400
Contingency (15%)	$8,160
Total Construction Costs	$62,560
Engineering (10%)	$6,256
Total Project Cost	$68,816
Annual O & M Cost	$55
Present Worth - O & M (30 yrs)	$518
Total Present Worth	**$69,300**

Sewer System 3 - Flush Sediments, Lime Stabilize, Cap in Railroad Right-of-Way, Fill Trenches

Construction Costs	$60,700
Contingency (15%)	$9,105
Total Construction Costs	$69,805
Engineering (10%)	$6,981
Total Project Cost	$76,786
Annual O & M Cost	$545
Present Worth - O & M (30 yrs)	$5,138
Total Present Worth	**$81,900**

APPENDIX 4

COLUMBIA MILLS SURFACE SOIL
MAIN PLANT AREA – UST AREA 1
FREQUENCY OF DETECTION
- Validated Data -

INORGANIC	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION* (mg/kg)	BACKGROUND CONCENTRATION** (mg/kg)
Aluminum	5/5	5130J–7030J	8800J–9880J
Antimony	1/5	8.8B	8.0B–8.8B
Arsenic	5/5	0.90J–4.8J	2.8J–3.3J
Chromium	5/5	5.2J–16.0J	8.5–8.8
Copper	5/5	22.2J–128J	8.5B–25.2J
Iron	5/5	6160J–19400J	11900J–12100J
Lead	5/5	12.2J–116J	8.8J–15.9J
Magnesium	5/5	543J–1520J	1180J–2350J
Manganese	5/5	157J–537J	178–313
Zinc	5/5	34.7J–833J	33.9J–45.5J

NOTES:

*As detected in samples obtained November 1989.

**Concentrations detected in two background surface soil samples obtained November 1989. Data is validated.

J–Indicates an estimated value.

B–This result is qualitatively suspect since this analyte was detected in field and/or laboratory blank(s) at a similar level(s).

COLUMBIA MILLS SOIL
MAIN PLANT AREA - AREA A
FREQUENCY OF DETECTION
- Non Validated Data -

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF SAMPLE QUANTITATION LIMITS	RANGE OF DETECTED CONCENTRATIONS	BACKGROUND CONCENTRATION*
VOLATILE ORGANICS (ug/kg)				
Acetone	2/12	1500–1800	4600–4700	13UL–70B
Trichlorotrifluoroethane	3/16	20	73–360	
1,1,1-Trichloroethane	1/19	20–30	56	6U–7UL
Tetrachloroethylene	8/26	20–30	34–530	6U–7UL
SEMIVOLATILES (ug/kg)				
Phenanthrene	1/4	1000	1000	390U–490U
Dibutyl phthalate	2/4	1000	1000–1800	2600B–4000B
Fluoranthene	1/4	1000	1000	390U–490U
Pyrene	1/4	1000	1100	390U–490U
Bis(2-ethylhexyl)phthalate	1/4	1000	1000	390U–2500B
INORGANICS (mg/kg)				
Aluminum	4/4		4600–5700	8800J–9880J
Arsenic	4/4		4.0–6.0	2.8J–3.3J
Barium	4/4		50–220	34.2J–80.8J
Beryllium	4/4		0.18–0.58	0.42B–0.45B
Cadmium	4/4		0.28–0.80	0.89U–0.86
Calcium	4/4		990–4200	254J–282J
Chromium	4/4		11–26	8.5–8.9
Cobalt	4/4		4.4–5.8	4.1B–6.8B
Copper	4/4		18–60	8.5B–25.2J
Iron	4/4		8000–14000	11900J–12100J
Lead	4/4		46–280	8.6J–15.9J+
Magnesium	4/4		2200–3200	1180J–2350J
Manganese	4/4		200–360	178–313
Mercury	4/4		0.05–0.30	0.11U–0.14U
Nickel	4/4		6.6–9.8	7.6–10.5
Potassium	4/4		400–440	178B–258B
Sodium	4/4		72–98	53.0B–64.5B
Vanadium	4/4		12–14	15.5–19.2
Zinc	4/4		27–240	33.9J–45.5J

NOTES:
Volatile organic samples obtained from former Piles 1,2 & 4 August 1988 and from aerated former Pile 3 August and September 1990. Semivolatile and inorganic samples obtained from former Piles 1, 2, 3 & 4 June 1989.
* Concentrations detected in two background surface soil samples obtained November 1989. Data is validated. Additional QA/QC samples (MS, MSD) included in range of concentrations for volatile and semivolatile organics.
+ Concentrations of lead in twelve surface soil samples obtained at locations outside the Drum Disposal Area (Background) in April 1988 ranged from 8.9 ppm – 53 ppm (average = 26.5 ppm). Data was not validated.
U – Indicates compound was analyzed but not detected.
L – Indicates sample quantitation limit is an estimated quantity.
J – Indicates an estimated value.
B – This result is qualitatively suspect since this analyte was detected in field and/or laboratory blank(s) at a similar level(s).

COLUMBIA MILLS SOIL
MAIN PLANT AREA - AREA B
FREQUENCY OF DETECTION

- Non Validated Data -

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS*	BACKGROUND CONCENTRATION**
SEMIVOLATILES (ug/kg)			
Phenanthrene	1/1	2700	390U-490U
Fluoranthene	1/1	2500	390U-490U
Pyrene	1/1	2100	390U-490U
Chrysene	1/1	1200	390U-490U
Benzo(a)anthracene	1/1	1000	390U-490U
Bis(2-ethylhexyl)phthalate	1/1	1400	390U-2500B
INORGANICS (mg/kg)			
Aluminum	1/1	5200	8800J-9880J
Arsenic	1/1	8.0	2.8J-3.3J
Barium	1/1	900	34.2J-80.8J
Beryllium	1/1	0.22	0.42B-0.45B
Cadmium	1/1	0.70	0.69U-0.66
Calcium	1/1	1100	254J-282J
Chromium	1/1	68	8.5-8.6
Cobalt	1/1	5.2	4.1B-5.8B
Copper	1/1	62	8.5B-25.2J
Iron	1/1	10000	11800J-12100J
Lead	1/1	630	8.6J-15.9J+
Magnesium	1/1	2400	1180J-2350J
Manganese	1/1	350	178-313
Mercury	1/1	0.25	0.11U-0.14U
Nickel	1/1	8.0	7.8-10.5
Potassium	1/1	480	178B-256B
Sodium	1/1	86	53.0B-84.5B
Vanadium	1/1	14	15.5-18.2
Zinc	1/1	310	33.9J-45.5J

NOTES:

*As detected in composite sample obtained June 1989 from former Pile 5. No volatile organics were detected in exit samples obtained from former Pile 5 in November 1990 following soil aeration activities.

**Concentrations detected in two background surface soil samples obtained November 1989. Data is validated. Additional QA/QC samples (MS, MSD) included in range of concentrations for semivolatiles.

+ - Concentrations of lead in twelve surface soil samples obtained at locations outside the Drum Disposal Area (Background) in April 1988 ranged from 8.9 ppm - 53 ppm (average = 26.5 ppm). Data was not validated.

U - Indicates compound was analyzed but not detected.

J - Indicates an estimated value.

B - This result is qualitatively suspect since this analyte was detected in field and/or laboratory blank(s) at a similar level(s).

COLUMBIA MILLS SEDIMENT
MAIN PLANT AREA - BENSON CREEK
SUMMARY OF DETECTIONS
– Validated Data –

CHEMICAL	NOVEMBER 1989											FEBRUARY 1990	ORGANICS CRITERIA*		METALS CRITERIA	
	SED 1	SED 2	SED 2 (REPREP)	SED 3	SED 3 (DUPE)	SED 3 (DUPE - REPREP)	SED 4	SED 4 (MS)	SED 4 (MSD)	SED 5	SED 5 (REPREP)	SS-7	AQUATIC TOXICITY BASIS	HUMAN HEALTH RESIDUE BASIS	CRITERIA**	LIMIT OF TOLERANCE***
VOLATILE ORGANICS (ug/kg)																
Methylene chloride	62B	23B	40B	24B	68B	21B	380B	100B	220B	32B	75B	20B				
1,1,1-Trichloroethane	13U	10UL	9UL	9U	10UL	10UL	16UL	16UL	16UL	12UL	12UL	2J				
Toluene	13U	10UL	9UL	9U	10UL	10UL	16UL	106%	132%	3J	3J	10UL				
Methyl ethyl ketone	25UR	37J	130J	12UR	20UR	20UR	33UR	33UR	33UR	24UR	24UR	20UR				
SEMIVOLATILES (ug/kg)																
Phenanthrene												610J	4170+			
Fluoranthene												820J				
Pyrene												560J				
Benzo(a)anthracene												330J		30		
Chrysene												360J		30		
di-n-Butylphthalate												19000B				
INORGANICS (mg/kg)																
Aluminum	4050J	5760J		5690J	3620J		6550J			6190J		7580J				
Antimony	7.5U	8.8U		7.6U	5.4U		11.7B			20.6B		13.5				
Arsenic	2.9J	3.4J		2.9J	2.1J		7.4J			13.7J		11.6			5(4.0-5.5)	33
Cadmium	0.90U	1.1U		0.94U	0.65U		3.5B			9.3		3.0			0.8(0.6-1.0)	10
Chromium	8.8J	10.2J		8.8J	6.7J		19.1J			48.2J		1670J			26(22-31)	111
Copper	35.3J	62.9J		49.5J	38.3J		722J			373J		770			19(15-25)	114
Iron	7030J	12600J		9630J	6620J		30800J			9440J		20500			24000(20000-30000)	40000
Lead	2.4	91.8		65.9	44.0		429			1560		13800			27(23-31)	250
Magnesium	1000J	1580J		1180J	774J		1290J			1120J		2810J				
Manganese	213J	606J		281J	226J		767J			146J		137			428(400-457)	1100
Zinc	110J	200J		166J	138J		2760J			9830J		1050J			85(85-110)	800
Cyanide	10.0U	10.0U		10.0U	10.0U		45.0			10.0U		164				

NOTES:

November 1989 samples not analyzed for semivolatiles

REPREP–Replicate sample.

DUPE–Duplicate sample.

MS–Matrix spike.

MSD–Matrix spike duplicate.

U–Indicates compound was analyzed but not detected.

J–Indicates an estimated quantity.

B–This result is qualitatively suspect since this analyte was detected in field and/or laboratory blank(s) at a similar level(s).

L–The sample quantitation limit is an estimated quantity.

%–Indicates percent recovery for MS and MSD samples.

R–Indicates an unreliable result based on data validation–compound (methyl ethyl ketone) may or may not be present in the sample due to poor instrument response.

*Source: NYSDEC Sediment Criteria Guidance Document – December 1989 Criteria based on sediment organic carbon content of 3%.

**Source: NYSDEC Sediment Criteria Guidance Document. Values in parenthesis are "no effect" and "lowest-effect" levels, respectively.

***Source: NYSDEC Sediment Criteria Guidance Document. Concentration which would be detrimental to the majority of species, potentially eliminating most

+–EPA proposed interim sediment criteria.

MALCOLM PIRNIE

COLUMBIA MILLS GROUND WATER
DRUM DISPOSAL AREA
FREQUENCY OF DETECTION

- Non Validated Data -

CHEMICAL		FREQUENCY OF DETECTION	RANGE OF SAMPLE QUANTITATION LIMITS (ug/l)	RANGE OF DETECTED CONCENTRATION (ug/l)	SCGs (ug/l)			
					USEPA MCL	NYSDEC MCL	NYSDEC GA-S	NYSDEC GA-G
VOLATILE ORGANICS								
Methylene Chloride		5/12	1–5	1J–2.6B		5	5	50
Acetone		3/3		2JB–51		50		
1,1-Dichloroethylene		1/12	1–5	TR<1	7	5	5	0.07
Chloroform		2/12	1–5	6–7	100+	100+	100	
Methyl ethyl ketone		1/5	10	18		50		
Toluene		2/12	1–5	2J–4		5	5	50
SEMIVOLATILES								
Bis(2-ethylhexyl)phthalate		2/2	10	1J–4J		50	50	
INORGANICS								
Aluminum	– soluble	0/2	200	ND				
	– total	1/2	200	7220				
Antimony	– soluble	0/2	60.0	ND				
	– total	1/2	60.0	74.0				3
Barium	– soluble	1/2	200	238	1000(T)	1000(T)	1000(T)	
Cadmium	– soluble	0/5	5–10	ND				
	– total	2/6	5	110–120	10	10	10	
Calcium	– soluble	2/2	5000	51800–56300				
Chromium	– soluble	0/5	10–50	ND				
	– total	3/6	10–50	178–800	50	50	50	
Copper	– soluble	0/5	10–25.0	ND				
	– total	4/6	20–25.0	30–2500		1000	200	
Iron	– soluble	2/2	100	284–512				
	– total	2/2	100	17000–65000		300	300	
Lead	– soluble	0/5	5–100	ND				
	– total	3/6	3.0–300	2780–58000	50	50	25	
Magnesium	– soluble	2/2	5000	7110–15900				
	– total	2/2	5000	11500–11800				35000
Manganese	– soluble	2/2	15.0	118–2310				
	– total	2/2	15.0	91.6–4550		300	300	
Nickel	– soluble	3/5	30–40	40–120				
	– total	3/4	30	40–14000				
Sodium	– soluble	2/2	5000	8230–12900			20000(T)	
Zinc	– soluble	5/5	20.0	54–270				
	– total	6/6	5–20.0	39–22000		5000	300	
Cyanide		2/4	10.0–100	153–218			100	

Notes:

Samples obtained from B-7S October 1985; B-7S/B-7D April, August, October 1987 and April 1988; B-10D April 1990 and B-10S/B-10D October 1990.

SCGs-Standards, Criteria and Guidelines.

J-Indicates an estimated value.

B-This result is qualitatively suspect since this analyte was detected in field and/or laboratory blank(s) at a similar level(s).

ND-Indicates compound was analyzed but not detected.

TR-Trace amount detected.

+Limit for total trihalomethanes.

(T)-SCG for total Barium or Sodium.

MALCOLM PIRNIE

COLUMBIA MILLS SEDIMENT
DRUM DISPOSAL AREA - PONDS
FREQUENCY OF DETECTION
- Non Validated Data -

POND 1

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION (mg/kg)	Criteria* (mg/kg)	Limit of Tolerance** (mg/kg)
INORGANICS				
Cadmium	13/13	0.35-6.6	0.8(0.8-1.0)	10
Chromium	13/13	2.6-110	26(22-31)	111
Copper	13/13	5.7-180	19(15-25)	114
Lead	12/13	1.7-480	27(23-31)	250
Nickel	13/13	2.0-130	22(15-31)	40
Silver	2/13	0.3-4.0		
Zinc	13/13	41-2300	85(65-110)	800

POND 2

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION (mg/kg)	Criteria* (mg/kg)	Limit of Tolerance** (mg/kg)
INORGANICS				
Cadmium	4/4	1.0-9.2	0.8(0.8-1.0)	10
Chromium	4/4	20-62	26(22-31)	111
Copper	4/4	13-590	19(15-25)	114
Lead	4/4	120-3000	27(23-31)	250
Nickel	4/4	2.7-42	22(15-31)	40
Zinc	4/4	94-7800	85(65-110)	800

POND 3

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION (mg/kg)	Criteria* (mg/kg)	Limit of Tolerance** (mg/kg)
INORGANICS				
Cadmium	6/6	0.63-8.4	0.8(0.8-1.0)	10
Chromium	6/6	13-200	26(22-31)	111
Copper	6/6	9.2-160	19(15-25)	114
Lead	6/6	56-13,000	27(23-31)	250
Nickel	6/6	4.6-60	22(15-31)	40
Silver	1/6	0.3		
Zinc	6/6	100-3200	85(65-110)	800

Notes:
- * Values in parenthesis are "no effect" and "lowest effect" levels, respectively. Source NYSDEC, Division of Fish and Wildlife document - Sediment Criteria - December 1989
- ** Concentration which would be detrimental to the majority of species, potentially eliminating most. Source: NYSDEC, Division of Fish and Wildlife document - Sediment Criteria - December 1989

MALCOLM PIRNIE

COLUMBIA MILLS SURFACE WATER
DRUM DISPOSAL AREA – PONDS
FREQUENCY OF DETECTION
– Non Validated Data –

POND 1

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF SAMPLE QUANTITATION LIMITS (ug/l)	RANGE OF DETECTED CONCENTRATION (ug/l)	SCGs (ug/l)		
				USEPA ACUTE CRITERIA	USEPA CHRONIC CRITERIA	NYSDEC CLASS D STANDARD
VOLATILE ORGANICS						
Methylene Chloride	3/3	1	1.0–2.4			
INORGANICS						
Cadmium	4/4	0.01–5	0.06–5	2.55	0.84	2.55
Chromium	3/4	0.01–50	0.11–2.0	1,269*	151*	1,269
Chromium(+6)	3/4	0.004–10	0.009–0.010	16	11	16
Copper	3/4	0.01–20	0.10–0.8	12.4	8.53	12.4
Lead	3/4	0.05–100	0.6–3.5	50.2	1.95	50.9
Nickel	3/4	0.01–30	2–7	1,026	114	1,379
Zinc	4/4	0.01–10	62–890	84.6	76.6	234

POND 2

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF SAMPLE QUANTITATION LIMITS (ug/l)	RANGE OF DETECTED CONCENTRATION (ug/l)	SCGs (ug/l)		
				USEPA ACUTE CRITERIA	USEPA CHRONIC CRITERIA	NYSDEC CLASS D STANDARD
INORGANICS						
Cadmium	1/2	5	7	2.55	0.84	2.55
Zinc	2/2	10	40–270	84.6	76.6	234

POND 3

CHEMICAL	FREQUENCY OF DETECTION	RANGE OF SAMPLE QUANTITATION LIMITS (ug/l)	RANGE OF DETECTED CONCENTRATION (ug/l)	SCGs (ug/l)		
				USEPA ACUTE CRITERIA	USEPA CHRONIC CRITERIA	NYSDEC CLASS D STANDARD
VOLATILE ORGANICS						
Methylene Chloride	2/2	1	3.0B–4.5B			
INORGANICS						
Cadmium	1/6	0.01–5	25	2.55	0.84	2.55
Copper	1/6	0.01–20	0.01	12.4	8.53	12.4
Lead	4/6	0.05–100	0.08–700	50.2	1.95	50.9
Nickel	2/6	0.01–30	0.01–0.02	1,026	114	1,379
Zinc	6/6	0.01–10	0.04–20,000	84.6	76.6	234

Note: SCGs – Standards, Criteria and Guidelines
* Value for Chromium III
B = Also found in blank; value shown corrected for concentration in blank.
Hardness dependent criteria based on calculated site surface water hardness of 68.2 mg/l. All criteria are hardness dependent except for Chromium(+6).

APPENDIX 5

ADMINISTRATIVE RECORD

1) Reports and previous site investigation reports:

   a) Remedial Investigation Report (3 volumes) prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, revised October 1991.

   b) Feasibility Study Report (3 volumes) prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, revised October 1991.

   c) Baseline Risk Assessment Human Health Evaluation Main Plant Area, prepared by Malcolm Pirnie, Inc. for Bond Schoeneck & King, revised December 1991.

   d) Baseline Risk Assessment Human Health Evaluation Drum Disposal Area, prepared by Malcolm Pirnie, Inc. for Bond Schoeneck & King, revised December 1991.

   e) Ecological Risk Assessment Drum Disposal Area, prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, December 1991.

   f) Interim Remedial Measure Report Removal of PCB Contaminated Soils in Building 8 Area, prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, January 1990.

   g) Interim Remedial Measures Report Treatment of Volatile Organic Compound Contaminated Soils originating from UST Excavations, prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, December 1990.

   h) Work Plan Vapor Extraction Pilot Study Remediation of Soils Near Test Pit 3 Interim Remedial Measures Program, prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, July 1990.

   i) Interim Remedial Measures Report Evaluation of Alternatives for Treatment of VOC Contaminated Subsurface Soils in Test Pit 3 Area, prepared by Malcolm Pirnie, Inc. for Bond, Schoeneck & King, February 1991.

2. NYSDEC Public Participation Plan.

3. Policy Documents (Technical and Administrative Guidance Memorandum, TAGM).

4. Regulatory Documents and Guidance Documents:

   a) Water Quality Regulations for Surface Waters and Groundwater, 6NYCRR Parts 700-705, September 1991.

   b) Division of Fish and Wildlife Sediment Criteria.

5. Analytical Data Results, Data Validation, QA/QC Reports.