



Department of Environmental Conservation

Division of Hazardous Waste Remediation

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**Balchem Plant  
Inactive Hazardous Waste Site**

Site Number 3-36-032  
Town of Wawayanda  
Orange County, New York

**Record of Decision**

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December 1995



New York State Department of Environmental Conservation  
GEORGE E. PATAKI, Governor      MICHAEL D. ZAGATA, Commissioner

# **DECLARATION STATEMENT - RECORD OF DECISION**

## **Balchem Plant Inactive Hazardous Waste Site Wawayanda (T), Orange County, New York Site No. 3-36-032**

### **Statement of Purpose and Basis**

The Record of Decision (ROD) presents the selected remedial action for the Balchem Plant inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substance Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Balchem Plant inactive hazardous waste disposal 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 B of the ROD.

### **Assessment of the Site**

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

### **Description of Selected Remedy**

Based upon the results of the Remedial Investigation and Feasibility Study (RI/FS) for the Balchem Plant site and the criteria identified for evaluation of alternatives, the NYSDEC has selected to complete the remediation of this site with a limited soil removal and the capping of the soils remaining on the site. The components of this remedy are as follows:

- A remedial design program to provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program.
- The continued operation of the IRM Interceptor Trench for a period of at least three years. The need to continue this collection system will be reevaluated at the end of the three years by the Balchem Corporation and the NYSDEC.

- The continued monitoring of the site for a period of at least three years to confirm the effectiveness of the remedy. The need to continue this monitoring will then be reassessed at the end of this period by the Balchem Corporation and the NYSDEC.
- The removal of the soils that are contaminated with greater than 500 ppm of lead to an off-site landfill. Soil which fails TCLP criteria for lead will be disposed of in a secure hazardous waste landfill.
- The landscaping of the facility to eliminate any future contaminated runoff from the site.
- The covering of the residually contaminated soils that will remain on the site with clean soil to a depth of at least 12 inches.
- Deed restrictions will be implemented to insure that the property remains an industrial property. This will further eliminate the exposure of the public to lead contaminated soils.

#### New York State Department of Health Acceptance

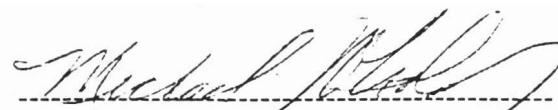
The New York State Department of Health (NYSDOH) concurs with the remedy selected for this site as being protective of human health.

#### Declaration

The selected remedy is protective of human health and the environment, is designed to comply with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that reduce the toxicity, mobility, or volume of the wastes.

12/28/95

Date



Michael J. O'Toole, Jr., Director  
Division of Hazardous Waste Remediation

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# RECORD OF DECISION

## "Balchem Plant Site"

Slate Hill, Orange County, New York

Site No. 3-36-032

December, 1995

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### SECTION 1: SITE LOCATION AND DESCRIPTION

The Balchem Plant site is located in Slate Hill, Orange County, New York. Please refer to Figure 1. The Balchem Corporation property is approximately three acres in size and is located on Route 284 near its intersection with County Road 6. The property is bounded on the northwest by the Middletown and New Jersey Railroad, on the southeast by Route 284, and residential properties on the remaining sides. The cause of concern at the site is a former drum disposal area on the grounds of the Balchem Facility. Please refer to Figures 2 and 3. The present plant facility occupies almost all of the property, with the drum disposal area encompassing a vacant area of approximately 120 feet by 120 feet adjacent to the warehouse's northwest wall. This area of concern is shown in detail on Figure 3. The property is presently still owned and operated by the Balchem Corporation for the production of food additives and the repackaging of ethylene oxide.

The facility is located on a small hill within the Wallkill River Valley. The geology of this valley is typically a folded shale or sandstone bedrock that is overlain by till. This till ranges in depth from

twenty feet on the ridges to over one hundred and fifty feet in the valleys. The upper till horizon is weathered resulting in a reddish-brown color while the deeper layers are not weathered and are a dull gray. These deeper layers are very dense and act as an aquiclude, or a soil layer that severely restricts water flow through it. The geology at the site is consistent with that of the valley, except for the presence of a fill layer in the drum disposal area above the weathered till layer. This fill layer creates an unusual groundwater effect at the site. At times, there are three distinct ground water units on the site. There is a perched water table in the fill that exists seasonally, another water table in the weathered till (also referred to as the upper glacial aquifer in some documents) and an aquifer in the fractured bedrock. This bedrock aquifer is the principal drinking water aquifer in the area as the weathered till unit has a very low water yield.

Joe Creek, a small tributary to the Catlin Creek system passes near the northwestern side of the facility, on the other side of the railroad tracks that run adjacent to the Balchem Plant property (see Figure 1).

## SECTION 2: SITE HISTORY

### 2.1: Operational/Disposal History

The Balchem Corporation purchased the facility in 1967 from Deltown Foods who had used the facility as a milk processing plant. The Balchem Corporation began operations that same year and has manufactured a variety of items throughout its existence there. Chemical operations began at the plant in 1969. From 1969 to 1974, these operations consisted of esterification, transesterification and distillation to produce three products that were used in water treatment. These products included dimethylamino ethyl methacrylate, diethylamino ethyl acrylate, and dimethyl maleate. Table 1 includes the chemicals used and the byproducts generated at the facility.

In addition to these manufacturing processes, there was an on-site laboratory to further develop these process lines and products. This laboratory and its records were destroyed by fires in 1972 and 1974. After the fire in 1974, these production lines and the laboratory were not rebuilt.

### 2.2: Remedial History

From 1982 to 1991, a total of three hundred and ten (310) drums, containing waste materials and contaminated soil were removed.

In 1982, during an excavation for a proposed addition to the plant, buried drums and building debris were unearthed. It is believed that these drums were buried on the property after the destruction of the laboratory and the termination of the previously mentioned production lines in 1974.

With NYSDEC concurrence, Balchem excavated and removed one hundred and seventy-two (172) drums containing waste material. Twenty-one (21) additional drums were generated when visibly contaminated soil was also removed from the excavation area and placed in drums. The

removed drums were found to contain the following liquids: isobutanol, lead oxide solutions, methyl methacrylate, dimethylamino ethyl methacrylate, unknown liquids with a sulfur odor and glycols. Semi-solid to solid materials removed included: an acidic dense material, dimethylamino ethyl methacrylate, parahydroxydiphenylamine, lead oxide, polymer of methyl methacrylate, impacted soils, metallic packing, and crushed drums. The soil surrounding the drums was also analyzed and found to be contaminated with heavy metals and organics, primarily lead, bis(2-ethylhexyl)phthalate and methyl methacrylate.

In 1987, NYSDEC approved a work plan to uncover any remaining drums and evaluate the groundwater condition at the site. This investigation uncovered an additional seven (7) drums. This investigation also revealed shallow groundwater contamination by lead, methyl methacrylate, bis(2-ethylhexyl)phthalate and nonane. The results of this investigation are presented in the March 2, 1988 report entitled, Hydrogeologic and Soil Assessment Field Investigation Report, Balchem Corporation, Middletown, New York. A copy of this report is available for review at the local repositories.

Following a ground penetrating radar survey in 1990 to determine the extent of the remaining drums, three additional drums were excavated.

In December, 1991, Balchem and the NYSDEC agreed upon an Order on Consent to implement a Focused Remedial Investigation/Feasibility Study (Focused RI/FS) addressing the buried drums remaining at the Balchem Plant Site. A work plan was prepared on behalf of the Balchem Corporation, which was reviewed and approved by the NYSDEC in October of 1991. The fieldwork was conducted between March and July of 1992. This fieldwork essentially called for the complete excavation of the area of concern. This excavation resulted in the removal of an additional one hundred and seven drums (107) of contaminated soil and buried drums, bringing the total number of drums removed from the drum disposal area to

three hundred and ten (310). During the excavation, it was also discovered that some of the drums were buried below the shallow groundwater table.

This excavation resulted in the removal of all drums and heavily contaminated soil from the site. However, the focused RI/FS work plan did not provide for the assessment of groundwater, which became a significant concern due to the presence of leaking drums below the groundwater table and the use of groundwater as the primary drinking water source in the area.

In July, 1993, an interceptor trench was installed to control a seasonal seep from this area. Please see section 4.2 for the details of this trench.

### **SECTION 3: CURRENT STATUS**

The Balchem Corporation, through a consent order with the NYSDEC, has completed an Expanded Remedial Investigation/ Feasibility Study that was initiated on February 23, 1994. This Expanded RI/FS was performed to address inadequacies with the Focused RI/FS that was initiated on January 14, 1992. This work plan called for the installation of additional monitoring wells, additional soil sampling and the sampling of Joe Creek. This investigation found contamination remaining in the soil of the former drum disposal area, no significant impact on Joe Creek from the site, no contamination in the bedrock aquifer, and minor contamination in the perched and weathered till groundwater. The results of this investigation are presented in the April 28, 1995 report titled, Remedial Investigation Results, Balchem Corporation, Slate Hill, New York.

As part of the continual assessment of the site, the New York State Department of Health (NYSDOH) and the Orange County Department of Health (OCDH) also sampled nearby private wells in 1987, 1988, 1990, 1992, and 1994. These wells

are all believed to be screened in the bedrock, which is the primary aquifer in the area. In 1987, a water sample from one well contained low levels of several volatile organic compounds (VOCs), however, no compound was present above New York State drinking water standards in effect at the time. During the 1994 sampling, a different well showed what appeared to be mild gasoline contamination. All other samples taken during these sampling rounds did not detect any significant contamination.

The one well that showed gasoline contamination was investigated further by Petroleum Spills of the regional DEC office in New Paltz. This investigation determined that the contamination was minimal and likely due to homeowner spillage. Resampling of this well on July 18, 1994, found no contamination present in the well above standards.

With the site now sufficiently characterized to select a remedy, the NYSDEC is now presenting this Record of Decision to the public for review.

#### **3.1 Summary of the Remedial Investigation**

The purpose of the Remedial Investigation (RI) was to define the nature and extent of any contamination resulting due to the former drum disposal area at the site.

A report entitled Remedial Investigation Results, dated April 28, 1995, has been prepared describing the recent field activities and summarizing the previous phases to a limited extent. A summary of the significant remedial investigation activities that occurred in all of the phases is presented below.

The RI activities consisted of the following:

- The installation and sampling of six shallow and three deep monitoring wells on site.
- The excavation of the entire drum disposal area with sampling at the excavation's edges.



- The removal of 310 drums consisting of contaminated soil and overpacked drums with various forms of sampling and waste characterization of the removed materials.
- Installation of over forty-five soil borings to verify subsurface stratigraphy and to further delineate any contamination. All samples from these borings were field screened and several samples were sent to a laboratory for further analysis.
- The sampling of a seasonal groundwater seep on the site.
- The sampling of the interceptor trench installed to control this seasonal seep.
- The installation and sampling of two piezometers to better define the perched water table and its effect on the contaminant migration. Five additional piezometers were installed, but have not been sampled.
- Numerous measurements of groundwater elevations to establish the groundwater flow direction and gradient in the various water units present on the site.
- The use of pressure transducers to monitor the water levels in the weathered till and the bedrock hourly over a period of several days to determine their hydraulic interaction.
- Sampling of the surface water (3) and sediments (3) in Joe Creek.
- Sampling of a swampy area adjacent to Joe Creek and a railroad ditch that lies between Joe Creek and the site.
- Sampling of nearby homeowner wells by the NYSDOH and OCDH to determine if site contaminants were impacting residents.

- Continuous air monitoring during all intrusive field activities.

The analytical data obtained from the Expanded RI/FS was compared to New York State Standards, Criteria, and Guidance (SCGs) in determining remedial alternatives. Groundwater, drinking water and surface water SCGs identified for the Balchem Plant site were based on NYSDEC Ambient Water Quality Standards and Guidance Values, and Part V of the NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, site conditions, site history, and risk-based remediation criteria were used. A summary of the results of the data collected in the Expanded Remedial Investigation/ Feasibility Study and a comparison to these standards and or criteria are presented in Tables 2 through 8. A complete listing of the analytical results from the Expanded RI/FS sampling may be examined at the document repository. This information has been placed there under the title, "Data package for the Expanded RI/FS." Samples that exceeded these SCG levels were then evaluated further to determine the significance of these exceedances. This additional evaluation is necessary as the levels presented in these guidances are generally threshold values that indicate there is the potential for environmental or human health impacts if exceeded.

Based upon the results of this initial comparison to SCGs and then further evaluation, certain areas and media of the site required remediation.

### 3.1.1.1. SOIL CONTAMINATION

The Expanded RI/FS included a limited on-site soil investigation to confirm that the drum removal removed all of the heavily contaminated soils, in addition to all of the drums. This investigation confirmed this to generally be true, however, a small area of soil with high lead contamination was

found. The sampling points of this investigation are shown on Figure 4.

The area that requires remediation is the soil located around soil boring 2 and monitoring well 6S. This remediation is warranted due to the high levels of lead found in this area during the Expanded RI/FS. Specifically, 2,210 ppm from the boring used for monitoring well 6S, 849 ppm from soil boring SB-2 and 570 ppm from surface soil sample SS-2. Both of these borings are subsurface samples. These high levels of lead contamination are likely a direct result of the former drum disposal area. The surface soil background level at the site is 103 ppm and the background subsurface soil level is 73.4 ppm. This background sample location can be seen on Figure 4 near the south east corner of the warehouse. This location is outside of the drum disposal area, but close enough to be representative of those soils within the area prior to the disposal of wastes there.

The remaining soils on site do not show any significant contamination.

A few semi-volatile compounds were detected in the on-site surface soil samples above guidelines, but they are not believed to be related to hazardous waste disposal. These compounds, specifically benzo(a)anthracene, benzo(a)pyrene, and dibenzo(a,h)anthracene, are components of automotive exhaust and are commonly found in areas with vehicle traffic. Considering the levels of these compounds detected and the frequency and closeness of the on site tractor trailer traffic to these sampling points, it is very likely that vehicles are the source of these compounds. In any event, these contaminants do not present any significant health or environmental concerns.

The on-site soil samples did not contain pesticides or PCBs above the soil cleanup levels. Several metals were detected above the background or soil cleanup levels, but they are not believed to indicate additional contamination outside of the area around soil boring SB-2 and monitor well 6S. Several

metals detected at high levels, i.e. calcium (566 to 17,400 ppm), iron (18,000 to 27,900 ppm), magnesium (3,240 to 6,400 ppm), sodium (18 to 342 ppm) and manganese (336 to 1,290 ppm), naturally occur in soil in this region of the state. Additionally, the remediation of this area around monitoring well 6S for lead would also reduce many of the highest levels of these other metals too. Please refer to Tables 2 and 3 for a summary of the other metals detected above soil cleanup goals.

### 3.1.2 AIR MONITORING

In addition to the on-site soil sampling, several air samples were collected using constant flow sampling pumps and analyzed for BTEX compounds. This is a grouping of the more common volatile organic compounds benzene, toluene, ethylbenzene and xylene. The locations of these sampling points are shown on Figure 5. This sampling indicated only trace levels of these compounds were present. Such levels indicate there is no air emissions problem associated with the drum disposal area.

### 3.1.3 SHALLOW GROUNDWATER SAMPLING

The Expanded RI/FS included an extensive investigation of the groundwater at the site. Six new monitoring wells were installed along with two piezometers. These wells and piezometers were then sampled for the complete Target Compound and Analytes List (TCL/TAL). The three existing wells on site were also sampled along with the on-site production well for a total of twelve separate sampling points from three separate water units. The perched water table and the weathered till water table are considered separate shallow units, and the fractured bedrock aquifer is considered to be a deep unit. These sampling points are shown on Figure 4. Sampling indicated that the groundwater has minor volatile

organic contamination and is limited to the perched water table and the weathered till unit. Please see Table 4 for a summary of this data.

The only on-site well that showed contamination above the standards and guidelines for a volatile organic or semi volatile organic compound was Piezometer 7. Piezometer 7 is 6 feet deep and screened in the perched water table. Specifically, 1,2 dichloroethene (89 ppb) and trichloroethene (7 ppb) were detected at this sampling point. No other monitoring well detected these compounds, or any other organic compounds above standard levels.

This data also indicates that the levels of contaminants in the weathered till unit have declined since the last drum removal. For example, monitor well 2 contained 38 ppb of benzene in December of 1987, and in the last sampling round in March 1994 had fallen below the detection limit. This trend is also exhibited by a number of other compounds and is indicative that natural attenuation for volatile contamination in the groundwater is occurring at the site.

The on-site monitoring wells were also sampled for pesticides and PCBs. The results found no detections of PCBs and several extremely low detections of various pesticides. Only piezometer 6 exceeded standards and guidelines for endrin (.091 ppb) and 4,4 DDD (.0051 ppb). This piezometer is 9 feet deep and is screened in the perched water table. No exceedances were noted in the weathered till or the bedrock aquifer, nor in any of the on-site soils. Considering the prevalence of agricultural activity in the area, the presence of pesticides in the groundwater is not attributable to the site.

Several metals were detected in the shallow and deep groundwater. Iron (up to 31,200 J ppb), manganese (up to 15,500 ppb), sodium (up to 510,000 ppb) and lead (108 and 17.7 ppb) were all detected in excess of standards, criteria and guidelines. However, the iron, manganese and sodium are all naturally occurring. The iron and

manganese exceed drinking water standards that have been established for aesthetic reasons and these exceedances pose little risk to the environment or human health. Similarly, the exceedance for sodium is only applicable to people on a sodium restricted diet and poses no risk to the environment and little risk to the general public. As for the 108 part per billion lead detection in piezometer 7, the remediation of the soils surrounding soil boring SB-2 and monitor well 6S would significantly reduce this level. Regardless, this level is present in only one sample from a water unit that cannot be used as a drinking source and would be contained by the IRM Interceptor Trench. As such, this level poses little or no threat to human health or the environment.

There was also a detection for lead (34.3 ppb) in monitoring well 3 above the action level of 15 parts per billion, but this detection was attributed to the high turbidity (897 ntu) of the sample. Groundwater samples with a high turbidity generally show elevated metal readings as the suspended soil particles naturally contain metals.

#### 3.1.4 DEEP GROUNDWATER SAMPLING

No significant contamination was detected in any of the deep monitoring wells on site. This absence of contamination in the deep wells is consistent with the sampling results of adjacent homeowner wells and the transducer monitoring of the hydraulic interaction between the bedrock aquifer and the weathered till water unit. These wells include monitoring wells 4D which is 74 feet deep, 5D which is 53 feet deep, 6D which is 64 feet deep and the production well which is over 250 feet deep.

Although 17.7 ppb of lead was detected from the Balchem Plant's production well which exceeds the 15 ppb action level for lead in drinking water supplies, it is not believed to be representative of a lead contamination problem in the bedrock aquifer. Three other bedrock water samples were collected from dedicated sampling wells and were lead free. Due to the production well's

construction, this sample was drawn from a copper sampling tube which could have lead solder that influenced the sample. Based on the closeness of the detection to the standard and the negative results from the dedicated monitoring wells, the existence of lead contamination in the bedrock is not believed to exist.

### 3.1.5 GROUNDWATER ELEVATION MONITORING

As described in the site background, the bedrock aquifer is the primary source of drinking water in the area. As such, the possibility of contamination in this unit was a significant concern during the Expanded RI/FS. This aquifer was not only sampled through on site monitoring wells, but hourly readings of the water levels were taken in the weathered till water unit and the bedrock aquifer. These elevations, as measured through the use of pressure transducers in monitoring well pairs 4S, 4D and 6S, 6D, clearly show that the units are not hydraulically connected. Since there is no hydraulic connection, the possibility for contamination from the drum disposal area to migrate into this water supply is extremely remote.

### 3.1.6. OFF SITE SURFACE WATER AND SEDIMENT SAMPLING

Three separate rounds of sampling were performed to assess the relationship, if any, to Joe Creek and the site. Joe Creek is classified as a Class D water body, as its flow is intermittent during certain seasons. The first sampling event occurred in April, 1994. This sampling event allowed the assessment of runoff into Joe Creek during its peak spring flow and the time that the potential for surface runoff from the site would be at its greatest. The second round occurred during August, 1994 and allowed for the assessment of the creek's condition during its summer low flow. The last round occurred in May, 1995 to further assess the condition of the soil in the railroad ditch between the site and the creek. The locations of these sampling points are shown on Figure 4.

During the first and second sampling events, sediment and surface water were collected from Joe Creek (SW\SED 006, 007, 008), and a marshy area adjacent to Joe Creek (SED\SW 001, 002, SED 003). Surface water samples were also collected from the railroad track ditch (SW 003, 004). The soil in the railroad ditch between the Balchem Plant and Joe Creek was sampled for lead and zinc by the NYSDEC. A total of 7 samples were taken. The first four (Ditch 1, Ditch 2, Ditch 3 and Ditch 4) were taken from the ditch adjacent to the Balchem Property. The remaining three samples (Ditch 5, Ditch 6, and Ditch 7) were background samples taken from a similar ditch south, and topographically upgradient, of the ditch in question.

#### 3.1.6 (a) Off Site Surface Water Sampling

The water samples collected were compared to the standards and guidelines for Class D surface waters.

The samples collected from Joe Creek found no exceedances of standards or guidelines, with the exception of iron (506 to 620 ppb).

Water samples from the railroad track ditch did not exceed standards or guidelines for any volatile or semivolatile compounds. One pesticide, 4,4 dichlorodiphenyltrichloroethane (DDT) at .05 J ppb, and two polychlorinatedbiphenyls (PCBs), 0.25 J ppb of 1254 and 0.48 ppb of 1260, were detected in exceedance of surface water standards. However, the presence and levels of these compounds are not unusual along a railroad track line and do not indicate an impact from the site. The unfiltered surface water samples from this ditch also exceeded surface water criteria for several metals. This is probably due to the turbid nature of the samples from the ditch.

#### 3.1.6 (b) Off Site Sediment Sampling

Sediment samples from Joe Creek, and the railroad

track ditch were compared to both sediment and soil guidelines as this material is not truly sediment in the sense that an aquatic environment is not present above this soil throughout the year.

#### Joe Creek:

Several semi-volatiles were detected, but only two were detected above the soil guidelines, 500 and 140 parts per billion of benzo(a)pyrene. The higher of these was detected in the upstream sampling location (SED 008), which was used as a background sample for the site. Therefore, this contamination cannot be attributed to the site. Exceedances of the sediment standards for four other similar contaminants were noted in this sampling point (SED 008) and the next downstream sampling point (SED 007). These contaminants, benzo(a)anthracene (380 J ppb), benzo(b)fluoranthene (530 J and 130 J ppb), benzo(k)fluoranthene (530 J and 140 J ppb), and indeno(1,2,3-c,d)pyrene (210 J and 74 J ppb) all follow the same trend of the highest level being in the most upstream sample (SED 008). Based on this distribution and the levels, it is very likely that these compounds are from the roadway that crosses Joe Creek just upgradient of sampling point SED 008, since these compounds are all typically found in automotive exhaust. As such, they do not indicate a contamination problem from the site nor are these levels considered a significant impact on Joe Creek.

These samples also detected two pesticides, 4,4 dichlorodiphenyltrichloroethane (from 1.7 J to 3.5 J ppb) and 4,4 dichlorodiphenyl-dichloroethane (1.7 J to 2.6 J ppb), at levels that did not exceed soil guidelines but that were in excess of sediment guidelines. The background sample, SED 008, contained these pesticides at levels of 2.0 JN and 1.7 J respectively. Based on the levels, distribution, and prevalence of agricultural activities in the area, these levels are not considered to present a contamination problem or significant impact on Joe Creek, nor are they attributable to the site.

Several metals were also detected in these samples. A few of these metals exceeded both soil and sediment criteria. The exact location and levels of these detections are summarized in Tables 5 and 6. This contamination is not believed to be caused by the site. During the fieldwork, a significant amount of household trash and debris was noted in and along Joe Creek, particularly in the areas of samples 001, 002, and 006. These sampling locations can be viewed on Figure 4. Among the items noted in these areas were a AA duracell battery, burn barrels, ash, animal manure, lawn trash, and a dental retaining plate.

Of the lead and zinc contamination along the creek bed that is potentially related to the site, only zinc exceeds the soil guidelines. Namely 228 N ppm in sample SED 007, 281 N ppm in sample SED 008, 987 ppm in SED 001 and 438 ppm in SED 002. The first two are imprecise, as noted by the N flag which denotes that a spiked sample recovery was not within the control limits, as are all of the on site detections except for the background subsurface sample (BGSB-1 at 97.2 ppm). These levels are also comparable to the levels found in the railroad ditch topographically upgradient of the site. Levels that are not due to the contamination at the site and are indicative of those levels found in the soils around the area. Additionally, these soils appear to be having no impact on the quality of the water in Joe Creek.

#### Railroad Ditch:

The NYSDEC samples showed that even though the water in the ditch does not appear to be impacted, the sediments in this ditch showed elevated levels of lead. Specifically, 718, 514, 1470, and 1890 ppm were in samples 1 through 4. This is in contrast to 84, 71, and 69 ppm of lead from the background samples 5 through 7. The zinc also showed this trend. Specifically 1080, 563, 517 and 1960 ppm were in samples 1 through 4, in contrast to 134, 139, and 87 ppb from the background samples 5 through 8.

### 3.2 Interim Remedial Measures:

Interim Remedial Measures (IRMs) were conducted at the site based on findings as the remedial investigation of the site progressed. An IRM is implemented when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

The IRM performed in July, 1993, was the installation of a trench and concrete collection sump. This trench is 105 feet long and 4 feet deep. The sump that this trench drains into is a concrete vault that is 4 feet in diameter and is 6 feet deep. This trench was designed to intercept and contain the groundwater flow from a perched water table that seasonally appears in the former drum disposal area. Please refer to Figure 6 for the trench's location. A perched water table is a unit of water that exists closer to the ground surface than the normal water table due to an underlying layer of material impervious to water, such as a clay lens. At the site, this perched water table is so close to the surface that it would occasionally well up and discharge water like a natural spring. This discharged water had shown benzene contamination when sampled in the past. So to prevent any possible exposure to this water and any possible migration of this water off site, the trench and sump were installed to intercept and contain this water until a full remedial program could be implemented. The water collected by this system is containerized in fifty-five gallon drums on site until it can be disposed of properly.

Due to the extremely dry conditions of 1993, and 1995, no perched water table existed and the IRM produced no water. However, during the extremely wet spring of 1994, the sump proved to be very effective. This system intercepted approximately 765 gallons of water, which were then transferred to 14 fifty-five gallon drums. Additionally, a sample of water collected from the sump contained only very low levels of contamination, 11 ppb of butanone and 46 ppb of

4 methylphenol. The complete analysis for the water sample taken from the sump is included in the data package located in the local document depository.

### 3.3 Summary of Human Exposure Pathways:

Presently, there are no human exposure pathways leading off of the site. The only potential human exposure pathway would be from the residual soil contamination in the former drum disposal area, the railroad track ditch and the groundwater from the perched and weathered till water units in the drum disposal area. Currently these soils and groundwater do not present a significant exposure pathway due to the limited access of the property and the limited exposure of on site workers to the affected media. However, without remedial action the levels of contamination present in the subsurface soils and the perched water table could pose a significant risk in the future.

### 3.4 Summary of Environmental Exposure Pathways:

Presently, there are no environmental exposure pathways leading off of the site. The only likely environmental exposure pathway would be from the contaminated media on site. Namely, the residual soil contamination in the former drum disposal area, the railroad track ditch and the groundwater from the perched and weathered till water units in the drum disposal area. The ability for a significant wildlife community to exist on the property is considered negligible due to the lack of groundcover on the site, the fencing of the site, the high level of vehicle and human traffic on the site and the Federal Food and Drug Administration's requirement for rodent population control at any facility that handles food ingredients. However, without the benefit of remedial action the possibility for contaminated media to migrate off of the site and impact the environment will remain.

#### **SECTION 4: ENFORCEMENT STATUS**

The NYSDEC and the Balchem Corporation entered into a Consent Order ( W3-071-86-06) on January 14, 1992. The Order obligates the Balchem Corporation to implement a remedial program for the site which would include a Focused Remedial Investigation and Feasibility Study (Focused RI/FS), design and implementation of the selected remedial alternative, and operation, maintenance and monitoring of this alternative.

#### **SECTION 5: SUMMARY OF THE REMEDIATION GOALS**

Goals for the remedial program have been established through the remedy selection process stated in 6NYCRR 375-1.10. These goals are established under the guideline of meeting all standards, criteria, and guidelines (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Reduce, control, and eliminate the contamination present within the soils on the site.*
- *Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the site.*
- *Reduce the potential for direct human contact with the soils remaining on the site.*
- *Reduce the potential for direct animal contact with the soils remaining on the site.*

#### **SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES**

Since the deep bedrock aquifer, which is the primary drinking water source in the area, was unaffected by the drum disposal area and since an IRM is already operating to remove the volatile organic contamination in the perched water table; no additional remedy is proposed for the groundwater at the site.

Based on the samples taken near the site, no remedial action is recommended for the creek bed of Joe Creek. Please refer to page 9 for the discussion of the sediment data.

The soils around monitoring well 6S were contaminated with up to 2,210 ppm of lead and are recommended for remediation. Although the amount of contamination in the railroad track ditch is small, the levels of lead in these soils possess the potential to impact Joe Creek. These elevated levels are believed to be from the site and hence are proposed to be removed.

Remedial alternatives for the soil contamination at the Balchem Plant site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled Feasibility Study, Balchem Corporation, Slate Hill, New York and dated May 2, 1995. A summary of the detailed analysis follows.

##### **6.1: Description of Remedial Alternatives**

##### **Alternative 1: No Further Action**

The no further action alternative is evaluated as a statutory requirement and as a basis for comparison. This alternative recognizes the remediation of the site completed under the previously undertaken IRM. It would require continued monitoring only, to evaluate the effectiveness of the remediation completed under the IRM. No monitoring or remediation of Joe

Creek or the railroad ditch would occur in the alternative. This is an unacceptable alternative as the site would remain in its present condition, and human health and the environment would not be adequately protected from future exposures.

### Alternative 2: Limited Action

<i>Present Worth:</i>	<i>\$ 47,000</i>
<i>Capital Cost</i>	<i>\$ 4,800</i>
<i>Annual O&amp;M:</i>	<i>\$ 14,000</i>
<i>Time to Implement</i>	<i>3 years</i>

This alternative includes the sampling of the on-site monitoring wells and soils, followed by a three-year groundwater monitoring program.

Landscaping would also be performed on the site to place a cap of clean soil with a grass cover over the drum disposal area. This cap would prevent human contact with the underlying soils, reduce the infiltration of precipitation in this area and prevent any future migration of the soils by erosion. This landscaping would also eliminate the potential for surface water runoff from the site in the future.

The IRM Interceptor Trench would continue to be operated for at least three more years. The continued operation of this system would be to contain the contaminated perched water table. This containment would significantly reduce the ability for this contamination to migrate beyond this unit. This action would also facilitate the monitoring of the contamination in this unit to insure that the contaminant levels naturally reduce to acceptable levels within the expected time frame.

No monitoring or remediation of Joe Creek or its channel bed would be performed in this alternative. There would also be no remediation or monitoring of the soils in the ditch between the site

and the adjoining railroad tracks.

Institutional controls would be implemented to insure that the property continues to be used as an industrial property in the future. At the end of three years, this remedy would be reevaluated by the NYSDEC and the Balchem Corporation to assess the need for the continued operation of the sump, the continued monitoring of the groundwater, and any other appropriate actions.

### Alternative 3: Environmental Management Action

<i>Present Worth:</i>	<i>\$ 105,000</i>
<i>Capital Cost:</i>	<i>\$ 60,000</i>
<i>Annual O&amp;M:</i>	<i>\$ 16,000</i>
<i>Time to Implement</i>	<i>3 years</i>

This alternative would remove soils exceeding 500 ppm of lead within the drum disposal area and in the railroad track ditch adjacent to the site for disposal at a secure landfill. The proposed soil excavation areas are shown on figure 7. The soil contamination within the railroad track ditch would be limited to a depth of approximately six inches. This excavation would be along the entire ditch between the two railroad sidings utilized by the Balchem Corporation. It is estimated that this excavated soil would total approximately 18 cubic yards. The significantly impacted soil on the site is estimated to be limited to within a fifteen foot radius of monitor well 6S and to total approximately 210 cubic yards in volume. This area would be excavated down to the water table, approximately 8 feet. The excavated soils would be temporarily stored onsite in roll off bins. Approximately 3 samples per roll off would be taken and analyzed according to the Toxicity Characteristic Leaching Protocol (TCLP). Roll offs whose samples failed to pass TCLP criteria would be disposed of in a secure hazardous waste landfill, while roll offs which pass TCLP criteria would be disposed of in an approved non-hazardous waste landfill. The remaining soils on the site would be landscaped, graded and covered



with clean soil and a grass layer to prevent any future migration of the residually impacted soils by erosion. This cover would also reduce the amount of precipitation infiltrating in this area, increase surface runoff and prevent human contact with these soils. Landscaping would also be implemented to eliminate the potential for surface runoff from the site in the future.

As in Alternative 2, this alternative would also include the continued operation of the IRM Interceptor Trench for a period of at least three years.

This alternative would include the sampling of the on-site monitoring wells, followed by a three year groundwater monitoring program. This program would allow for the verification of the present site conditions and the effectiveness of the selected remedy. At the end of the three years, this remedy would be reevaluated by the NYSDEC and the Balchem Corporation to assess the need for the continued operation of the sump, monitoring of the groundwater, and any other appropriate actions.

Institutional controls would also be implemented to insure that the site is used only as an industrial facility in the future, as lead levels above background would remain in the subsurface soils.

## 6.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet

applicable environmental laws, regulations, standards, and guidelines.

Alternatives 2 and 3 would achieve compliance with standards, criteria and guidelines for groundwater over time. In the short term, there would continue to be exceedances of groundwater criteria in the perched water table (piezometer 7) for 1,2 Dichloroethene. However, this level should fall to below standards, less than 5 parts per billion, within three years. This compliance would be assured by the monitoring of the groundwater at the site for at least three years.

Alternative 3 would achieve compliance with standards, criteria, and guidelines for all of the soils on site. Alternative 1 would not achieve the criteria for lead for all of the soils on the site. Some soils in exceedence of the recommended state soil cleanup goal of 500 ppm and the 2,000 ppm action level for lead set by the Environmental Protection Agency for industrial soils would remain.

Alternatives 1, 2, and 3 would be in compliance with standards, criteria and guidelines for the surface water in Joe Creek. None of the alternatives would affect the contaminants found in the creek bed itself.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Remedial alternative 3 would be protective of human health and the environment. However, Alternative 1 and 2 would leave the potential of future risks at the site as lead contamination at significant levels would still remain in the subsurface soils at the site.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and implementation are

evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

None of the proposed alternatives would pose any significant risks in the short term to the surrounding community or the workers at the Balchem Plant. Protective measures, such as the wetting down of soils to control dust, would be implemented as needed along with the standard health and safety monitoring measures during the construction.

#### 4. Long-term Effectiveness and Permanence.

This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternatives 1 and 2 would leave soil contaminated with significant lead levels at the site. There will be no increased human health risk for alternative 2 as these soils would be subsurface and there should be little chance of contaminant migration due to the surface cover and immobile nature of lead. However, the possibility for the groundcover to be breached would exist. The use of institutional controls to prevent residential use of the site and the maintenance of the soil cover should adequately address this risk, especially in light of the relatively low mobility and hazardous nature of lead. Nevertheless, the additional measure for the removal and disposal of the more contaminated soils in a secure landfill by Alternative 3 would reduce this risk even further.

#### 5. Reduction of Toxicity, Mobility or Volume.

Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 1, 2 and 3 would not significantly reduce the volume or toxicity of the lead

contaminated soil at the site. There are few technologies that are capable of doing this for lead contaminated soils and site conditions do not merit the use of one of these technologies. Alternative 3 would permanently remove the more significantly contaminated soils from the site and, as such, is preferable to Alternative 1 or 2.

Alternative 3 would also remediate the small amount of lead contaminated soil in the railroad track ditch. Alternative 1 and 2 would leave this contamination in place and untreated.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Both of the proposed alternatives would be readily implementable. The necessary materials and personnel needed for either alternative can be easily and promptly obtained from a number of sources. Both of the remedies are technically sound and administratively feasible.

7. Cost. Capital, and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are \$105,000 for Alternative 3 and \$47,000 for Alternative 2.

8. Community Assessment - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan will be evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and how

the Department will address the concerns raised. If the final selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

## **SECTION 7: SUMMARY OF THE SELECTED REMEDY**

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 3 as the remedy for this site.

This selection is based upon the increased benefits of Alternative 3 over Alternative 2. Although both alternatives would be protective of human health and the environment, Alternative 3 will reduce even further the risk of any threat to human health and the environment in the future. This reduction in risk will be achieved at no substantial increase in the level of effort and time to remediate the site. Hence, Alternative 3, the environmental management alternative, is preferable to Alternative 2, limited action.

The estimated present worth cost to implement the selected remedy is \$105,000. The cost to construct the remedy is estimated to be \$60,000 and the estimated average annual operation and maintenance cost for 3 years is \$16,000.

The elements of the selected remedy are as follows:

1. A remedial design program to provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program.
2. The continued operation of the IRM Interceptor Trench for a period of at least three years. The need to continue this collection system will be reevaluated at the end of the three years by the Balchem Corporation and the NYSDEC.
3. The continued monitoring of the site for a period of at least three years to confirm the effectiveness of the remedy. The need to continue this monitoring will then be reassessed at the end of this period by the Balchem Corporation and the NYSDEC.
4. The removal and disposal of soils contaminated with greater than 500 ppm of lead to an off-site landfill. Soil which fails TCLP criteria for lead will be disposed of in a secure hazardous waste landfill.
5. The landscaping of the facility to eliminate any future contaminated runoff from the site.
6. The covering of the residually contaminated soils that will remain on the site with clean soil to a depth of at least 12 inches.
7. Deed restrictions will be implemented to insure that the property remains an industrial property. This will further eliminate the exposure of the public to lead contaminated soils.

TABLE 1

CHEMICALS USED AT THE BALCHEM FACILITY  
1969 THROUGH 1974

PRODUCT	CHEMICALS USED IN PRODUCTION	BY-PRODUCTS	HANDLING
dimethylaminoethyl methacrylate	1) dimethylaminoethanol 2) methyl methacrylate 3) parahydroxydiphenylamine 4) methyl ether hydroquinone 5) lead oxide 6) benzene	methanol, still bottoms consisting of dimethylaminoethyl methacrylate	1) tank cars 2) tank cars 3) cardboard drums 4) cardboard drums 5) bags 6) steel drums
diethylaminoethyl acrylate	1) diethylaminoethanol 2) methyl acrylate 3) parahydroxydiphenylamine 4) methyl ether hydroquinone 5) aluminum isopropylate	methanol, isopropanol, still bottoms consisting of diethylaminoethyl acrylate	1) tank cars 2) tank cars 3) cardboard drums 4) cardboard drums 5) steel drums
dimethyl maleate	1) maleic anhydride 2) methanol 3) paratoluenesulfonic acid 4) calcium oxide	calcium oxide salts, paratoluenesulfonic acid	1) tank wagons 2) tank wagons 3) steel drums 4) bags

TABLE 2  
SUMMARY OF SURFACE SOIL SAMPLES  
EXCEEDING NEW YORK STATE SOIL CRITERIA

Compounds	New York Cleanup Criteria	Eastern USA Background Concentration	Background Concentration (BGSS-1)	Range of Detections	Detections / Samples	Exceedances	
						Location	Concentration
<b>ppb</b>							
Chrysene	400	NA	62 J	62 JB - 860	4/4	SS-3	860
Benzo(a)anthracene	220 or MDL	NA	40 J	40 J - 660 J	4/4	SS-3	660 J
Benzo(a)pyrene	61 or MDL	NA	360 U	360 J - 680 J	3/4	SS-1 SS-2 SS-3	260 J 140 J 680 J
Dibenzo(a,h)anthracene	14 or MDL	NA	360 U	350 U - 140 J	2/4	SS-1 SS-3	62 J 140 J

TABLE 2 cont'd

Compounds	New York Cleanup Criteria	Eastern USA Background Concentration	Background Concentration (BGSS-1)	Range of Detections	Detections / Samples	Exceedances	
						Location	Concentration
<b>METALS ppm</b>							
Aluminum	SBG	33,000	11,300 U	11,300 U - 12,800	3/4	SS-1 SS-2 SS-3	11,600 12,400 12,800
Arsenic	7.5 or SBG	3 - 12	5.3	5.3 - 9.2	4/4	SS-2 SS-3	9.2 7.8
Beryllium	0.16 or SBG	0 - 1.75	0.18 U	0.18 U - 0.82 B	1/4	SS-3	0.82 B
Calcium	SBG	130 - 35,000	566*	566* - 7820*	4/4	SS-1 SS-2 SS-3	2,960* 3,030* 7,820*
Chromium	10 or SBG	1.5 - 40	19.4	17.6 - 22.3	4/4	SS-2 SS-3	22.3 22
Copper	25 or SBG	1 - 50	29.6	28.4 - 43.2	4/4	SS-2 SS-3	40.4 43.2
Iron	2,000 or SBG	2,000 - 550,000	18,400	18,400 - 23,200	4/4	SS-1 SS-2 SS-3	20,500 20,300 23,200
Lead	SBG	4 - 61	103	103 - 570	4/4	SS-1 SS-2 SS-3	204 570 362
Magnesium	SBG	100 - 5,000	3,240	3,240 - 5,910	4/4	SS-1 SS-2 SS-3	3,730 3,780 5,910
Mercury	0.1	.001 - .2	0.39 J	0.23 J - 0.39 J	4/4	SS-1 SS-2 SS-3	0.34 J 0.33 J 0.23 J
Manganese	SBG	50 - 50,000	336	336 - 494	4/4	SS-1 SS-2 SS-3	494 350 482
Nickel	13 or SBG	0.5 - 25	17.2	17.2 - 26.4	4/4	SS-1 SS-2 SS-3	25.7 24.4 26.4
Potassium	SBG	8,500 - 43,000	497	497 - 1,300	4/4	SS-1 SS-2 SS-3	826 1040 1300
Sodium	SBG	6,000 - 8,000	18.2 B	18.2 B - 95.5 B	4/4	SS-1 SS-2 SS-3	47.2 B 54.4 B 95.5 B
Zinc	20 or SBG	9 - 50	105 N	105 N - 235 N	4/4	SS-1 SS-2 SS-3	186 N 209 N 235 N

## NOTES:

- J: The associated numerical value is estimated  
 U: The material was analyzed for but not detected. The number given is the sample quantitation limit.  
 NA: Not applicable; Eastern USA background concentrations are available only for metals.  
 SBG: Site background  
 \*: Duplicate analysis not within control limits  
 MDL: Method detection limit.  
 B: The compound analyzed for was also found in the blank  
 N: Spiked sample recovery was not within control limits

TABLE 3  
SUMMARY OF SUB SURFACE SAMPLES THAT  
EXCEEDED NEW YORK STATE SOIL CRITERIA

Compounds	New York Cleanup Objective	Eastern USA Background Concentration	Background Concentration (BGSB-1)	Range of Detections	Detections / Samples	Exceedances	
						Location	Concentration
<u>SVOCs</u> ppb <u>Benzo(s)pyrene</u>	61 or MDL	NA	52 J	380 U - 160 J	6/8	SB-2 MW6-6'-8'	160 J 88 J
<u>METALS</u> ppm							
Arsenic	7.5 or SBG	3 - 12	4.2	2.3 - 8.7	8/8	SB-2	8.7
Beryllium	0.16 or SBG	0 - 1.75	0.16 U	0.16 U - 1.1	1/8	SB-2	1.1
Calcium	SBG	130 - 35,000	368	368 - 17,600*	8/8	SB-1 SB-2 SB-3 MW4-6'-8' MW6-6'-8' PZ6-10 PZ7-5	17,400* 3,390* 2,170* 9,190* 15,700* 1,750* 3,630*
Chromium	10 or SBG	1.5 - 40	23.4	14.2 - 41.6	8/8	SB-2	41.6
Copper	25 or SBG	1 - 50	31	25.1 - 128	8/8	SB-2 MW4-6'-8' MW6-6'-8' PZ6-10	128 32.5 32.1 33.5
Iron	2,000 or SBG	2,000 - 550,000	21,000	17,800 - 27,900	8/8	SB-1 SB-2 SB-3 PZ6-10 PZ7-5	23,700 27,800 21,300 27,900 24,000
Lead	SBG	4 - 61	73.4	15.8* - 2,210*	8/8	SB-1 SB-2 MW6-6'-8' PZ7-5	204* 849* 2,210* 391*
Magnesium	SBG	100 - 5,000	4,020	4,020 - 6,400	8/8	SB-1 SB-2 SB-3 MW4-6'-8' MW6-6'-8' PZ6-10 PZ7-5	6,400 4,400 4,220 4,650 4,130 5,510 4,790
Manganese	SBG	50 - 50,000	344	344 - 1,290	8/8	SB-1 SB-2 SB-3 MW4-6'-8' MW6-6'-8' PZ6-10 PZ7-10	549 554 522 405 653 1,290 353
Mercury	.1	0.001 - 0.2	0.53 J	0.086 UJ - 0.53 J	4/8	SB-1 SB-2 SB-3	0.14 J 0.37 J 0.11 J

TABLE 3 cont'd

Nickel	13 or SBG	0.5 - 25	19.1	16.5 - 76.8	8/8	SB-1 SB-2 SB-3 MW4-6'-8' PZ6-10 PZ7-5	25.8 76.8 22.3 25.6 29.4 21.8
Potassium	SBG	8,500 - 43,000	772	772 - 1,260	8/8	SB-1 SB-2 SB-3 MW4-6'-8' MW6-6'-8' PZ6-10 PZ7-5	1240 999 1050 1120 800 1260 837
Sodium	SBG	6,000 - 8,000	26.5 B	26.5 - 342	8/8	SB-1 SB-2 SB-3 MW4-6'-8' MW6-6'-8' PZ6-10 PZ7-5	342 105 B 40.4 B 83.8 212 59.1 B 56.8 B
Zinc	20 or SBG	9 - 50	97.2	85 N - 523 N	8/8	SB-1 SB-2 MW4-6'-8' MW6-6'-8' PZ7-5	132 523 199 193 188

## NOTES:

- J: The associated numerical value is estimated  
U: The material was analyzed for but not detected. The number given is the sample quantitation limit.  
NA: Not applicable; Eastern USA background concentrations are available only for metals.  
SBG: Site background  
•: Duplicate analysis not within control limits  
MDL: Method detection limit.  
B: The compound analysed for was also found in the blank  
N: Spiked sample recovery was not within control limits



TABLE 4  
SUMMARY OF SEDIMENT SAMPLES THAT  
EXCEEDED NEW YORK STATE CRITERIA

Compounds	New York Soil Cleanup Objective	Eastern USA Background Concentration	New York State Sediment Criteria <sup>(1)</sup>					Background Concentration (SED 008)	Range of Detections	Detections / Samples	Exceedures	
			Bioaccumulation		Benthic Aquatic Life						Location	Concentration
			Human	Wildlife	Chronic Toxicity	Acute Toxicity						
VOC3 ppb 1,1 Dichloroethene	400	NA	0.6	NA	NA	NA	NA	13 U	11 U - 13 U	0/3	---	---
SVOC3 ppb Benzo(a)pyrene	61 or MDL	NA	39.0	NA	NA	NA	NA	500 J	370 U - 500 J	2/3	SED 008	500 J
Benzo(a)anthracene	224 or MDL	NA	39.0	NA	NA	NA	NA	380 J	13 J - 380 J	3/3	SED 006 SED 007 SED 008	13 J 110 J 380 J
Benzo(b)fluoranthene	1.1	NA	39.0	NA	NA	NA	NA	590 J	19 J - 590 J	3/3	SED 007 SED 008	130 J 590 J
Benzo(k)fluoranthene	1,100	NA	39.0	NA	NA	NA	NA	530 J	22 J - 530 J	3/3	SED 007 SED 008	140 J 530 J
Chrysene	400	NA	39.0	NA	NA	NA	NA	470	26 J - 470	3/3	SED 007 SED 008	130 J 470 J
Indeno(1,2,3-cd)-pyrene	3,200	NA	39.0	NA	NA	NA	NA	210 J	370 U - 210 J	2/3	SED 007 SED 008	74 J 210 J
PESTICIDE ppb 4,4 DDE	2,100	NA	0.3	30	30	NA	NA	4.1 U	1.1 R - 4.3 U	0/3		
4,4 DDD	2,900	NA	0.3	30	30	NA	NA	1.7 J	1.7 J - 2.6 J	3/3	SED 006 SED 007 SED 008	2.6 J 2.3 J 1.7 J
4,4 DDT	2,100	NA	0.3	30	30	33,000	2.0 JN	1.7 J - 3.5 J		2/3	SED 006 SED 007 SED 008	3.5 J 1.7 J 2.0 JN

<sup>(1)</sup> Assumes 3% organic carbon

TABLE 4  
SUMMARY OF SEDIMENT SAMPLES THAT  
EXCEEDED NEW YORK STATE CRITERIA

Compounds	New York Soil Cleanup Objective	Eastern USA Background Soil Concentration	New York Sediment Criteria		Background Concentration (SED 008)	Range of Detections	Detections / Samples	Exceedances	
			Lowest Effect Level	Severe Effect Level				Location	Concentration on
METALS (ppm)									
Antimony	SBG	NA	2.0	25.0	9.1 UJ	6.8 UJ - 8.9 J	1/3	SED 006	8.9
Arsenic	7.5 or SBG	3 - 12	6.0	33.0	4.9	4.9 - 13.6	3/3	SED 006	13.6
Cadmium	1 or SBG	0.1 - 1	0.6	9.0	0.45 U	0.34 U - 1.3	1/3	SED 006	1.3
Chromium	10 or SBG	1.5 - 40	26.0	110.0	16.3	16.3 - 23.2	3/3	SED 007 SED 006	23.2 17.8
Copper	25 or SBG	1 - 50	16.0	110.0	22.4	22.4 - 456		SED 006 SED 007 SED 008	456 47.4 22.4
Iron	2,000 or SBG	2,000 - 550,000	2.0%	4.0%	28,200	25,800 - 40,800	3/3	SED 006 SED 007 SED 008	40,800 25,800 28,200
Lead	SBG	4 - 61	31.0	110.0	21.8*	21.8* - 84.4*	3/3	SED 006 SED 007	84.4* 37.6*
Manganese	SBG	50 - 50,000	460.0	1100.0	1440	594 - 1440	3/3	SED 006 SED 007 SED 008	594 608 1440
Mercury	0.1	0.001 - 0.2	0.15	1.3	0.12 UJ	0.095 - 0.12 UJ	3/3	---	---
Nickel	13 or SBG	0.5 - 25	16.0	50.0	23.4	.4 - 47.1	3/3	SED 006 SED 007 SED 008	47.1 31.8 23.4
Zinc	20 or SBG	9 - 50	120.0	270.0	113 N	113 N - 281 N	3/3	SED 006 SED 007	281 N 228 N

NOTES:

- J: The associated numerical value is estimated
- U: The material was analyzed for but not detected. The number given is the sample quantitation limit.
- NA: Not applicable; Eastern USA background concentrations are available only for metals.
- SBG: Site background
- \*: Duplicate analysis not within control limits
- MDL: Method detection limit.
- B: The compound analyzed for was also found in the blank
- N: Spiked sample recovery was not within control limits

TABLE 5  
SUMMARY OF SAMPLES ADJACENT TO JOE CREEK  
THAT EXCEEDED NEW YORK STATE CRITERIA

Compounds	New York Soil Cleanup Objective	Eastern USA Background Concentration	New York State Sediment Criteria (1)					Background Concentration (SED 008)	Range of Detections	Detections / Samples	Exceedances	
			Bioaccumulation	Wildlife	Benthic Aquatic Life	Chronic Toxicity	Acute Toxicity				Location	Concentration
VOCl <sub>3</sub> ppb 1,1 Dichloroethene	400	NA	0.6	NA	NA	NA	NA	13 U	10 U - 6.0 J	1/3	SED 002	6.0 J
SVOCs ppb Benzo(a)pyrene	61 or MDL	NA	39.0	NA	NA	NA	NA	530	28 J - 1100	3/3	SED 001 SED 002	400 J 1100
Benzo(a)anthracene	224 or MDL	NA	39.0	NA	NA	NA	NA	380 J	310 U - 1,000 J	2/3	SED 001 SED 002	370 J 1000 J
Benzo(b)fluoranthene	1.1	NA	39.0	NA	NA	NA	NA	590 J	44 J - 1,700	3/3	SED 001 SED 002 SED 003	5. 1 4
Benzo(k)fluoranthene	1,100	NA	39.0	NA	NA	NA	NA	530 J	30 J - 1,400	3/3	SED 001 SED 002	410 J 1400
Chrysene	400	NA	39.0	NA	NA	NA	NA	470	41 J - 1,400	3/3	SED 001 SED 002 SED 003	490 J 1400 41 J
Indeno(1,2,3-cd)pyrene	3,200	NA	39.0	NA	NA	NA	NA	210 J	330 U - 200 J	3/3	SED 001 SED 002	200 J 420 J
PESTICIDES ppb 4,4 DDE	2,100	NA	0.3	30	30	NA	NA	4.1 U	0.72 J - 5.9 J	3/3	SED 001 SED 002 SED 003	5.9 J 5.5 J 0.72 J
4,4 DDD	2,900	NA	0.3	30	30	NA	NA	1.7 J	3.3 U - 10	2/3	SED 001 SED 002	7.1 J 10.0
4,4 DDT	2,100	NA	0.3	30	30	33 000	33 000	2.1 N	---	0/3	---	---
PCBs ppb Arochlor 1254	1.0 Surface 10.0 Subsurface	NA	0.024	42.0	57.9	80,800	80,800	41 U	33 U - 53 JN	2/3	SED 001 SED 002	34 JN 53 JN

NOTES:  
J: The associated numerical value is estimated.  
U: The material was analyzed for but not detected. The number given is the sample quantitation limit.  
NA: Not applicable; Eastern USA background concentrations are available only for metals.  
SDG: Site background

TABLE 5  
SUMMARY OF SAMPLES ADJACENT TO JOE CREEK  
THAT EXCEEDED NEW YORK STATE CRITERIA

Compounds	New York Soil Cleanup Objective	Eastern USA Background Soil Concentration	New York Sediment Criteria		Background Concentration (SED 008)	Range of Detections	Detections / Samples	Exceedances	
			Lowest Effect Level	Severe Effect Level				Location	Concentration
<u>METALS</u> ppm									
Antimony	SBG	NA	2.0	25.0	9.1 UJ	—	0/3	—	—
Arsenic	7.5 or SBG	3 - 12	6.0	33.0	4.9	5.6 J - 21.7 J	3/3	SED 001 SED 002	18.5 J 21.7 J
Cadmium	1 or SBG	0.1 - 1	0.6	9.0	0.45 U	0.62 U - 3.2 B	1/3	SED 002	3.2 B
Chromium	10 or SBG	1.5 - 40	26.0	110.0	16.3	17.9 - 31.9	3/3	SED 001 SED 002 SED 003	26.2 31.9 17.9
Copper	25 or SBG	1 - 50	16.0	110.0	22.4	14.7 - 70.9	3/3	SED 001 SED 002	43.4 70.9
Iron	2,000 or SBG	2,000 - 550,000	2.0%	4.0%	28,200	25,500 J - 50,500 J	3/3	SED 001 SED 002 SED 003	41,500 50,500 25,500
Lead	SBG	4 - 61	31.0	110.0	21.8*	32 J - 672 J	3/3	SED 001 SED 002 SED 003	225 J 672 J 32 J
Manganese	SBG	50 - 50,000	460.0	1100.0	1,440	592 J - 2,110 J	3/3	SED 001 SED 002 SED 003	851 J 2,110 J 592 J
Mercury	0.1	0.001 - 0.2	0.15	1.3	0.12 UJ	0.16 U - 0.58	1/3	SED 002	0.58
Nickel	13 or SBG	0.5 - 25	16.0	50.0	23.4	20.1 B - 38.9 B	3/3	SED 001 SED 002 SED 003	21.4 B 38.9 B 20.1 B
Zinc	20 or SBG	9 - 50	120.0	270.0	113 N	92 - 987	3/3	SED 001 SED 002	438 987

NOTES:

- J: The associated numerical value is estimated  
 U: The material was analyzed for but not detected. The number given is the sample quantitation limit.  
 NA: Not applicable; Eastern USA background concentrations are available only for metals.  
 SBG: Site background  
 •• Duplicate analysis not within control limits  
 MDL: Method detection limit.  
 B: The compound analysed for was also found in the blank  
 N: Spiked sample recovery was not within control limits

TABLE 6  
SUMMARY OF GROUNDWATER SAMPLES THAT  
EXCEEDED NEW YORK STATE CRITERIA

Compounds	New York Standard <sup>(1)</sup>	Background Concentration (MW 5S / 5D)	Range of Detectious	Detectious / Samples	Exceedances		
					Location	Turbidity (NTUs)	Concentration
<u>VOCs</u> ppb							
Benzene	0.7	10 U / 10 U	10 U - 0.6 J	1/12	Sump	7.0	1 J
1,2 Dichloroethene	5	10 U / 10 U	10 U - 89	3/12	PZ 6	37.0	89
Trichloroethene	5	10 U / 10 U	10 U - 7 J	1/12	PZ 6	37.0	7 J
<u>SVOCs</u> ppb							
Phenol	1	10 U / 11 U	10 U - 14	2/12	MW 6S REP <sup>(4)</sup> SUMP	NA NA 7.0	14 8.0 J 5 J
<u>PESTICIDES</u> ppb							
Dieldrin	ND (<0.01)	0.005 UJ / 0.001 R	0.002 J - 0.007 J	2/12	PZ 6 MW 3	37.0 897	0.007 J 0.002 J
Endrin	ND (<0.01)	0.010 UJ / 0.012 UJ	0.010 UJ - 0.047	1/12	PZ 6	37.0	0.047
4,4 DDD	ND (<0.01)	0.001 R / 0.012 UJ	0.001 R - 0.091	2/12	PZ 6	37.0	0.091

<sup>(1)</sup> = Maximum contaminant levels from Subpart 3-1 Public Water Systems

<sup>(2)</sup> = There is no standard, however water containing more than 20,000 ppb should not be used by people on a severely restricted sodium diet. Similarly, water containing more than 270,000 should not be used by people on a moderately restricted sodium diet.

<sup>(4)</sup> = This is a replicate sample, a duplicate, of the sample taken from monitoring well 6S. As such it is not counted in the twelve samples taken.

NOTES:

- J: The associated numerical value is estimated .  
 U: The material was analyzed for but not detected. The number given is the sample quantitation limit.  
 NA: Not applicable; Eastern USA background concentrations are available only for metals.  
 SBG: Site background  
 \*: Duplicate analysis not within control limits  
 MDL: Method detection limit.  
 B: The compound analysed for was also found in the blank  
 N: Spiked sample recovery was not within control limits

TABLE 6  
SUMMARY OF GROUNDWATER SAMPLES THAT  
EXCEEDED NEW YORK STATE CRITERIA

Compounds	New York Standard <sup>a)</sup>	Background Concentration (MW 5S / 5D)	Range of Detections	Detections / Samples	Exceedances		
					Location	Turbidity (NTUs)	Concentration
<u>METALS</u> ppm							
Arsenic	50	1.0 U / 3.0 BW	1 U - 47.7	7/12	MW 2 MW 3	123 897	27 S 47.7
Iron	300	1110 J / 892 J	67.8 J - 31,200 J	12/12	PZ 6 PZ 7 MW 1 MW 2 MW 3 MW 4S MW 4D MW 5S MW 5D MW 6S MW 6D P. WELL REP SUMP	37.0 37.0 166 123 897 427 11.0 41.0 30.0 NA 6.0 8.0 NA 7.0	1,270 J 5,580 J 16,000 J 15,100 J 31,200 J 4,570 J — 1,110 J 892 J 17,400 J — 747 J 16,000 J 12,500 J
Lead	15	1.3 B / 1.4 B	1 U - 108	10/12	PZ 7 P. WELL	37.0 8.0	108 17.7
Manganese	300	3860 / 4330	21.7 - 16,900	12/12	PZ 6 PZ 7 MW 1 MW 2 MW 3 MW 4S MW 4D MW 5S MW 5D MW 6S MW 6D P. WELL REP SUMP	37.0 37.0 166 123 897 427 11.0 41.0 30.0 NA 6.0 8.0 NA 7.0	1,190 1,850 5,350 15,500 16,900 9,660 291 2,470 — 923 452 506 934 6,600 J
Sodium	(3)	13,200 / 84,900	5,150 - 570,000	12/12	MW 2 MW 3 MW 4D MW 5D MW 6D	123 897 11.0 30.0 6.0	57,000 52,600 28,700 84,900 23,700

<sup>a)</sup> = Maximum contaminant levels from Subpart 3-1 Public Water Systems

<sup>b)</sup> = There is no standard, however water containing more than 20,000 ppb should not be used by people on a severely restricted sodium diet. Similarly, water containing more than 270,000 should not be used by people on a moderately restricted sodium diet.

<sup>c)</sup> = This is a replicate sample, a duplicate, of the sample taken from monitoring well 6S. As such it is not counted in the twelve samples taken.

NOTES:

J: The associated numerical value is estimated

U: The material was analyzed for but not detected. The number given is the sample quantitation limit.

NA: Not applicable; Eastern USA background concentrations are available only for metals.

SBG: Site background

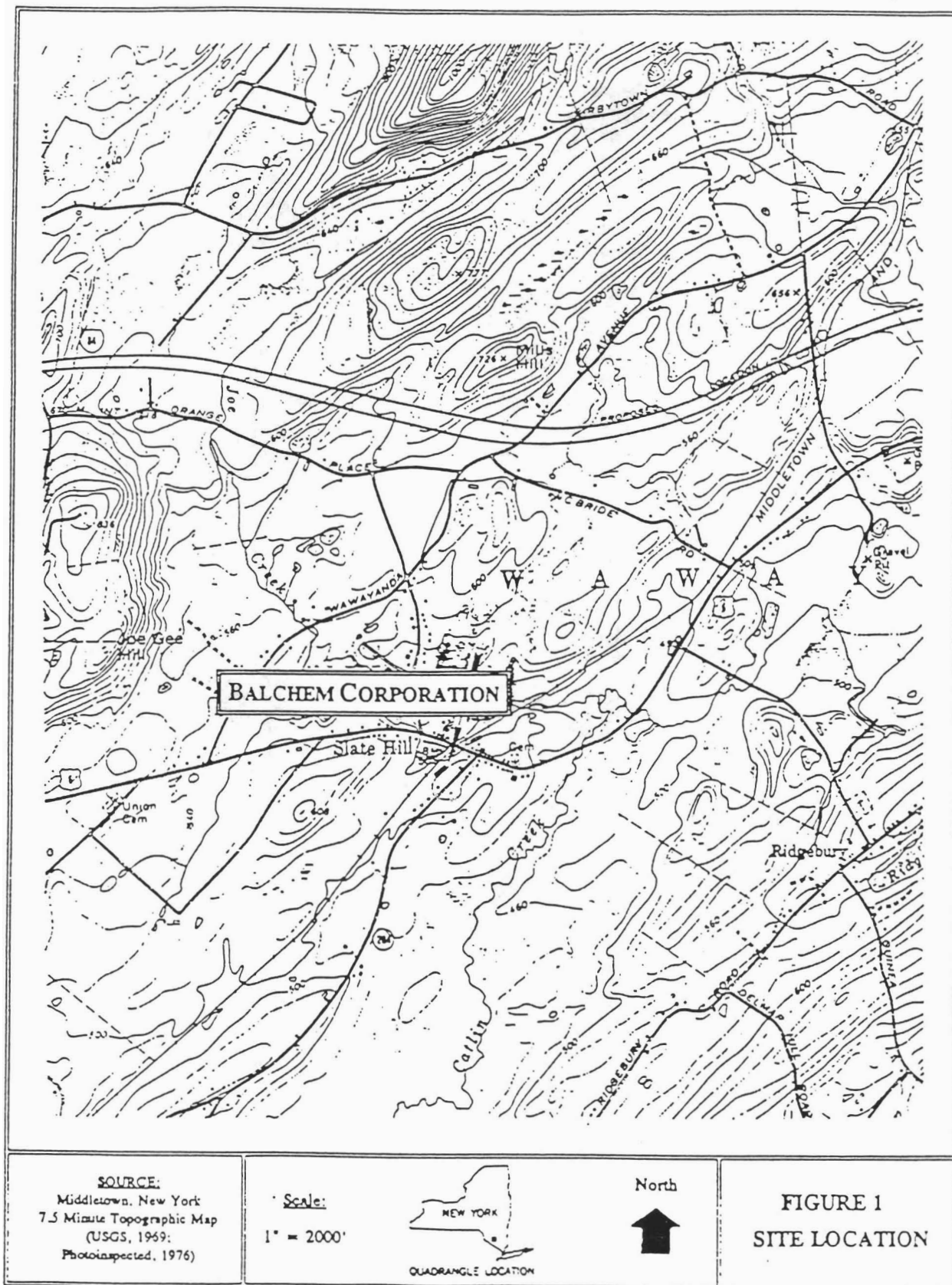
• Duplicate analysis not within control limits

MDL: Method detection limit.

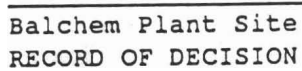
B: The compound analysed for was also found in the blank

N: Spiked sample recovery was not within control limits

# Figure 1



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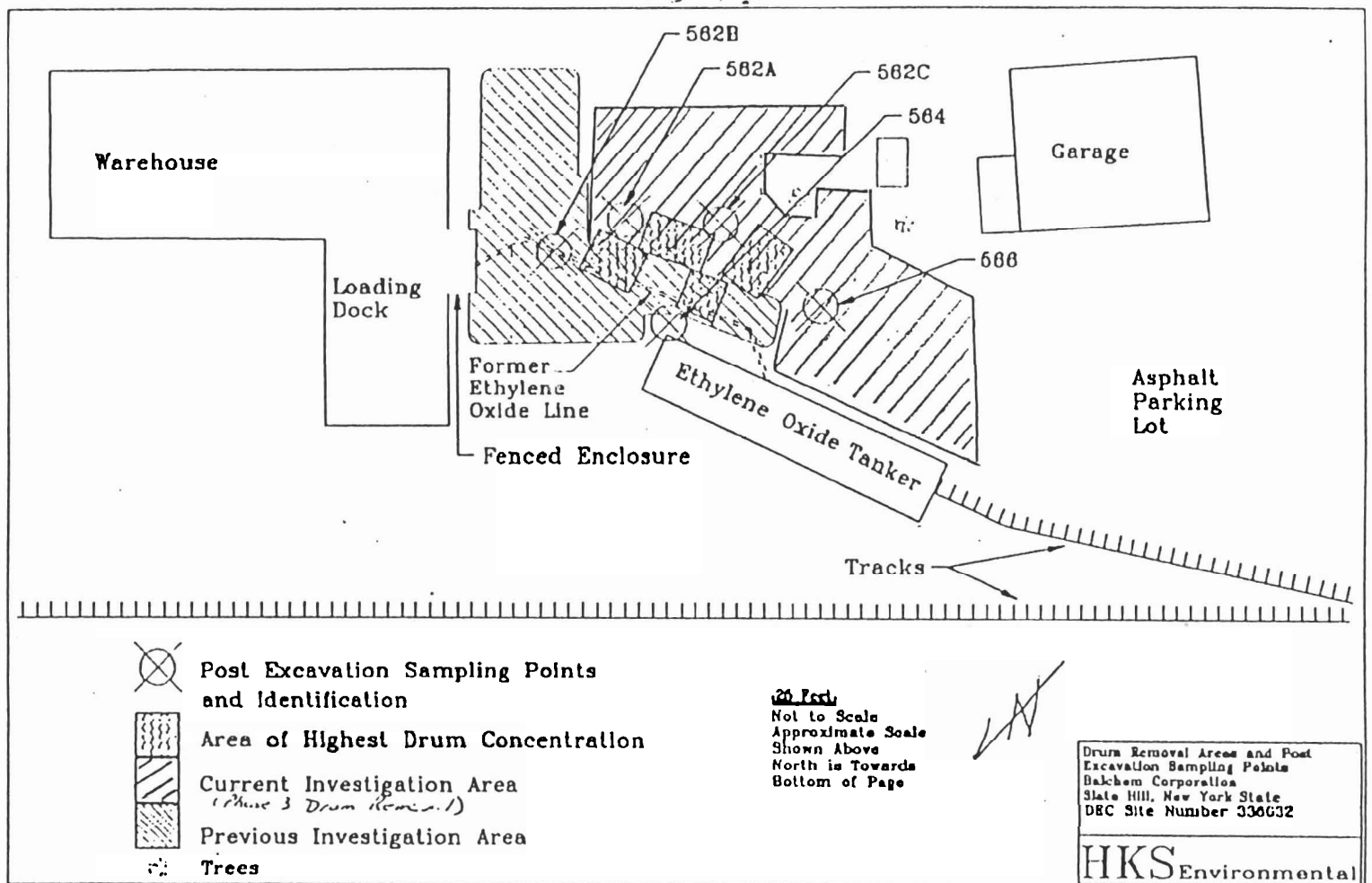


Figure 3

10/95 Drum Removal Report

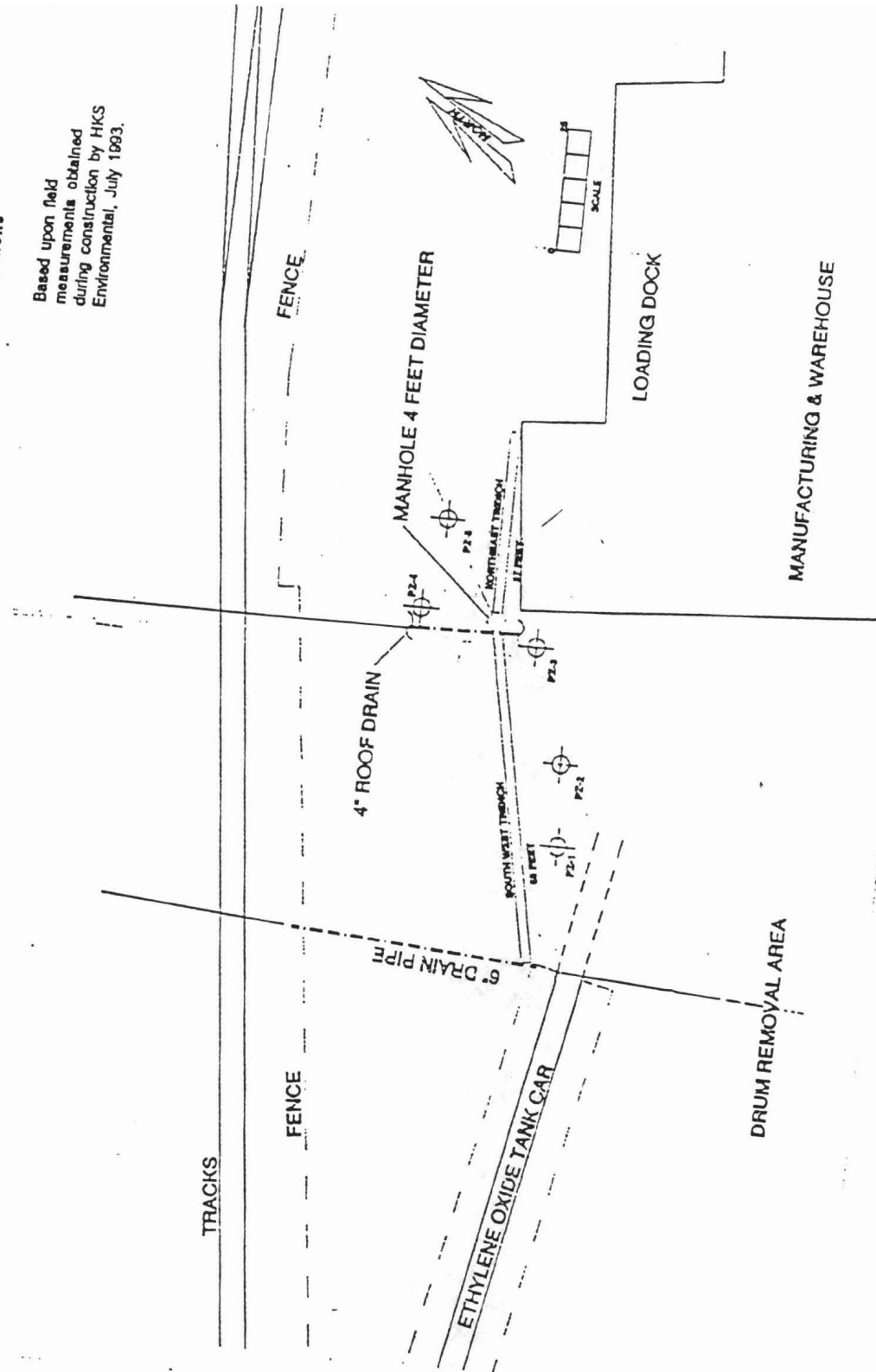




# Figure 6

Figure 6  
Trench and Piezometer  
Locations

Based upon field  
measurements obtained  
during construction by HKS  
Environmental, July 1993.



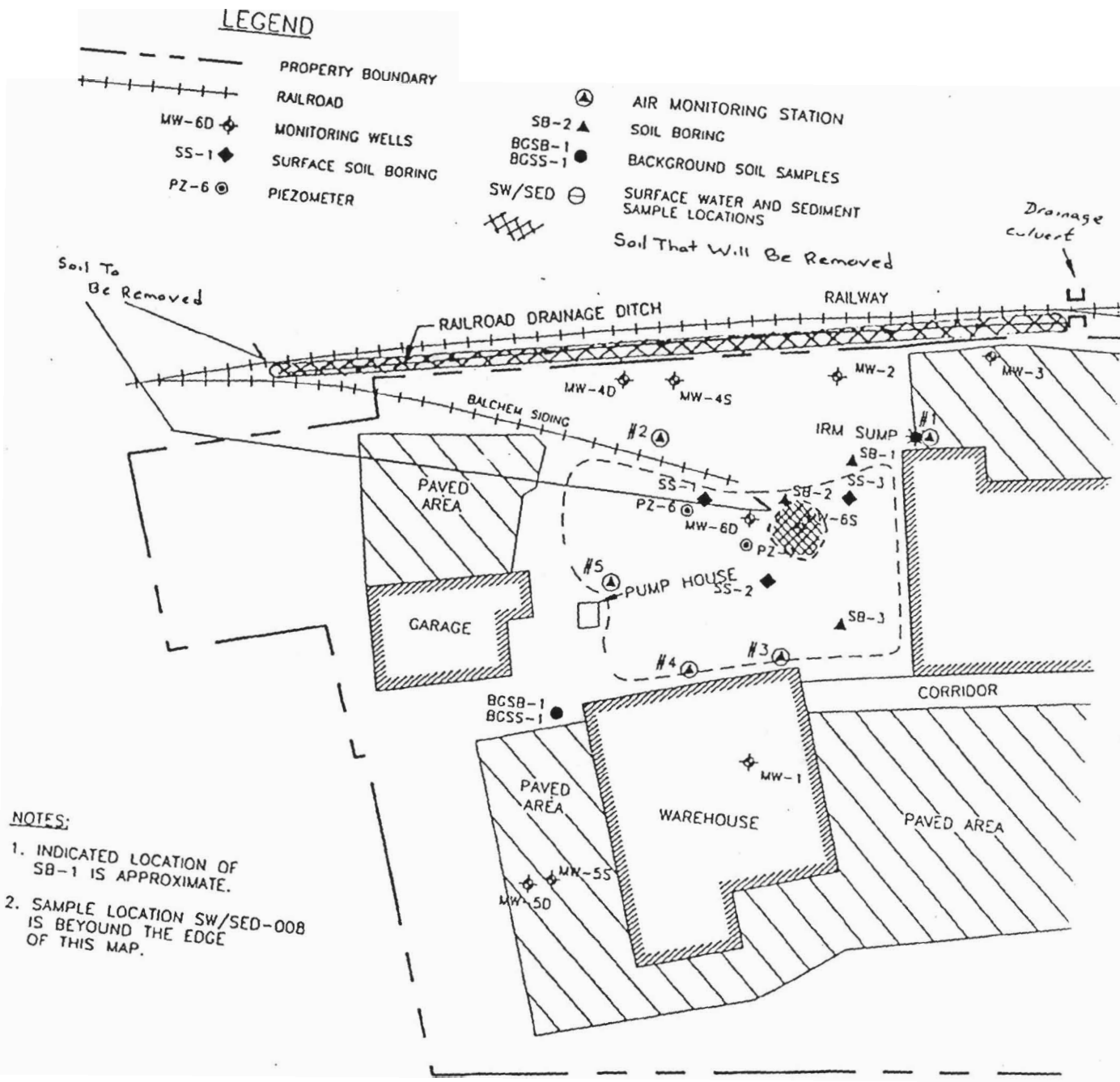


Figure 7

## APPENDIX A

### Responsiveness Summary Balchem Plant Site Site No. 3-36-032

This document summarizes the comments and questions received by the New York State Department of Environmental Conservation (NYSDEC) regarding the Proposed Remedial Action Plan (PRAP) for the subject site. A public comment period was held between September 14 and October 19, 1995 to receive comments on the proposal. A public meeting was also held on October 2, 1995 in the Wawayanda Town Hall to present the results of the investigation and to present the PRAP.

This Responsiveness Summary is comprised of verbal comments and questions obtained during the October 2, 1995 meeting and written comments received during the comment period. The written comments were received from Mr. Jeffrey K. Bridges, Jr. in a October 12, 1995 letter during the comment period and is available for review in the document repositories.

The following comments and questions are taken directly or paraphrased from the meeting or from written comments received during the comment period.

1C. Where did the drums come from?

R. The buried drums removed from the Balchem Corporation site are believed to be from former production lines at the facility. These production lines were terminated after a fire in 1974.

2C. Was it legal to do this at the time?

R. At that time there were no laws or regulations controlling the disposal of hazardous waste.

3C. Is it now?

R. No, now it is illegal to simply bury these materials.

4C. How and why was air monitoring used?

R. During the drum removal conducted during the summer of 1992, air emissions became a concern. Hence, an air monitoring program was instituted at that time. Based on this, an air monitoring program was also adopted during any intrusive (one that would disturb the on site soils) field work during the Expanded RI/FS.

The air monitoring program consisted of five stationary vacuum pumps with charcoal absorbent tubes, and real time analysis with a volatile organic vapor analyzer. Additional details of the program and the relevant analytical data are included in the April 28, 1995 RI Report. This analytical data found only trace levels of contaminants which indicated that there was no air emission problem associated with the drum disposal area.

5C. Will this be done during the construction?

R. The details of the remedial design have not been completed yet, but the continuance of an air monitoring program of some type during construction will be implemented.

6C. Will there be continued monitoring of the surrounding homeowner wells?

R. The details of the remedial design and the groundwater monitoring program have not been completed, but it is anticipated that only on site wells would be regularly monitored. Presently, there are three wells on the Balchem property that are downgradient of the former drum disposal area MW 4S, MW 2 and MW 3. Additionally, it is believed that all of the surrounding homeowner wells are screened in the bedrock aquifer which has not been affected by the site. Data from this monitoring program will be continually evaluated by the NYSDEC and the NYSDOH. Based on this or any other relevant data, the NYSDOH can sample any surrounding homeowner wells.

7C. Could the contamination go around these wells?

R. The monitoring wells (MW 4S, MW 2 and MW 3) are located in a line across the natural shallow groundwater direction. It normally would not be possible for the groundwater contamination to migrate around these wells without a large man made influence on this groundwater. There are presently no such influences on the shallow groundwater at the site.

8C. Has the lead contamination traveled across the railroad tracks to the adjoining properties?

R. No, it is not believed that the lead contamination has traveled onto the adjoining properties. The primary way for lead to migrate is to adhere to soil particles and then migrate with that soil via erosion, dust etc. Our soil sampling, which was done both on site and off site, found that lead levels dropped off dramatically as we moved from the drum disposal area to the railroad track to the ditch outflow. Additionally, soil sample SED-003 was collected on an adjacent lot and detected the presence of lead at levels consistent with background.

9C. What will the acceptable level for lead be?

R. The soil cleanup level for lead at this site will be 500 parts per million (ppm). Presently,

R. The soil cleanup level for lead at this site will be 500 parts per million (ppm). Presently, there are lead levels as high as 2,210 ppm on the site.

10C. Why will the IRM only be operated for three years?

R. The period of three years is only an estimate that was selected based on the recommendation of Balchem's engineering consultant as a sufficient time for the minor volatile organic contamination to fall below groundwater standards. Groundwater contamination levels will be reviewed periodically by the Balchem Corporation and the NYSDEC to determine if additional monitoring or action is needed.

11C. Could you make it clear who did the work in the past and who will do the work in the future?

R. The Balchem Corporation did the work in the past through their consent order and with NYSDEC oversight. This consent order also covers the remedial design, construction and future monitoring.



**APPENDIX B**  
**Balchem Plant Site**  
**ID: 3-36-032**

**ADMINISTRATIVE RECORD**

1. Consent Order, #W3-071-86-06, New York State Department of Environmental Conservation.
2. Hydrogeologic and Soil Assessment, Balchem Corporation, Groundwater Technology Inc., March 1988.
3. Drum Removal Report, Balchem Corporation, Hulihan, Kozak & Smiriglio Environmental Inc., December 1992.
4. Report of Interim Remedial Measure Interceptor Drainage System, Balchem Corporation, Hulihan, Kozak & Smiriglio Environmental Inc., September 1993.
5. Field Sampling and Analysis Plan, Balchem Corporation, Remediation Technologies Inc., December 1993.
6. Remedial Investigation and Feasibility Study Work Plan, Balchem Corporation, Remediation Technologies Inc., January 1994.
7. Quality Assurance Project Plan, Balchem Corporation, Remediation Technologies Inc., January 1994.
8. Citizen Participation Plan, Balchem Corporation, January 1994.
9. Sample Collection Activities Report, Balchem Corporation, Remediation Technologies Inc., August 1994.
10. Field Sampling Addendum, Balchem Corporation, Remediation Technologies Inc., May 1994.
11. Remedial Investigation Results, Balchem Corporation, Remediation Technologies Inc., April 1995.
12. Feasibility Study, Balchem Corporation, Remediation Technologies Inc., May 1995.
13. Proposed Remedial Action Plan, Balchem Plant Site, New York State Department of Environmental Conservation, September 1995.