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Superfund Record of Decision:

Byron Barrel & Drum, NY

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16. Abstract (Limit: 200 words)

The Byron Barrel & Drum site is in Genesee County, New York, and occupies approximately two acres of an eight-acre tract of land. The rural area surrounding the site includes woods, wetlands and agricultural land, with approximately 320 people living within a one-mile radius of the site. The site is a former salvage yard for heavy construction equipment, some of which remains onsite along with other debris. From 1978 to 1980 the site owner reportedly abandoned approximately 200 barrels of hazardous waste without a permit. Some drums were reportedly ripped open, causing the hazardous waste to mix with the soil, and ultimately buried onsite. The State and EPA discovered these barrels in 1982 and initiated an investigation which resulted in the removal and disposal of the drums and approximately 40 cubic yards of contaminated soil and debris. A subsequent remedial investigation in 1987 revealed that solvent spills have contaminated two major areas of the site, resulting in soil and ground water contamination. This remedial action addresses the two contaminated ground water plumes and residual soil contamination that has been releasing contaminants into the ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics including PAHs, and phenols; and metals including chromium and lead.

(Continued on next page)

17. Document Analysis a. Descriptors

Record of Decision - Byron Barrel & Drum, NY
First Remedial Action - Final
Contaminated Media: soil, debris, gw
Key Contaminants: VOCs (benzene, PCE, TCE, toluene, xylenes), other organics (PAHs, phenols), metals (chromium, lead)

b. Identifiers/Open-Ended Terms

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16. Abstract (Continued)

EPA/ROD/R02-89/089
Byron Barrel & Drum, NY

The selected remedial action for this site includes pumping and treatment of ground water using precipitation, sedimentation, and filtration to remove metals, and air stripping and carbon adsorption to remove organics, followed by reinjection into the aquifer and, if necessary, offsite discharge of excess treated water; disposal of ground water residues at an offsite RCRA-permitted facility; treatment of 4,100 cubic yards of contaminated soil using in situ soil flushing; further evaluation of 1,100 cubic yards of inorganic contaminated soil to determine ultimate disposal; dismantling and decontaminating debris followed by offsite disposal; and air and ground water monitoring. The estimated present worth cost for this remedial action is $5,572,000, which includes annual O&M costs of $259,700.

RECORD OF DECISION SUMMARY

BYRON BARREL AND DRUM SITE

BYRON, GENESEE COUNTY, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

NEW YORK

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Byron Barrel and Drum, Byron Township, Genesee County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Byron Barrel and Drum site. The selected remedial alternative was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Contingency plan (NCP). This decision is based on the administrative record for the site. The attached index identifies the items that comprise the administrative record upon which the selection of the remedial action is based.

The State of New York has concurred with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present a current or potential threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy described in this document, in-situ soil flushing to remove volatile organic and inorganic contaminants from subsurface soils, represents the final remedial action for the site. It addresses residually contaminated soils at the site and contaminated groundwater in the underlying aquifer. Prior cleanup actions have resulted in the removal of drums containing hazardous substances and contaminated surface soil.

The major components of the selected remedy are:

- Performance of aquifer testing to assist in the optimization of the groundwater pumping and reinjection system;
- Dismantling of the maintenance building, and decontamination if necessary, with disposal of the debris at an off site landfill;

- Extraction and treatment of the groundwater via precipitation, sedimentation, and filtration to remove the heavy metals, and air-stripping and carbon adsorption to remove the volatile organics; underlying the site.

- Reinjection of treated groundwater to the aquifer and, if necessary, discharge of excess treated water to the closest surface water body;

- Further evaluation of elevated surface soil inorganic concentrations in an area where organic contamination is not present, to determine its ultimate disposition (i.e., off-site disposal or placement on the soil to be flushed);

- Disposal of the groundwater treatment residuals at an off-site Resource Conservation and Recovery Act Subtitle C disposal facility; and

- Appropriate environmental monitoring and review of the treatment process, including monitoring of residential wells, to ensure the effectiveness of the remedy.

DECLARATION

Consistent with CERCLA, as amended by SARA, and the NCP, I have determined that the selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Because this remedy will not result in hazardous substances remaining on-site above health based levels, the five-year review will not apply to this action.

William J. Muszynski
William J. Muszynski, P.E.
Acting Regional Administrator

9-29-89
Date

SITE NAME, LOCATION, AND DESCRIPTION

The Byron Barrel and Drum site is located in Genesee County, New York, approximately 3.6 miles northwest of the Township of Byron. The site occupies approximately 2 acres of an 8-acre parcel of property off Transit Road in a rural area (see Figure 1). Approximately 20 people live within one mile of the site. The nearest residence is approximately 0.2 miles from the site boundary. Two large vacant buildings are located on site.

The site was used as a salvage yard for heavy construction equipment such as graders, bulldozers, cement mixers, and cranes. Numerous pieces of such equipment are present on-site. In addition, metallic and nonmetallic debris litters the site. The site itself is relatively flat. Gravel was mined from a pit located on the site. The site is heavily vegetated except in the gravel pit and, to a lesser extent, along the access road.

The site is abutted by heavily wooded areas and is directly adjacent to an active vegetable farm. The agricultural land originated from swamp deposits and is locally referred to a "muckland." This land has been classified as prime agricultural land by the State of New York. The soils are apparently highly organic in nature.

The closest surface-water body is Oak Orchard Creek. It originates southwest of the site and flows in a generally northeasterly direction, approximately 1,000 feet west of the site.

Several large wetlands exist in the vicinity of the site. The nearest wetland is approximately 1 mile due south. In addition, a wildlife sanctuary, the Byron-Berge Swamp, exists approximately 4 miles to the east.

Groundwater is used as a potable water source by local residents and as a source of irrigation water by farmers.

The surficial geology of the region is characterized by glacial debris and drift deposited as part of the barred oscillation during the late Wisconsinan Age approximately 12,300 years ago. These deposits consist of eskers, moraines, terraces, coarse gravel and sand, low swampy basins, and muckland. Glacial till is characterized by silty clay and silty sand that is sparsely to moderately stony, very compact, and highly impermeable. The glacial till is generally found to be deposited directly on top of the bedrock.

The bedrock underlying the glacial till in this region is silurian in age and consists of massive argillaceous limestones, calcareous shales, and dolostones.

The natural overburden at the site consists of organic soil with silty sands that may incorporate finer or coarser material. This material comprises the aquifer of concern. The overburden is underlain by relatively impermeable glacial till that separates the over-burden and the underlying bedrock. The maximum depth at which bedrock was encountered was 99.5 feet, and the minimum depth was 72 feet. Groundwater encountered in the natural overburden ranged from less than 4 feet to more than 32 feet deep. Saturated thicknesses ranged from approximately 11.5 to 18.5 feet, caused by the undulating surface of the glacial till.

Groundwater flows in a north-northwest direction, eventually discharging to Oak Orchard Creek to the west.

A drainage system which prevents the water table from rising into the root zone of the crops is known to exist beneath the farmland adjacent to the site. Excess water collected via this system is discharged directly to Oak Orchard Creek.

Oak Orchard Creek flows northward, passes the site to the west, and terminates in low, swampy land after it exits the onion fields to the north. Oak Orchard Creek acts as a natural receiving channel for runoff from the onion fields. It contains standing water; the level of which changes with the increase/decrease of precipitation within the region.

Site History

The Byron Barrel and Drum site was discovered in early July 1982, when an unidentified individual reported the disposal of "approximately 400 55-gallon steel barrels that were filled with noxious-smelling chemicals" to the New York State Police Major Crimes Unit.

As a result of this report, a police investigation was initiated. A helicopter flight over the area on July 16, 1982 revealed the presence of a number of drums on the property. Further investigation revealed that Darrell Freeman, Jr., who owned the property, did not possess a permit from either the New York State Department of Environmental Conservation (NYSDEC) or the Environmental Protection Agency (EPA) for the storage or disposal of hazardous waste.

As a result of the investigation, a search warrant was issued. Two drum storage areas were located. The first area contained 121 barrels, and the second area contained 98 barrels. NYSDEC representatives obtained 11 drum waste samples during the search.

On July 23, 1982, various persons were interviewed regarding waste disposal activities at the site. A former employee of Mr. Freeman reported that he first noted approximately 80 drums on the Freeman property in the spring of 1978. These drums were located off the east side of the dirt road that runs through the Freeman property. The source further indicated that two more shipments of drums arrived at the site in the summer of 1979. These drums were unloaded and deposited at a site off to the west side of the dirt road behind a small clump of trees. These drum storage locations correspond to those identified during the police search. The source further reported that a fourth load of drums arrived sometime that summer. He did not witness their arrival, but noted that they were piled in front of two cement trucks in an area just south of the second disposal site.

Sometime during the fall of 1980, the source indicated that Mr. Freeman instructed him to go to the site of the fourth load of barrels and bury them. Apparently, Mr. Freeman instructed this individual to rip the drums open with a backhoe and bury them and mix them in with the dirt.

Wehran Engineering and Camp Dresser & McKee submitted a preliminary investigation report to NYSDEC in September 1983. The results of this investigation led to the site's inclusion on the Superfund National Priorities List in April 1984.

In March 1984, NYSDEC requested that EPA conduct an immediate removal action at the site with funds available under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Subsequently, EPA issued a notice to Mr. Freeman regarding the intent to conduct the removal operation. Mr. Freeman indicated that he wished to conduct the work on his own. When subsequent contact with Mr. Freeman and his attorneys did not result in progress on the action, EPA commenced removal work at the site in August, 1984.

The removal action included the removal and disposal of the drums and approximately 40 cubic yards of contaminated soil and debris. In addition, a monitoring well was installed near the burial area, and a groundwater sample was obtained. The removal action was completed by December 1984. Residential well sampling was conducted in the vicinity of the site in June 1986. Contaminants were not detected in the residential well samples.

In June 1987, a remedial investigation and feasibility study (RI/FS) was initiated at the site. The RI revealed that two major sources of contamination exist at the Byron Barrel and Drum site (see Figure 2). The first of these sources is located in the southwestern portion of a former drum storage and waste disposal area (Source Area 1). The second source is located in the southwestern portion of the property in the vicinity of the maintenance building (Source Area 2). This source is believed to have originated from solvent spills. Subsurface contamination in both areas consists primarily of chlorinated aliphatic hydrocarbons, including 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethene, and 1,1-dichloroethene. In Source Areas 1 and 2, chromium and lead contamination was detected in soil samples in concentrations above background. Small quantities of elevated chromium and lead concentrations were also detected in surface soil samples from Source Area 3, which is located in the eastern portion of the site. No contamination with chlorinated aliphatics was detected in surface or subsurface soil in Source Area 3.

Groundwater contaminant plumes, consisting of chlorinated aliphatic hydrocarbons, were found to be originating from Source Areas 1 and 2. Source Area 2 also shows high levels of methyl ethyl ketone (MEK). There does not appear to be a groundwater contaminant plume emanating from Source Area 3.

Although groundwater in the vicinity of the site is used as a drinking water source, the hydrogeologic and groundwater quality investigations revealed that no migration of contaminants to the domestic wells has occurred.

ENFORCEMENT ACTIVITIES

In June 1984, EPA issued an Administrative Order requiring the property owner to take immediate corrective actions to clean up the site. The owner, however, did not comply with EPA's order.

In 1985, a Litigation Referral Package was prepared, requesting the initiation of a civil action against Mr. Freeman. This ongoing action seeks civil penalties, cost recovery, punitive treble damages, and a claim for future relief.

COMMUNITY PARTICIPATION

EPA and NYSDEC have kept the local citizens advised throughout the Superfund process at the Byron Barrel and Drum site.

The RI/FS report and the Proposed Plan for the site were released to the public in July 1989. These documents were made available to the public at information repositories maintained at the Gillam Grand Library and at the Byron Town Hall. A notice of availability from these documents was published in the Batavia Daily News on August 8, 1989. A public comment period was held from July 29, 1989 through August 31, 1989. In addition, a public meeting was held on August 16, 1989 to solicit comments on and to discuss the findings of the RI/FS report and the Proposed Plan. At this meeting, representatives from EPA and NYSDEC answered questions about the site and the remedial alternatives under consideration. Responses to comments and letters received during the public comment period, as well as questions raised at the public meeting, public meeting, are summarized in the Responsiveness Summary, which is part of this Record of Decision (ROD).

SCOPE AND ROLE OF RESPONSE ACTION

Prior cleanup actions by EPA have already addressed most of the contamination at the Byron Barrel and Drum site. These actions have resulted in the removal of all drums and approximately 40 cubic yards of contaminated soil and debris. The low levels of soil contamination remaining at the site have been found to present minimal risk to human health. The remedy authorized by this ROD addresses the principal threat remaining at the site by treating the two plumes of contaminated groundwater, which currently exceed state and federal groundwater quality standards, and the low-level residual subsurface soil that has been releasing contaminants into the groundwater, through infiltra- tion of precipitation. In addition, inorganic concentrations above background levels in the groundwater and surface soil at the site will be addressed as part of the selected remedy.

The selected remedy will be a permanent solution for addressing the groundwater and the surface and subsurface soil contamination at the site. The federal and state groundwater quality standards will be achieved by removing the contaminants during treatment of the groundwater. Reinjection of the treated groundwater will remove contaminants from the surface and subsurface soils. Hence, the treatment of soils will result in the elimination of a long-term source of groundwater contamination, and it will mitigate the risk to public health and the environment associated with the migration of contaminants off-site.

The purpose of this response is to ensure protection of the groundwater from the continued release of contaminants from the soil, and to restore the groundwater to levels consistent with state and federal water quality standards. This will be the final response action for this site.

SUMMARY OF SITE CHARACTERISTICS

Approximately 200 55-gallon steel barrels that were filled with hazardous waste were abandoned at the Byron Barrel and Drum site from 1978 to 1980, when the site was used as a salvage yard for heavy construction equipment. Leakage and spillage from these drums appears to have been the primary source of contamination of the site. The drums and their contents were removed from the site by EPA in 1984. In addition, approximately 40 cubic yards of visibly-contaminated surface soil and debris were removed from the site during the same period.

Analyses of soil, groundwater, sediment, and surface water from the site and adjacent areas indicate that the environmental contamination at the Byron Barrel and Drum site consists primarily of subsurface soil and groundwater contamination. Based on the absence of substantial soil contamination, it appears that the EPA removal action was effective in reducing contaminant releases. Chlorinated aliphatic hydrocarbons such as 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethene, and 1,1-dichloroethene are the primary contaminants. Various monocyclic aromatics such as toluene and xylenes were also detected, although groundwater contamination with these substances is minimal when compared to the contamination with chlorinated species.

SURFACE SOIL

A total of 25 surface soil samples were collected during the field investigation at the locations shown in Figure 3. The locations were selected based on the results of the soil-gas investigation and historical information. Of the 25 samples, 21 were collected on-site, and 4 were collected off-site to provide background information. Surface soil samples were collected to provide the necessary data to assess the risks posed by dermal contact, as well as to provide information on potential contamination migration via surface-water erosion of soil.

Surface soils at the Byron Barrel and Drum site contain only low levels of volatile organics (less than 50 parts per billion (ppb)), phthalate esters (less than 600 ppb), polynuclear aromatic hydrocarbons (less than 300 ppb), and benzoic acid (less than 500 ppb). By contrast, much higher concentrations of various pesticides, such as 4,4'-DDT, 4,4'-DDE, endrin, and dieldrin, were encountered. The highest concentrations of the pesticides were detected in surface soil samples which were collected from the adjacent farmland. On-site samples containing pesticides were obtained in proximity to the agricultural land and are believed to be present as a result of atmospheric transport of pesticides during their application to crops. Figure 3 summarizes the volatile organics detected in surface soil samples.

Although chromium and lead were detected in site surface soils above background, contamination with these substances is not pronounced. Figure 4 presents the analytical results for surface soil samples containing chromium and lead above background levels. As is evident from the Figure 4, chromium and lead contamination is greatest in Source Area 3.

Based on the results of a surface soil sampling program in Source Area 3, it is estimated that there are 1,100 cubic yards of contaminated soil in this area.

SUBSURFACE SOIL

As shown in Figure 5, test pits and trenches were dug at 46 locations, from which a total of 130 subsurface samples were collected for analysis. No drums were detected in any of these test pits.

As shown in Figure 6, volatile organics were detected in subsurface soil samples at concentrations ranging from 5 ppb to 2,669 ppb. The most pronounced contaminants based on the mobile laboratory results are toluene, 1,1,1-trichloroethane, and trichloroethane. Concentrations of these ranged as high as 865 ppb, 551 ppb, and 2,669 ppb, respectively.

Twenty subsurface soil samples were also obtained. As can be seen by the analytical results summarized in Table 1, volatile organics are the primary contaminants detected, and toluene and trichloroethene were detected at relatively high concentrations (2,700 ppb and 2,800 ppb, respectively). In addition, several other volatile organics, notably xylenes and tetrachloroethene (PCE), were detected at high concentrations. Xylene concentrations ranged as high as 1,700 ppb, while PCE concentrations ranged as high as 4,400 ppb. All of these samples were collected from the southwestern portion of Source Area 1. In addition, phthalate esters were detected in several samples at concentrations ranging as high as 2,000 ppb (di-n-butylphthalate). Arochlor 1254 was detected in one test pit sample at a depth of 4 feet. PCBs were detected in drum samples collected by the NYSDEC prior to the removal action. The detection of PCB Arochlor 1254 at a concentration of 690 milligrams per kilogram (mg/kg) indicates that some release of PCBs occurred at the site. However, only one sample from Source Area 1 contained a PCB compound, and the available data indicate that PCB contamination is not extensive. PCBs were not identified in any of the other matrices sampled at the site (i.e., surface soil, sediment, groundwater, or surface water).

Based upon the sampling results in Source Area 1, it is estimated that there are 1,100 cubic yards of contaminated soil in this area.

The analytical results for subsurface soil samples obtained in Source Area 2 are depicted in Figure 7. Subsurface soil samples contained several chlorinated aliphatic hydrocarbons, including 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, 1,1-dichloroethene, and methylene chloride. TCA concentrations ranged as high as 410 ppb in these samples.

Based on the results of the subsurface soil sampling and analysis program in Source Area 2, it is estimated that approximately 3,000 cubic yards of contaminated unsaturated zone soil exists in this area.

Figure 8 depicts detections of chromium and lead above background soil concentrations. From this figure, it is apparent that subsurface contamination with these contaminants is not extensive in any of the source areas.

GROUNDWATER

The primary contaminant transport mechanism at the Byron Barrel and Drum site is associated with groundwater advection of dissolved contaminants. Two contaminant plumes originating in the vicinity of Source Areas 1 and 2 were noted to be migrating in the downgradient direction to the northwest. No evidence of contaminant migration toward residential wells to the southwest was observed during the RI. Based on the analytical results for monitoring well samples, it is apparent that these contaminant plumes are confined to the immediate proximity of the source areas. It is estimated that the contaminant plumes have migrated no further than 400 and 300 feet from the Source Areas 1 and 2, respectively. This phenomenon is a manifestation of the shallow hydraulic gradient and the relatively recent time frame of disposal activities (as late as 1982).

Four distinct rounds of groundwater sampling were conducted at the Byron Barrel and Drum site. The first two rounds were conducted during the course of the monitoring well installation program. The second complete sampling round included analysis for volatile organics. The analytical results for groundwater sampling rounds 3 and 4 are summarized in Tables 2 and 3, respectively.

As shown in Tables 2 and 3, a number of volatile organic chemicals were detected in site groundwater samples during the third and fourth sampling rounds. Volatile organics detected frequently and/or at high concentrations include 1,1,1-trichloroethane, 1,1-dichloroethane, tetrachloroethene, trichloroethene, 1,1-dichloroethene, and 1,2-dichloroethene. Concentrations of these compounds ranged as high as 4,400 ppb, 290 ppb, 82 ppb, 3,300 ppb, 41 ppb, and 110 ppb, respectively. Of these compounds, all but 1,2-dichloroethene are considered major site contaminants. Only one sample was found to contain 1,2-dichloroethene at a concentration above 1 ppb, which is the sample mentioned above. Methylene chloride was detected in one of three samples at a concentration of 2.8 ppb.

Figures 9 and 10 summarize the results for the predominant site groundwater contaminants for the third and fourth sampling rounds, respectively.

In addition to the organic contaminants detected in site groundwater samples, a number of inorganic constituents were detected above background levels. Table 4 provides a summary of the inorganic sample results for the upgradient monitoring well (MW-4A) versus the site monitoring well samples. Chemicals detected at concentrations significantly above background include aluminum, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. It should be noted that groundwater samples were not filtered prior to acidification. Hence, these results are indicative of total inorganics in the water samples, including those present in suspended solids. The average concentrations presented in Table 4 indicate that there is little difference between the overall site concentrations and background levels. With the exception of sodium, mercury, and zinc, the average background concentrations exceed the site average values. Figure 11 displays the results for chromium and lead detected above background (upgradient) levels. Based on these results, it appears that lead contamination exists in all source areas.

The analytical results for groundwater samples collected during the supplemental activities are summarized in Figure 12. Groundwater contamination consists of chlorinated aliphatics and ketones. Organic contamination with 1,1,1-trichloroethane and MEK is most pronounced. Concentrations of TCA ranged as high as 2,500 ppb while concentrations of MEK ranged as high as 3,000 ppb.

The estimated extent of the contaminant plumes originating from Source Areas 1 and 2 is depicted in Figure 13. There is not a contaminant plume originating from Source Area 3.

SURFACE WATER AND SEDIMENT

Surface water and sediment samples obtained from a drainage ditch adjacent to the site property contained relatively low levels of organic chemicals. There is no evidence of any downstream impact on Oak Orchard Creek, the primary receiving surface water body. Several sediment samples from another drainage ditch that runs east to west, just north of the site, contained relatively high levels of toluene, acetone, and MEK. However, based upon surface drainage patterns and the absence of potential discharge of contaminated groundwater to this drainage channel, it is not believed that this contamination is site related.

SUMMARY OF SITE RISKS

Organic chemicals at the Byron Barrel and Drum site, that were apparently released through spillage and leakage of waste chemicals stored in above ground drums, have contaminated the soil and the groundwater underlying the site. Predominant transport routes identified for the migration of those contaminants to other environmental media include: 1) volatilization of the volatile organic compounds from the soil and subsequent releases (emissions) to air; 2) movement through soils (percolation) to groundwater; and 3) release to surface water, in the Oak Orchard Creek adjacent to the site, through discharge of the contaminated groundwater. Based on the nature of contamination at the Byron Barrel and Drum site and various site-specific conditions, only groundwater transport is considered a major contaminant migration route. The major portion of contamination is contained in saturated subsurface soils and groundwater.

CONTAMINANT IDENTIFICATION

The risk assessment for the site has identified 35 contaminants of concern. These include 16 non-carcinogenic and 19 carcinogenic compounds. Because chemicals having nonthreshold effects can cause adverse effects even at low concentrations, all of the organic carcinogenic substances detected in groundwater were included as indicator compounds, regardless of their frequency of occurrence or concentrations. With the exception of various pesticides, virtually all of the organic chemicals detected at the site and in the study area were included as indicator chemicals. Background levels of pesticides are substantially greater than any levels detected on site (i.e., approximately one order of magnitude). Several of the pesticides were detected only in background locations. Site samples containing pesticides were generally from locations near the adjacent farmland, suggesting that aerial application or spray application of pesticides on windy days resulted in the low-level pesticide contamination on-site. In view of the presence of background contamination, the various pesticides were not included as indicator chemicals.

Chromium and lead were included as indicator chemicals as a result of their detection in surface soils above background. In addition, polynuclear aromatic hydrocarbons and phthalate esters were included as a result of their presence in surface soils.

The indicator chemicals chosen for the Byron Barrel and Drum site are summarized in Table 5.

EXPOSURE ASSESSMENT

The following potential exposure routes were identified for the Byron Barrel and Drum site:

- Direct dermal contact at the source
- Accidental ingestion of contaminated soil at the source
- Inhalation of contaminated fugitive dust
- Inhalation of volatile emissions
- Household use of groundwater

Several other exposure routes were also considered for inclusion but were dismissed based on site-specific conditions. For example, root uptake of contaminants by the adjacent crops was considered possible. However, through direct visual inspection it was determined that the crops grown in the adjacent field have shallow root zones (i.e., less than six inches). The drainage system in the field appears to be effective in preventing groundwater from reaching the root zone.

Furthermore, exposure through contact and non-contact recreation in the surface water bodies were also discounted based on the size of the drainage ditches and Oak Orchard Creek.

For each of the exposure routes two cases are considered for each pathway; the first is a maximum-case scenario and the second is an average case scenario.

Direct Dermal Contact

The site is presently unfenced. Therefore, human receptors may come in direct contact with contaminated soil or waste. Trespassing adolescents and adult hunters are considered the most likely receptors via direct dermal contact.

Accidental Ingestion of Soil

Because the site is unfenced, it is considered possible that receptors may be exposed through accidental ingestion of contaminated soil. Pica ingestion is generally a tendency exhibited only by children of ages between 6 months and 6 years. Adult and adolescent receptors could also be exposed in an incidental manner through hand-to-mouth contact (e.g., smoking, eating, etc.).

Inhalation of Fugitive Dust

Human receptors reside in the vicinity of the Byron Barrel and Drum site. Although site vegetation will impede the emission of particulates via wind erosion, several sources may be susceptible to fugitive dust emission. Therefore, the potential for inhalation of fugitive dust exists in the vicinity of the site, and this contaminant release mechanism and subsequent exposure route was considered.

A particulate emission model suggested in the April 1989 EPA Superfund Exposure Assessment Manual was used to generate the downwind contaminant concentrations.

Inhalation of Volatile Emissions

Doses resulting from the inhalation of volatilized soil contaminants can be significant for downwind receptors. Although surface soil contamination appears negligible at the Byron Barrel and Drum site, this exposure route has also been considered.

Household Use of Groundwater

There are numerous routes of exposure associated with household use of contaminated water. Receptors may be exposed via ingestion and inhalation of volatiles emitted from showers, dishwashers, washing machines, and other turbulent sources, as well as through dermal contact during bathing, dishwashing, car washing, etc. However, previous experience has shown that ingestion and inhalation of volatiles during showering are the predominant exposure mechanisms in the home. Dermal uptake is essentially negligible; similarly, doses incurred through inhalation from all other sources (i.e., dishwashers, washing machines, etc.) generally amount to less than 10 percent of the dose incurred through ingestion and shower inhalation. Therefore, only ingestion and inhalation of volatiles during showering are assessed quantitatively for this exposure route.

Three distinct groundwater use scenarios were considered: (1) doses based on maximum observed monitoring well concentrations; (2) doses based on average monitoring well concentrations; and (3) doses based on concentrations detected in distinct residential wells.

Table 6 provides a summary of the various exposure routes and input parameters considered.

TOXICITY ASSESSMENT SUMMARY

Cancer potency factors (CPFs) have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

<u>RISK CHARACTERIZATION SUMMARY</u>

Risk characterization for the Byron Barrel and Drum site included an assessment of risk associated with exposures to non-carcinogens and carcinogens. Non-carcinogenic risks were assessed using a hazard index computed from expected daily intake levels (subchronic and chronic) and reference levels (representing acceptable intakes).

Potential carcinogenic risks were computed by multiplying chronic (long-term) intake levels to a respective carcinogenic potency factor.

The quantified carcinogenic and non-carcinogenic risk estimates associated with various soil and air exposure routes are summarized in Tables 7 and 8, respectively. Whereas, Tables 9 and 10 summarize the carcinogenic and non-carcinogenic risk estimates associated with the various groundwater use scenarios, including those based on maximum monitoring well concentrations, arithmetic average monitoring well concentrations, and maximum residential well concentrations.

Excess lifetime cancer risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1.0 E-06). An excess lifetime cancer risk of 1.0E-06 indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

Potential concern for non-carcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The context within which to judge the relative risk from each of the pathways has been established by EPA. For carcinogens, the target risk range is a E-07 to E-04 excess lifetime cancer risk. For non-carcinogens, where the sum of expected dose/Rfd ratios exceeds unity (1.0), observed concentrations pose unacceptable risks of exposure.

In conclusion, with the possible exception of inorganics located in Source Area 3, surficial contamination at the Byron Barrel and Drum site poses minimal risks to human receptors. The cumulative

Hazard Index from dermal contact, accidental ingestion, and inhalation of volatiles and dust is 4.9 x 10^{-3}, which is well below 1.0. The cumulative incremental cancer risk through these exposure routes is 6.5 x 10^{-7} (1 in 1.5 million), which falls well within the EPA target risk range of 10^{-7} to 10^{-4}.

The Hazard Index for groundwater use based on residential well concentrations is 2.2 x 10^{-1}, which is below unity. The incremental cancer risk for groundwater use based on residential well concentration is 3.4 x 10^{-7} (1 in 2.9 million), which falls well within the target risk range.

However, the Hazard Index for groundwater use based on maximum monitoring well concentrations exceeds 1.0. Therefore non-carcinogenic effects would be likely if the aquifer at the Byron Barrel and Drum Site were developed for potable use. Similarly, the incremental cancer risk based on maximum monitoring well concentrations exceeds the upper bound of the target risk range (2.4 x 10^{-3}). An incremental maximum cancer risk of 1 in 420 would be incurred if the aquifer is developed for potable purposes under future conditions.

ENVIRONMENTAL ASSESSMENT

Table 11 presents a comparison of the maximum contaminant concentrations in surface waters to the Federal Ambient Water Quality Criteria for the protection of aquatic life and to the state surface water standards. Oak Orchard Creek is currently a Class D stream but may be upgraded to Class C. Class D surface waters are suitable for contact recreation and allow for survival of aquatic life. Class C surface waters are suitable for fishing, contact recreation, and fish propagation. None of the organics were found at concentrations that exceed the Ambient Water Quality Criteria. Of the inorganics in the site surface waters, only copper exceeds the federal and state standards for chronic toxicity, based on a calculated hardness of 763 milligram per liter (mg/l). No acute standards are exceeded. In addition, the maximum concentrations of zinc and vanadium exceed the state standards for chronic toxicity to aquatic life. However, the stream is very small and receives runoff from a large area of agriculture. It is likely that aquatic life is more susceptible to the presence of pesticides.

During the course of the RI, it was noted that the aquatic ecosystem appears healthy (based on visual observations). No stressed flora or fauna were noted in either the drainage ditches or in Oak Orchard Creek. The site itself also appears to support a healthy population of mammals and reptiles. Species observed in the vicinity of the site included garter snakes, rabbits, white tail deer, and muskrats.

CLEANUP LEVELS FOR THE CONTAMINATED MEDIA

Cleanup levels based on public health and environmental concerns and on a review of Applicable or Relevant and Appropriated Requirements (ARARs) were developed at the Byron Barrel and Drum site. For both source control (soil cleanup) and management migration (groundwater cleanup) measures. ARARs were used to determine the appropriate extent of site remediation, to scope and formulate remedial response actions, and to govern the implementation and operation of the selected action. CERCLA requires that primary consideration be given to remedial response actions that attain or exceed ARARs. The purpose of this requirement is to make CERCLA response actions consistent with other pertinent federal and state environmental requirements.

A requirement under CERCLA may be either "applicable" or "relevant and appropriate" to a site-specific remedial action, but not both. Currently, the only enforceable regulatory standards promulgated under the Safe Drinking Water Act are the Maximum Contaminant Levels (MCLs) for the protection of human health. However, MCLs have not been specified for the majority of the indicator chemical at the site. Therefore, only regulatory guidelines were used for comparative purposes to infer health risks and environmental impacts. Relevant regulatory guidelines include Ambient Water Quality Criteria, Maximum Contaminant Level Goals (MCLGs), and EPA Drinking Water Health Advisories. The ARARs identified for the contaminated media at the Byron Barrel and Drum site are summarized below.

Soil

In order to provide protectiveness for future ingestion of groundwater, it is necessary to remediate volatile organic contaminants detected in the subsurface soil. The subsurface soil contamination does not pose a public health threat under existing or anticipated future conditions. There are not any ARARs for soil remediation, therefore, the cleanup levels have been derived so that contaminants must be remediated to concentrations where leaching into groundwater will result in levels below MCLs. Table 13 presents a range of cleanup goals for vadose zone subsurface soils.

The soil cleanup levels were back-calculated from groundwater cleanup levels using an unsaturated/saturated zone linkage model and theoretical distribution coefficients between the solid and aqueous phases.

The soil cleanup levels were compared to the contaminant concentrations identified in each soil boring sample. Any samples with contaminant concentrations below the cleanup levels are considered clean. The depth of contamination varies with each borehole. For a conservative estimate, it is assumed that contamination has reached the groundwater table which is approximately eight feet deep with the Source Areas 1 and 2 and four feet in Source Area 3.

Groundwater

The groundwater at the Byron Barrel and Drum site was classified by New York State as class "GA", which indicates that the water is suitable as a drinking water supply. The RI has determined that contaminants from the site have contaminated the groundwater. The two existing groundwater plumes originating from Source Areas 1 and 2 present a risk of off-site migration of contaminants to the nearby Oak Orchard Creek. The remedial response action, therefore, includes the following:

- ensure protection of groundwater and surface water from the continued release of contaminants from soils; and

- restore groundwater to levels consistent with state and federal ARARs.

The federal and New York State ARARs associated with quality of groundwater suitable for drinking at the Byron Barrel and Drum site are listed in Table 13. A comparison of the concentrations of the contaminants of concern in the groundwater to these ARARs reveals that most volatile organic compounds exceed the regulatory concentrations. As a result, the groundwater cleanup levels should meet the most stringent of the federal and state ARARs listed in Table 13. For those compounds having only non-carcinogenic effects, cleanup levels have been derived so that the total non-carcinogenic risk (Hazard Index) does not exceed unity (i.e., a value of 0.9 was used as the target Hazard Index). The sources of each of the various cleanup levels are provided in footnotes to Tables 13.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or, the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan.

DESCRIPTION OF ALTERNATIVES

All of the drums and approximately 40 cubic yards of contaminated surficial soil and debris have been removed from the site. The levels of subsurface soil contamination on-site, with the possible exception of inorganics located in Source Area 3, present risk levels which are within EPA's acceptable range. However, contaminants remaining at the site have contaminated the underlying groundwater, exceeding federal and state groundwater quality standards. Specifically, Source Area 1 and Source Area 2 are releasing organic contaminants into the groundwater through infiltration of precipitation. The two plumes exceed ARARs and pose a risk of off-site migration of contaminants to the nearby Oak Orchard Creek. There does not appear to be a groundwater contaminant plume emanating from Source Area 3. The alternatives described below address the remaining subsurface soil contamination at the site and the contamination in the groundwater underlying the site.

A total of eight alternatives were evaluated in detail for remediating the site. Five remedial alternatives address the contaminated subsurface soils that contribute to groundwater contamination at the Byron Barrel and Drum site. In addition, six alternatives address the contamination in the groundwater beneath the site. These alternatives are as follows:

ALTERNATIVE 1 - NO ACTION WITH MONITORING

The Superfund program requires that the "no-action" alternative be considered at every site. Under this alternative, EPA would take no further action to control the source of contamination. However, long-term monitoring of the site would be necessary to monitor contaminant migration. Monitoring can be implemented by using previously-installed monitoring wells and residential wells.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions would be implemented at that time to remove or treat the wastes.

The present worth cost of this alternative for a 20-year period is approximately $265,000. The time to implement this alternative is two months.

ALTERNATIVE 2 - DEED AND GROUNDWATER-USE RESTRICTIONS

This alternative would not require implementation of remedial actions to address groundwater or subsurface soil contamination. Deed restrictions would be imposed to prevent excavation in areas of contamination. Groundwater-use restrictions would be implemented in the affected area to prevent the use of contaminated groundwater for drinking or irrigation purposes. These institutional controls would also alert future property owners to potential site-related risks. A long-term monitoring program would also be implemented. Deed and groundwater restrictions can be implemented by state and local officials. Groundwater monitoring can be performed using previously-installed monitoring wells and residential wells.

The present worth cost of this alternative, for a 20-year period, is approximately $279,000. The time to implement this alternative would be 2 months.

ALTERNATIVE 3 - DEED RESTRICTIONS AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative would not require implementation of remedial actions to address subsurface soil contamination. Deed restrictions would be imposed to prevent excavation in areas of subsurface soil contamination. Groundwater would be collected using a series of extraction wells and pumped to an on-site treatment system.

To treat the volatile organic contaminants (VOCs) in the extracted groundwater, an air stripping column and activated carbon adsorber would be constructed at the site. The air and VOC mixture exiting the air stripper would be treated by a vapor phase carbon adsorption unit. The clean air would be emitted to the atmosphere. It is anticipated that a carbon adsorption unit would be necessary for the removal of the MEK, since air stripping would not remove this contaminant from the groundwater. In addition, inorganic contaminants in the groundwater would be removed by precipitation prior to air stripping. Discharge piping would be installed to pump the treated water to the drainage ditch located north of the onion field or to Oak Orchard Creek. All air and surface water discharges would comply with state and federal standards.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the site and its environs would continue for at least five years after the completion of the remediation to ensure that the goals of the remedial action have been met. Pre-construction, construction and post-construction air monitoring would also be performed.

The present worth cost of this alternative is approximately $4,874,000. The time to reduce the groundwater contaminant concentrations to levels based on ARARs is estimated to be 20 years.

ALTERNATIVE 4 - SOIL CAPPING AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternative 3, except that synthetic membrane caps would be installed over the areas of soil contamination.

Under this alternative, the maintenance building would be dismantled, and decontaminated if necessary, and disposed of off-site. Prior to capping, the areas would be graded to control surface water runoff and erosion. A protective soil cover would be placed over the synthetic membrane, topsoil would be spread, and the capped areas would be revegetated.

The groundwater pumping, treatment, and discharge scenario would be the same as that discussed for Alternative 3. Monitoring would be the same as in Alternative 3.

The present worth cost of this alternative is approximately $5,143,000. Two months would be required to construct the cap. The time to reduce the groundwater contaminant concentrations to levels based on ARARs is estimated to be 20 years.

ALTERNATIVE 5 - SOIL EXCAVATION AND OFF-SITE DISPOSAL AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternatives 3 and 4, except that contaminated soil would be excavated and hauled to an off-site Resource Conservation and Recovery Act (RCRA) landfill for disposal.

Under this alternative, the maintenance building would be dismantled and decontaminated if necessary, and disposed of off-site. Contaminated subsurface soil would be excavated, loaded into trucks, and hauled to an approved off-site RCRA landfill for disposal. (So as to comply with RCRA land disposal requirements, treatment of the contaminated soil might be required prior to disposal.) The excavations would be backfilled with clean fill material from an off-site source. These areas would be covered with a layer of topsoil and revegetated.

The groundwater pumping, treatment, and discharge scenario would be the same as for Alternative 3. Monitoring would be the same as Alternative 3.

The present worth cost of this alternative is approximately $7,929,000. Two months will be required to remove the contaminated soil. The time to reduce groundwater contaminant concentrations to levels based on ARARs is 20 years.

ALTERNATIVE 6 - SOIL EXCAVATION AND THERMAL DESORPTION AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternatives 3, 4, and 5, except that contaminated subsurface soil would be excavated and treated on-site using low-temperature thermal desorption to remove volatile organic contaminants.

Under this alternative, the maintenance building would be dismantled, and decontaminated if necessary, and disposed of off-site. Contaminated soil would be excavated and hauled to a mobile thermal desorption unit that would be set up at the site. Treated soil would be used to backfill the excavations. The areas would be covered with a layer of topsoil and revegetated. Because of the presence of inorganic constituents in the soil, which thermal desorption would not remove, treatment of the residual by chemical fixation might be necessary before backfilling to comply with RCRA land disposal requirements.

The groundwater pumping, treatment, and discharge scenario would be the same as for Alternative 3. Monitoring would be the same as in Alternative 3.

The present worth cost of this alternative is approximately $6,899,000. Two months would be required to complete soil treatment. The time to reduce groundwater contaminant concentrations to levels based on ARARs is estimated to be 20 years.

ALTERNATIVE 7 - IN-SITU SOIL VAPOR EXTRACTION AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternatives 3, 4, 5, and 6, except that contaminated subsurface soil would be treated by in-situ vapor extraction using air extraction and injection wells.

Under this alternative, the maintenance building would be dismantled and decontaminated if necessary, and disposed of off-site. Vapor extraction wells would be installed at the centers of Source Area 1 and 2. Air injection wells would be installed around the perimeters of the Source Areas 1 and 2. A vacuum would be induced and the air that would be collected would be treated using vapor-phase carbon adsorption. A synthetic membrane would be used to prevent air leakage from the soil surface between the air extraction and injection wells.

The groundwater pumping, treatment, and discharge scenario would be the same as for Alternative 3. Monitoring would be the same as Alternative 3.

The present worth cost of this alternative is approximately $5,200,000. Six months would be required to reduce soil contaminants to levles that would achieve groundwater ARARs. The time to reduce groundwater contaminant concentrations to levels based on ARARs would be 20 years.

ALTERNATIVE 8 - IN-SITU SOIL FLUSHING AND GROUNDWATER PUMPING, TREATMENT, AND RECHARGE

This alternative is similar to Alternative 3, except that a portion of the treated groundwater would be recharged to the aquifer in the areas of subsurface soil contamination. This alternative would attempt to restore groundwater quality and flush the residual contaminants from the subsurface soil.

The maintenance building would be dismantled, and decontaminated if necessary, and disposed of off-site.

Monitoring would be the same as for Alternative 3.

The present worth cost of this alternative is approximately $5,572,000. The time to reduce soil contaminant concentrations to levels that would achieve groundwater ARARs is estimated to be in 10 years. The time to reduce groundwater contaminant concentrations to levels based on ARARs is 20 years.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely short-term effectiveness, long-term effectiveness and permanence, reduction of toxicity, mobility or volume, implementability, cost, compliance with applicable or relevant and appropriate requirements (ARARs), overall protection of human health and the environment, state acceptance, and community acceptance.

Each criterion will be briefly addressed, in order, with respect to the preferred alternatives for both soil and groundwater.

A. Overall Protection of Human Health and the Environment.

Alternative 8 would eliminate the potential risk to human health and the environment. The reinjection of treated groundwater into the aquifer would flush volatile organic contaminants from the subsurface soil, thereby eliminating the potential risk associated with any excavation under future land-use scenarios.

Alternatives 3, 4, 5, 6, 7, and 8 would be protective of human health and the environment, but Alternative 8 provides a higher degree of confidence in its ability to permanently remove the contaminants from the soil.

Under Alternatives 1, 2, and 3, residual subsurface contaminants would continue to leach into the groundwater, and continued off-site migration of contaminants would result.

The aquifer at the site has a low yield due to its low transmissivity. Because increasing the pumping rate would cause excessive drawdown of the water table, Alternatives 3, 4, 5, 6, 7, and 8 would take an estimated 20 years to decrease ground- water contaminant concentrations to levels based on ARARs. Alternative 1 would not reduce the present and future risk to human health and the environment. Although, under Alternative 2, the risk to human health would be potentially eliminated by restricting groundwater use and soil disturbance, the risk to the environment would remain unchanged.

B. Compliance with ARARs

All technologies proposed in Alternatives 3 through 8 would be designed and implemented to satisfy all action, contaminant, and location-specific requirements. Since no federal or New York State regulations specify clean-up levels for contaminants in the soil, soil cleanup levels were calculated such that the aquifer will be protective of public health and the environment. Alternative 8 would achieve the federal and state groundwater quality standards for the organic contaminants and would remove subsurface soil contamination. Alternatives 1 and 2 are not effective in complying with groundwater ARARs.

Alternative 1 would not comply with state or federal drinking water standards or criteria required for protection of the groundwater resources. This is in contrast to Alternative 2, which would not comply with chemical-specific ARARs for ingestion of groundwater, but would meet all other ARARs.

C. Long-term Effectiveness and Permanence

Alternative 8 would effectively treat the most mobile wastes in on-site soil, thus, effectively reducing the source of groundwater contamination. Alternative 8 is considered most effective since recirculating the groundwater would prevent potential aquifer drawdown and would enhance the removal of contaminants adsorbed to the saturated soil.

Under Alternative 6, which include excavation, thermal desorption, and back-filling, inorganic contamination in subsurface soil would not be removed. Hence, further treatment might be necessary before ultimate disposal of the soil could occur.

Alternatives 3 through 8 would effectively reduce the potential risks associated with the migration of contaminants in the groundwater by extracting and treating them. Alternative 3 would not be as effective in mitigating the leaching of subsurface soil contaminants with subsequent migration to groundwater.

Alternatives 1 and 2 would not be effective in mitigating potential risks associated with future development of the aquifer and future land-use scenarios, including excavation in areas of subsurface soil contamination. In addition, the contaminants would be left untreated in the subsurface soil and groundwater and a long-term monitoring program would be implemented to determine if the contamination was migrating from the site.

D. Reduction of Toxicity, Mobility, or Volume

Alternative 8, as well as Alternatives 3 through 7, would reduce the toxicity, mobility, and volume of the organic contaminants in the groundwater. Under Alternative 8, the recharge of the treated effluent would result in in-situ flushing of subsurface soil contaminants that then would be collected by the extraction system and treated. In contrast, Alternatives 6 and 7 would reduce toxicity by in-situ vapor extraction and thermal treatment, respectively. Alternatives 3 through 5 do not employ treatment to reduce the toxicity, mobility, or volume of soil contaminants. However, in Alternative 4, capping would reduce the mobility of subsurface soil contaminants.

Alternatives 1 and 2 do not reduce the toxicity, mobility, or volume of contaminants.

E. Short-Term Effectiveness

Alternatives 4 through 8 would effectively reduce the potential risks posed by groundwater contamination. For all of the groundwater treatment remedies (Alternatives 3 through 8), an estimated pumping time of 20 years would be required to attain ARARs for groundwater.

Under Alternatives 4 through 8, dust may be generated during excavation and other material handling activities; therefore, dust control procedures would be needed. Air monitoring would be required to determine whether steps are needed to protect on-site workers and the general public from adverse air emissions.

Alternatives 3 through 8 include activities that could result in potential exposure of workers and residents to volatilized contaminants during the installation of the groundwater extraction and reinjection systems. The threat to on-site workers, however, would be mitigated through the use of protective equipment.

There would be minimal risk to the public and on-site workers during implementation of Alternatives 3 and 8. In contrast, Alternative 5 could pose a risk to the public if a spill occurred during off-site transport.

Groundwater sampling under Alternatives 1 and 2 would not result in a risk to the public, on-site workers, or the environment. However, workers would need protective clothing during sampling of on-site wells.

F. Implementability

The technologies and process options proposed in Alternatives 3 through 8 for pumping and treatment are all demonstrated and commercially available. These systems are reliable, if properly maintained.

All components of Alternative 8 utilize relatively common construction equipment and materials and could be easily implemented. Also, in-situ soil flushing has been successfully pilot tested and has performed on a full-scale basis for similar organic contaminants. In contrast, the treatment technology for Alternative 7 (in-situ soil vapor extraction), although successfully demonstrated for the removal of volatile organics from unsaturated soil, has had limited use to date. Furthermore, in-situ soil vapor extraction is currently available from only a few vendors nationwide.

All components of Alternatives 1 and 2 would be relatively easy to implement. Groundwater monitoring can be performed using previously installed monitoring wells and residential wells.

Under Alternative 4, approximately 2 months would be required to construct the cap. It would take approximately 6 months to remove the contaminated soil under Alternative 5 (excavation and landfilling), Alternative 6 (excavation and thermal desorption), and Alternative 7 (in-situ vapor extraction). Under Alternative 3, the cap could be constructed within 2 months. It would take an estimated 10 years to remediate the soil under Alternative 8 (soil flushing). The groundwater treatment scenario for Alternatives 3 through 8 would require an estimated 20 years for the groundwater to meet state and federal standards.

Table 14 summarizes the implementation times for the eight alternatives for comparison purposes.

G. Cost

Only those technologies considered to be cost-effective and appropriate to the magnitude of the problem were considered for site remediation. Since groundwater pumping, treatment, and discharge scenarios, with the exception of Alternative 8 in which treated groundwater is reinjected into the aquifer, are similar for Alternatives 3 through 8, the estimated cost associated with groundwater remediation for any of these alternatives will be approximately $4,874,000. Therefore, the difference in cost within each alternative reflects the soil remediation component which varies from capping in Alternative 4 to excavation and off-site disposal in Alternative 5.

The capital cost of Alternative 8 (in-situ soil flushing) is estimated to be $1,917,000. Annual operation and maintenance costs are estimated to be $259,700. Alternative 8 is cost-effective because it has been determined to provide overall effectiveness proportional to its cost, the net present worth value being $5,572,000. The capital cost and present worth associated with Alternative 5 (off site disposal) are $3,899,00 and $7,929,000, respectively. The operation and maintenance costs for Alternative 5 are $285,800. It should be noted that Alternatives 5 and 8 are the only alternatives which address both organic and inorganic contamination present in both groundwater and subsurface soil.

Under Alternatives 4, 6, and 7 inorganic and organic contamination will be addressed in groundwater; however, only organic contamination will be addressed in subsurface soil. For Alternative 4 (capping) the capital cost will be $1,716,000, while the present worth cost will be $5,143,000. The operation and maintenance cost of capping will be $237,400. The associated capital cost and present worth for Alternative 6 (thermal treatment) will be approximately $3,319,000 and $6,899,000, respectively. The operation and maintenance costs for thermal treatment will be $249,700. As for in-situ vapor extraction, Alternative 7, capital cost and present worth will be $1,761,000 and $5,200,000, respectively. Operation and maintenance costs are estimated at $238,400 for the in-situ soil vapor extraction alternative.

Table 14 summarizes the costs for the eight alternatives for comparison purposes.

H. <u>State Acceptance</u>

Since groundwater in the vicinity of the site is used as a drinking water source, the primary remedial action objective for the Byron Barrel and Drum site is the restoration and protection of the aquifer. Remedial alternatives that restore contaminated groundwater to concentrations attaining federal and state standards, and to some extent ensure protection of groundwater and surface water from continued release of contaminants from soils, are preferred by the State of New York.

Accordingly, under Alternatives 3 through 8, the restoration of the aquifer at the site will be achieved by effectively treating and removing groundwater contaminants and, hence, by eliminating the potential risks to human health and the environment. However, NYSDEC has concurred that Alternative 8 represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for final remediation for the site.

I. <u>Community Acceptance</u>

Although groundwater ARARs are being violated at the site, the RI and risk assessment have indicated that the site does not pose a current threat to public health, since the contaminant plumes are not currently threatening residential wells. As a result, the community has expressed concern that remediation is unnecessary.

In addition, the Byron Town Board passed a resolution recommending that only institutional controls (deed restrictions in areas of subsurface soil contamination and groundwater use restrictions in the aquifer area) be employed at the site.

THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, both EPA and NYSDEC have determined that for Source Areas 1 and 2, Alternative 8, in-situ soil flushing and groundwater pumping, treatment, and recharge, is the most appropriate remedy for the Byron Barrel and Drum site.

The major components of the selected remedy are:

- Dismantling, and decontamination if necessary of the maintenance building, with disposal of the debris at an off-site landfill;

- Extraction and treatment of the groundwater, via precipitation, sedimentation, and filtration to remove the heavy metals, and air-stripping and carbon adsorption to remove volatile organics underlying the site.

- Reinjection of treated groundwater to aquifer and, if necessary, discharge of excess treated water to the closest surface water body;

- Further evaluation of elevated surface soil inorganic concentrations in Source Area 3, where organic contamination is not present, to determine its ultimate disposition (i.e., off site disposal or placement on the soil to be flushed);

- Disposal of the groundwater treatment residuals at an off-site RCRA Subtitle C disposal facility; and

- Appropriate environmental monitoring, including monitoring of residential wells, to ensure the effectiveness of the remedy.

Based upon modeling conducted during the RI/FS, it has been estimated that 20 years will be required to remediate the aquifer. Aquifer testing will be performed in an attempt to optimize the pumping and reinjection system so as to minimize the time required to remediate the aquifer. In addition, an annual review will be conducted of the plume removal so that the system can operate in the most efficient manner.

The contaminated media present at the Byron Barrel and Drum site that will be addressed under the selected remedy are:

- Unsaturated subsurface soil in Source Areas 1 and 2;

- Saturated subsurface soil and groundwater originating from Source Areas 1 and 2; and

- **Surface** soil in Source Area 3.

Contaminated groundwater will be removed from the sand and gravel unit of the aquifer by a system of extraction wells. It will be treated on-site using a combination of precipitation, sedimentation, and filtration for the removal of heavy metals, and air stripping and carbon adsorption for the removal of organic contaminants. Then, the treated groundwater will be reinjected into the aquifer underlying the site. The exact number and location of the extraction wells, the pumping routes, and the type of the reinjection system (wells, french trench, etc.) will be determined during the design phase.

Approximately 4,100 cubic yards of contaminated soil from Source Areas 1 and 2 will be treated via in-situ soil flushing. In addition, approximately 1,100 cubic yards of contaminated soil from Source Area 3 will be further evaluated during the remedial design to determine the ultimate disposition of the inorganic contamination.

Air monitoring will be performed prior to, during, and following construction at the site. Environmental monitoring will be required during the life of the treatment process.

While the levels of contaminants present in the subsurface soils do not pose a risk to public health, localized "hot spots" in Source Areas 1 and 2 may be contributing to the contamination of the aquifer. The concentrations of contaminants present in the aquifer exceed state and federal standards. Flushing the residual contaminants from the soil would prevent possible leaching of contaminants into the aquifer once groundwater treatment ceases.

Groundwater treatment will continue until the federal and state standards for the organic contaminations have been achieved and until the levels of inorganic constituents are returned to background.

Remediation Goals

The risk assessment has concluded that the Hazard Index for groundwater use based on maximum monitoring well concentrations exceeds 1.0. Therefore, non-carcinogenic effects would be likely if the aquifer at the Byron Barrel and Drum Site were developed for potable use. Similarly, the incremental cancer risk based on maximum monitoring well concentrations exceeds the upper bound of the target risk range (2.4×10^{-3}). An incremental maximum cancer risk of 1 in 420 would be incurred if the aquifer is developed for potable purposes under future conditions.

The purpose of this response action is to restore the groundwater underlying the site to levels consistent with state and federal ARARs and to ensure protection of the ground and surface water (in

Oak Orchard Creek adjacent to the site) from the continued release of contaminants from soils. Since no federal or state ARARs exist for soil remediation, the action level for the organic and inorganic contaminants in soil was determined through a site-specific analysis. This analysis used fate and transport modeling to determine levels to which contaminants in soils should be reduced in order to ensure no leaching of contaminants to groundwater above MCL levels.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The low levels of soil contamination remaining at the site, following the removal of all above-ground drums and 40 cubic yards of contaminated soil and debris, present minimal risk to human health. The selected remedy further protects human health and the environment through the removal and treatment of contaminants via precipitation, sedimentation, and filtration to remove inorganics and air stripping and carbon adsorption to remove organic contaminants in groundwater. In addition, treatment of the contaminated subsurface soils through the in-situ soil flushing process will remove the most mobile wastes from the soil, resulting in the elimination of a long-term source of groundwater contamination, and it will mitigate the risks to public health and the environment associated with the migration of those contaminants off-site. There are no short-term threats associated with the selected remedy that cannot be readily controlled.

Compliance With Applicable or Relevant and Appropriate Requirements

The selected remedy, in-situ soil flushing of contaminated soils along with air stripping and carbon adsorption of the groundwater will comply with all chemical-, action-, and location-specific ARARs.

Regulations in 40 CFR 144, the Underground Injection Control (UIC) program, may be appropriate for discharge of the treatment plant effluent to the subsurface. The UIC program prohibits injection activities that allow movement of contaminants into underground sources of drinking water, which may result in violations of MCLs or result in adverse health effects. The treatment plant was designed so that the effluent would meet 10^{-6} incremental cancer risks and a cumulative Hazard Index below unity. Because the groundwater recovery wells are designed to capture all released contaminants, and since the remedial action will continue until the remedial objectives for both groundwater and soil are attained, this alternative complies with the intent of the UIC program.

State ARARs include State Permit Discharge Elimination System regulations (6 NYCRR Part 750 through 758), groundwater quality standards (6 NYCRR 703.5), air regulations (6 NYCRR Parts 200, 201, 212, and 257), and effluent standards and/or limitations for discharge to groundwater (6 NYCRR Parts 703.6 and 703.7). ARARs and federal, and NY State Air Guide-1, and the treatment systems will be designed to meet state and federal monitoring during the remedial action would be conducted to demonstrate that remedial objectives for both subsurface soil and groundwater are obtained. guidelines for the control ambient air quality standards (40CFR 50.6, 50.7, 50.12) are also applicable.

Cost-Effectiveness

The selected remedy is cost effective because it has been determined to provide overall effectiveness proportional to its cost; the net present worth value being $5,572,000. The cost of the soil treatment component of the selected remedy is only 23 percent of the cost of the excavation and off-site disposal alternative and only 34 percent of the cost of the alternative involving on-site incineration, yet the selected remedy mitigates as effectively as those alternatives all the risks posed by the contaminants at the site. The cost of the groundwater component of the selected remedy is approximately $4,874,000, similar to the cost for the groundwater components of the other alternatives, offering the same degree of certainty with regard to the effective removal of all the organic and inorganic contaminants from the contaminated groundwater.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA and New York State have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the final source control operable unit at the Byron Barrel and Drum site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and

NYSDEC have determined that this selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost, also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

The selected remedy is as effective as the other remedial action alternatives in the short-term offering the additional advantage of on-site treatment, thereby reducing potential risks to residents along transportation routes. The implementability of the selected remedy is comparable to the other alternatives. The selected remedy is also the least costly treatment option and also is less expensive than off-site disposal.

The selection of treatment of the contaminated groundwater is consistent with program expectations that indicate that highly toxic and mobile waste are a priority for treatment and often necessary to ensure the long-term effectiveness of a remedy. All the alternatives that consider remedial action are reasonably comparable with respect to long-term effectiveness and implementability, therefore, the major tradeoffs that provide the basis for the selection of the remedy are reduction in toxicity, mobility or volume, and cost effectiveness. The selected remedy can be implemented with less risk to the area of residents and at less cost than the other remedial action alternatives and is, therefore, determined to be the most appropriate solution for the contaminated groundwater at the Byron Barrel and Drum site.

With regard to implementability, the components of the selected remedy are easily implemented, proven technologies and are readily available.

Preference for Treatment as a Principal Element

By treating the contaminated soils via in-situ soil flushing and by treating the groundwater by air stripping and carbon adsorption the selected remedy addresses the principal threats posed by the site through the use of treatment technologies. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

APPENDIX 1 - TABLES

TABLE 1

OCCURRENCE AND DISTRIBUTION OF SUBSURFACE SOIL CONTAMINANTS
CONTRACT LABORATORY PROGRAM SAMPLES(1)
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Contaminant	Contract Required Detection Limit (CRDL) (µg/kg)	No. of Positive Detections/ No. of Samples	Concentration Range (µg/kg)(2)	Arithmetic Average Concentration (µg/kg)(3)	Geometric Mean Concentration (µg/kg)(4)
acetone	10	1/20	270	14	6.1
toluene	5	9/20	6.0-2,700	240	13
ethylbenzene	5	2/20	33-51	4.2	3.3
xylenes	5	3/20	7.0-1,700	89	4.3
1,1,1-trichloroethane	5	4/20	17-150	16.1	4.8
1,1,2-trichloroethane	5	1/20	12	0.6	2.7
tetrachloroethene	5	10/20	3.0-4,400	280	11
trichloroethene	5	10/20	13-2,800	220	18
1,1-dichloroethene	5	2/20	2.0-10	0.6	2.6
methylene chloride	5	5/20	25-190	24	5.8
1,3-dichloropropene	5	1/20	7	0.35	2.6
bis(2-ethylhexyl)phthalate	330	4/20	80-1,700	100	180
di-n-butylphthalate	330	8/20	1,200-2,000	700	420
naphthalene	330	1/20	95	4.8	160
pyrene	330	1/20	79	4.0	160
4,4'-DDT	16	1/20	12	0.6	8.2
4,4'-DDE	16	1/20	7	0.35	7.9
PCB 1254	160	1/20	690	35	89
aluminum	200	20/20	1,370-5,640	3,300	3,100
antimony	60	1/20	10.4	0.52	1.1
arsenic	10	17/20	1.3-2.9	1.7	1.8

TABLE 1
OCCURRENCE AND DISTRIBUTION OF SUBSURFACE SOIL CONTAMINANTS
CONTRACT LABORATORY PROGRAM SAMPLES(1)
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK
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Contaminant	Contract Required Detection Limit (CRDL) (µg/kg)	No. of Positive Detections/ No. of Samples	Concentration Range (µg/kg)(2)	Arithmetic Average Concentration (µg/kg)(3)	Geometric Mean Concentration (µg/kg)(4)
barium	200	20/20	6.8-69	36	31
cadmium	5	1/20	1.2	0.06	1.0
calcium	5,000	20/20	1,670-91,600	39,000	26,000
chromium	10	9/20	1.7-15.5	2.7	2.1
cobalt	50	19/20	1.7-8.2	3.8	3.5
copper	25	17/20	3.2-12.8	6.7	5.5
iron	100	20/20	3,210-12,300	7,200	6,900
lead	5	10/20	4.7-22.6	4.6	2.8
magnesium	5,000	20/20	1,970-26,500	11,000	9,100
manganese	15	20/20	137-536	310	290
nickel	40	9/20	3.7-8.8	2.9	2.2
potassium	5,000	16/20	240-699	380	130
silver	10	2/20	57.7-144	10	1.6
sodium	5,000	11/20	61.4-756	77	12
vanadium	50	20/20	4.0-14.4	8.5	8.1
zinc	20	20/20	17.4-122	57	50

(1) Organic analyses conducted using EPA Methods 624 (volatiles), 625 (extractables), and 608 (pesticides/PCBs).
(2) Concentration range for positive detections only.
(3) Calculated using "ϕ" for nondetections.
(4) Calculated using 1/2 the CLP CRDL for nondetections.

TABLE

OCCURRENCE AND DISTRIBUTION OF GROUNDWATER CONTAMINANTS
ROUND 3 MONITORING WELL SAMPLES(1)
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Contaminant	Contract Required Detection Limit (CRDL) (μg/L)	No. of Positive Detections/ No. of Samples	Concentration Range (μg/L)(2)	Arithmetic Average Concentration (μg/L)(3)	Geometric Mean Concentration (μg/L)(4)
toluene	5	2/20	1.0	0.10	2.3
xylenes	5	3/20	2.0-3.0	0.35	2.5
1,3-dichlorobenzene	5	4/20	2.0-3.0	0.45	4.2
1,4-dichlorobenzene	5	1/20	2.0	0.10	4.8
1,1,1-trichloroethane	5	11/20	9.0-4,400	380	33
1,1-dichloroethane	5	10/20	1.0-290	18	4.5
tetrachloroethene	5	1/20	82	4.1	3.0
trichloethene	5	4/20	5.0-3,300	170	4.3
1,2-dichloroethene	5	1/20	110	5.5	3.0
1,1-dichloroethene	5	9/20	2.0-41	5.3	4.4
N-nitrosodiphenylamine	10	2/20	2.0	0.20	4.6
arsenic	10	20/20	2.0-26	9.6	7.8
barium	200	20/20	84-2,870	840	610
beryllium	5	5/20	3.0-5.0	0.90	2.7
cadmium	5	20/20	3.0-24	11	9.2
calcium	5,000	20/20	125,000-549,000	420,000	390,000

TABLE 2
OCCURRENCE AND DISTRIBUTION OF GROUNDWATER CONTAMINANTS
ROUND 3 MONITORING WELL SAMPLES(1)
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK
PAGE TWO

Contaminant	Contract Required Detection Limit (CRDL) (µg/L)	No. of Positive Detections/ No. of Samples	Concentration Range (µg/L)(2)	Arithmetic Average Concentration (µg/L)(3)	Geometric Mean Concentration (µg/L)(4)
chromium	10	19/20	13-89	40	33
cobalt	50	20/20	5.0-105	31	23
copper	25	20/20	31-618	160	110
iron	100	20/20	5,794-44,300	28,000	25,000
lead	5	20/20	13-260	97	73
magnesium	5,000	20/20	34,200-151,000	91,000	83,000
manganese	15	20/20	552-9,460	3,900	3,000
mercury	0.2	5/20	0.2-0.5	0.07	0.13
nickel	40	20/20	30-144	71	64
potassium	5,000	20/20	2,580-8,920	4,400	4,100
silver	10	1/20	6	0.30	5.0
sodium	5,000	20/20	3,300-37,900	11,000	7,900
vanadium	50	18/20	12-54	27	27
zinc	20	20/20	62-2,020	570	380

(1) Organic analyses conducted using EPA Methods 624 (volatiles), 625 (extractables), and 608 (pesticides/PCBs).
(2) Concentration range for positive detections only.
(3) Calculated using "ϕ" for nondetections.
(4) Calculated using 1/2 the CLP CRDL for nondetections.

TABLE

OCCURRENCE AND DISTRIBUTION OF GROUNDWATER CONTAMINANTS
ROUND 4 MONITORING WELL SAMPLES(1)
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Contaminant	Method Detection Limit (MDL) (µg/L)	No. of Positive Detections/ No. of Samples	Concentration Range (µg/L)(2)	Arithmetic Average Concentration (µg/L)(3)	Geometric Mean Concentration (µg/L)(4)
benzene	0.2	1/20	0.50	0.025	2.3
toluene	0.2	5/20	0.3-1.0	0.14	1.7
chlorobenzene	0.2	2/20	0.046-0.22	0.013	1.8
1,2-dichlorobenzene	0.4	1/20	0.026	0.0013	2.0
1,3-dichlorobenzene	0.4	2/20	0.02-0.041	0.003	1.6
1,4-dichlorobenzene	0.3	8/20	0.016-0.91	0.054	0.46
1,1,1-trichloroethane	0.03	11/20	15-760	150	26
1,1,2-trichloroethane	0.02	8/20	0.013-3.7	0.19	0.49
1,1-dichloroethane	0.07	11/20	0.12-16	3.5	2.7
tetrachloroethene	0.03	1/20	51	2.6	2.9
trichloroethene	0.12	4/20	5.9-2,800	140	4.2
1,2-dichloroethene	0.10	1/20	0.93	0.047	2.4
1,1-dichloroethene	0.13	11/20	0.46-6.1	1.6	2.4
vinyl chloride	0.18	1/20	0.06	0.003	4.0
chloroform	0.05	3/20	0.026-0.13	0.0095	1.4
bromodichloromethane	0.10	2/20	0.021-0.024	0.0022	1.6
2-chloroethylether	0.13	1/20	60	3.0	5.7
aluminum	200	20/20	1,460-279,000	51,000	24,000
arsenic	10	1/20	41.3	2.1	5.6
barium	200	20/20	120-5,230	870	480

TABLE 3
OCCURRENCE AND DISTRIBUTION OF GROUNDWATER CONTAMINANTS
ROUND 4 MONITORING WELL SAMPLES(1)
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK
PAGE TWO

Contaminant	Method Detection Limit (MDL) (μg/L)	No. of Positive Detections/ No. of Samples	Concentration Range (μg/L)(2)	Arithmetic Average Concentration (μg/L)(3)	Geometric Mean Concentration (μg/L)(4)
beryllium	5	20/20	1.1-22.6	4.3	2.8
cadmium	5	3/20	4.7-21.4	1.8	3.1
calcium	5,000	20/20	71,4000-2,070,000	460,000	290,000
chromium	10	20/20	37.8-479	130	100
cobalt	50	18/20	7.5-377	57	33
copper	25	20/20	9.5-2,110	350	120
iron	100	20/20	2,530-666,000	110,000	50,000
lead	5	18/20	4.5-631	110	35
magnesium	5,000	20/20	10,900-500,000	120,000	78,000
manganese	15	20/20	132-19,800	3,300	1,600
mercury	0.2	3/20	0.40-0.70	0.085	0.13
nickel	40	20/20	8.9-606	120	75
potassium	5,000	20/20	1,710-35,300	11,000	8,100
silver	10	11/20	4.1-8.9	2.7	4.9
sodium	5,000	19/20	2,110-50,800	11,000	7,700
vanadium	50	20/20	4.5-574	110	51
zinc	20	20/20	24.6-7,580	1,300	370

(1) Organic analyses conducted using EPA Methods 601/602 (volatiles).
(2) Concentration range for positive detections only.
(3) Calculated using "0" for nondetections.
(4) Calculated using 1/2 the CLP CRDL for nondetections.

TABLE 4

INORGANIC RESULTS FOR UPGRADIENT AND SITE GROUNDWATER SAMPLES
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Chemical	Maximum Concentration (ug/l)		Average Concentration (ug/l)(3)	
	Upgradient(1)	Site(2)	Upgradient(1)	Site(2)
aluminum	58,900	279,000	29,450	28,072
arsenic	8.0	24	4.0	3.967
barium	1,490	5,230	1,159.5	1,003.3
beryllium	4.6	22.6	4.3	2.8
cadmium	20	24	10	6.8
calcium	549,000	2,070,000	494,000	449,160
chromium	171	479	130	87.8
cobalt	65	377	64.05	48.8
copper	406	2,110	395	295.4
iron	159,000	666,000	96,300	77,575
lead	170	631	147.5	117.96
magnesium	151,000	500,000	147,000	102,932
manganese	8,340	19,800	5,755	3,939
mercury	-	0.7	-	0.0933
nickel	143	606	141.5	97.38
potassium	12,900	35,300	9,500	7,475
silver	6.0	8.9	5.6	1.3
sodium	9,370	50,800	9,190	10,769
vanadium	129	574.0	87	72.2
zinc	917	7,580	835	1,116

(1) Upgradient samples from MW-4A.
(2) Site samples do not include wells 4A, 11B, 12B, 13B, or 14B.
(3) Average concentrations determined using only one of any two duplicate samples collected.

TABLE 5

INDICATOR CHEMICALS
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Carcinogens	Noncarcinogens
benzene	acetone
1,4-dichlorobenzene	2-butanone
1,1,2-trichloroethane	4-methyl-2-pentanone
1,1-dichloroethane	toluene
1,2-dichloroethane	xylenes
tetrachloroethene	chlorobenzene
trichloroethene	1,2-dichlorobenzene
1,1-dichloroethene	1,3-dichlorobenzene
carbon tetrachloride	phenol
chloroform	4-methylphenol
methylene chloride	di-n-butyl phthalate
chloromethane	1,1,1-trichloroethane
bromodichloromethane	1,2-dichloroethene
chlorodibromomethane	benzoic acid
benzo(a)pyrene	chromium
benzo(a)anthracene	lead
benzo(b)fluoranthene	
bis(2-ethylhexyl)phthalate	
N-nitrosodiphenylamine	

TABLE 6

EXPOSURE ROUTES AND INPUT PARAMETERS
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Matrix	Exposure Route	Input Parameters
Soil	Dermal Contact	Maximum Surface Soil Concentrations Average Surface Soil Concentrations Soil Adherence Factor: 1 mg/cm^2 Exposed Surface Area of Skin: Adult - 2,950 cm2 Adolescent - 2,330 cm2 Relative Absorption Fraction: Volatiles - 10% Semivolatiles - 5% Inorganics - 5% Body weight: Adult - 70 kg Adolescent - 45 kg Exposure Frequency: 30 days/year
Soil	Accidental Ingestion	Maximum Surface Soil Concentrations Average Surface Soil Concentrations Soil Ingestion Rate: 100 mg/day Body Weight: Adult - 70 kg Adolescent - 45 kg Exposure Frequency: 30 days/year
Air	Dust Inhalation	Maximum Surface Soil Concentrations Average Surface Soil Concentrations Breathing Rate: Adult - 20 m^3/day Child - 10 m^3/day Disturbance Frequency: 30 events/month Vegetative Cover Factor: 0 Source Surface Area: 400 m^2 Body Weight: Adult - 70 kg Child - 10 kg Exposure Frequency: 365 days/year

TABLE 6
EXPOSURE ROUTES AND INPUT PARAMETERS
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK
PAGE TWO

Matrix	Exposure Route	Input Parameters	
Air	Volatile Inhalation	Maximum Surface Soil Concentrations	
		Average Surface Soil Concentrations	
		Breathing Rate:	
		Adult -	20 m^3/day
		Child -	10 m^3/day
		Source Surface Area:	2,000 m^2
		Body Weight:	
		Adult -	70 kg
		Child -	10 kg
		Exposure Frequency:	365 days/year
Water	Ingestion/Inhalation	Maximum Monitoring Well Concentrations	
		Average Monitoring Well Concentrations	
		Maximum Residential Well Concentrations	
		Ingestion Rate:	
		Adult -	2 L/day
		Child -	1 L/day
		Inhalation Rate:	
		Adult -	20 m^3/day
		Child -	10 m^3/day
		Body Weight:	
		Adult -	70 kg
		Child -	10 kg
		Exposure Frequency:	365 days/year

TABLE 7

NONCARCINOGENIC RISK ESTIMATES
SOIL AND AIR EXPOSURE ROUTES
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Indicator Chemical	Dose/Reference Dose							
	Dermal Contact(1)		Accidental Ingestion(1)		Dust Inhalation(2)		Volatile Inhalation(2)	
	Maximum-Case	Average-Case	Maximum-Case	Average-Case	Maximum-Case	Average-Case	Maximum-Case	Average-Case
1,1,1-trichloroethane	9.5×10^{-9}	3.5×10^{-10}	4.1×10^{-9}	1.5×10^{-10}	4.9×10^{-12}	1.8×10^{-13}	2.4×10^{-5}	8.8×10^{-7}
tetrachloroethene	3.0×10^{-7}	1.1×10^{-8}	1.3×10^{-7}	4.7×10^{-9}	5.1×10^{-11}	1.9×10^{-12}	2.6×10^{-5}	9.7×10^{-7}
trichloroethene	-(3)	-	-	-	-	-	-	-
chloroform	8.5×10^{-8}	1.1×10^{-8}	3.7×10^{-8}	4.7×10^{-7}	-	-	-	-
benzoic acid	2.6×10^{-8}	3.0×10^{-9}	2.2×10^{-8}	2.6×10^{-9}	-	-	-	-
benzo(a)anthracene	-	-	-	-	-	-	-	-
benzo(b)fluoranthene	-	-	-	-	-	-	-	-
benzo(a)pyrene	-	-	-	-	-	-	-	-
bis(2-ethylhexyl)phthalate	5.9×10^{-6}	9.0×10^{-7}	5.8×10^{-6}	7.7×10^{-7}	-	-	-	-
di-n-butyl phthalate	1.4×10^{-7}	3.6×10^{-8}	1.2×10^{-7}	7.4×10^{-9}	-	-	-	-
chromium (III)	1.7×10^{-4}	1.5×10^{-5}	1.5×10^{-4}	1.3×10^{-5}	-	-	-	-
lead	4.1×10^{-3}	2.6×10^{-4}	3.5×10^{-4}	2.3×10^{-4}	-	-	-	-
Total (Hazard Index)	4.3×10^{-3}	2.8×10^{-4}	5.1×10^{-4}	2.4×10^{-4}	5.6×10^{-11}	2.1×10^{-12}	5.0×10^{-5}	1.9×10^{-6}

(1) Risk estimates based on adolescent receptors exposed at the source.
(2) Risk estimates based on child receptors exposed at downwind locations.
(3) - Not applicable: Reference Dose unavailable for ingestional and/or inhalational exposure.

TABLE 8

CARCINOGENIC RISK ESTIMATES
SOIL AND AIR EXPOSURE ROUTES
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Indicator Chemical	Incremental Cancer Risk							
	Dermal Contact(1)		Accidental Ingestion(1)		Dust Inhalation(2)		Volatile Inhalation(2)	
	Maximum-Case	Average-Case	Maximum-Case	Average-Case	Maximum-Case	Average-Case	Maximum-Case	Average-Case
1,1,1-trichloroethane	-	-	-	-	-	-	-	-
tetrachloroethene	7.1×10^{-11}	2.6×10^{-12}	2.4×10^{-11}	8.9×10^{-13}	2.8×10^{-15}	1.0×10^{-16}	1.4×10^{-9}	5.3×10^{-11}
trichloroethene	1.0×10^{-10}	4.4×10^{-12}	3.5×10^{-11}	1.5×10^{-12}	7.3×10^{-14}	3.1×10^{-15}	1.7×10^{-7}	7.2×10^{-9}
chloroform	2.4×10^{-12}	3.1×10^{-13}	8.2×10^{-13}	1.1×10^{-13}	1.9×10^{-14}	2.5×10^{-15}	1.3×10^{-7}	1.7×10^{-8}
benzoic acid	-	-	-	-	-	-	-	-
benzo(a)anthracene	1.7×10^{-9}	6.2×10^{-11}	1.1×10^{-9}	4.2×10^{-11}	1.1×10^{-12}	4.0×10^{-14}	5.3×10^{-16}	2.0×10^{-17}
benzo(b)fluoranthene	2.2×10^{-8}	1.5×10^{-9}	1.5×10^{-8}	9.9×10^{-10}	1.4×10^{-11}	9.4×10^{-13}	1.5×10^{-13}	9.9×10^{-15}
benzo(a)pyrene	1.1×10^{-8}	4.2×10^{-10}	7.7×10^{-9}	2.9×10^{-10}	7.3×10^{-11}	2.7×10^{-12}	8.6×10^{-15}	3.2×10^{-16}
bis(2-ethylhexyl)phthalate	7.6×10^{-10}	1.2×10^{-10}	5.2×10^{-10}	8.0×10^{-11}	-	-	-	-
di-n-butyl phthalate	-	-	-	-	-	-	-	-
chromium (III)	-	-	-	-	-	-	-	-
lead	-	-	-	-	-	-	-	-
Total	3.6×10^{-8}	2.1×10^{-9}	2.4×10^{-8}	1.4×10^{-9}	2.9×10^{-7}	3.7×10^{-8}	3.0×10^{-7}	2.4×10^{-8}

(1) Risk estimates based on adult receptors exposed at the site.
(2) Risk estimates based on adult receptors exposed at downwind locations.
(3) - Not applicable: Surface soil indicator chemical has no known carcinogenic effects or will not be subject to volatile emissions (metals).

TABLE 9

NONCARCINOGENIC RISK ESTIMATES
GROUNDWATER USE
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Indicator Chemical	Dose/Reference Dose		
	Maximum Monitoring Well Concentrations(1)	Average Monitoring Well Concentrations(2)	Residential Well Concentrations
benzene	-(3)	-	-
toluene	1.1×10^{-4}	1.6×10^{-5}	-
xylenes	1.7×10^{-4}	2.0×10^{-5}	-
chlorobenzene	1.1×10^{-3}	1.8×10^{-4}	-
1,2-dichlorobenzene	2.8×10^{-6}	1.4×10^{-7}	-
1,4-dichlorobenzene	-	-	-
1,1,2-trichloroethane	2.6×10^{-3}	1.4×10^{-4}	-
1,1,1-trichloroethane	1.6×10^{0}	1.5×10^{-1}	-
1,2-dichloroethane	-	-	-
1,1-dichloroethane	8.3×10^{-2}	5.0×10^{-3}	-
tetrachloroethene	2.5×10^{-1}	1.2×10^{-2}	7.5×10^{-4}
trichloroethene	-	-	-
1,1-dichloroethene	1.3×10^{-1}	1.7×10^{-2}	-
vinyl chloride	-	-	-
carbon tetrachloride	-	-	3.8×10^{-4}

TABLE 9
NONCARCINOGENIC RISK ESTIMATES
GROUNDWATER USE
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK
PAGE TWO

Indicator Chemical	Dose/Reference Dose		
	Maximum Monitoring Well Concentrations(1)	Average Monitoring Well Concentrations(2)	Residential Well Concentrations
chloroform	1.5×10^{-3}	2.7×10^{-5}	-
methylene chloride	1.3×10^{-3}	-	-
bromodichloromethane	-	-	-
dibromochloromethane	2.0×10^{-5}	-	-
N-nitrosodiphenylamine	-	-	-
chromium	1.4×10^{-2}	2.5×10^{-3}	-
lead	1.3×10^{1}	2.4×10^{0}	8.2×10^{-2}
Total (Hazard Index)	1.5×10^{1}	2.6×10^{0}	8.3×10^{-2}

(1) Based on four rounds of monitoring well sampling and analysis.
(2) Based on round 3 and round 4 monitoring well sampling and analysis.
(3) - Not applicable: No Reference Dose available or contaminant not detected.

TABLE 10

CARCINOGENIC RISK ESTIMATES
GROUNDWATER USE
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Indicator Chemical	Incremental Cancer Risk		
	Maximum Monitoring Well Concentrations(1)	Average Monitoring Well Concentrations(2)	Residential Well Concentrations
benzene	4.0×10^{-7}	2.0×10^{-8}	-
toluene	-(3)	-	-
xylenes	-	-	-
chlorobenzene	-	-	-
1,2-dichlorobenzene	-	-	-
1,4-dichlorobenzene	7.8×10^{-7}	3.9×10^{-9}	-
1,1,2-trichloroethane	5.0×10^{-6}	2.6×10^{-7}	-
1,1,1-trichloroethane	-	-	-
1,2-dichloroethane	9.4×10^{-7}	-	-
1,1-dichloroethane	4.3×10^{-4}	2.6×10^{-5}	-
tetrachloroethene	7.1×10^{-5}	3.5×10^{-6}	2.2×10^{-7}
trichloroethene	1.0×10^{-3}	5.0×10^{-5}	9.7×10^{-8}
1,1-dichloroethene	9.3×10^{-4}	1.2×10^{-4}	-
vinyl chloride	2.5×10^{-6}	1.2×10^{-7}	-
carbon tetrachloride	-	-	3.1×10^{-8}

TABLE 10
CARCINOGENIC RISK ESTIMATES
GROUNDWATER USE
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK
PAGE TWO

Indicator Chemical	Incremental Cancer Risk		
	Maximum Monitoring Well Concentrations(1)	Average Monitoring Well Concentrations(2)	Residential Well Concentrations
chloroform	4.4×10^{-7}	8.1×10^{-9}	-
methylene chloride	7.5×10^{-7}	-	-
bromodichloromethane	4.9×10^{-7}	4.7×10^{-9}	-
dibromochloromethane	1.9×10^{-7}	-	-
N-nitrosodiphenylamine	1.6×10^{-7}	1.6×10^{-8}	-
chromium	-	-	-
lead	-	-	-
Total	2.4×10^{-3}	2.0×10^{-4}	3.4×10^{-7}

(1) Based on four rounds of monitoring well sampling and analysis.
(2) Based on round 3 and round 4 monitoring well sampling and analysis.
(3) - Not applicable: Contaminant not detected or noncarcinogenic.

TABLE 11

COMPARISON OF MAXIMUM SURFACE WATER CONTAMINANT CONCENTRATIONS
AND AMBIENT WATER QUALITY CRITERIA
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Chemical	Maximum Surface Water Concentration (µg/L)	Ambient Water Quality Criteria(1) (µg/L)		NY State Surface Water Standard (µg/L)	
		Acute	Chronic	Class D	Class C
toluene	9	17,500	--		
1,1,1,-trichloroethane	7	18,000	--		
1,2-dichloroethene	0	11,600	--		
chloromethane	39	11,000	--		
phenol	13	10,200	2,560	5.0	5.0
4-methylphenol	62	--	--		
arsenic	31.9	360	190	360	190
copper	97	120	67	120	67
lead	28.2	1,082	48	1,082	48
nickel	17	7,913	880	8,641	448
vanadium	51			190	14
zinc	391	654	592	1,735	30

(1) Ambient water quality criteria for the protection of freshwater aquatic life. Inorganics are based on a calculated hardness of 763 mg/L.

TABLE 12

SOURCE CONTROL (SOIL) CLEANUP LEVELS
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Chemical	Soil Cleanup Level (µg/kg)		
	ARAR-Based(1)	Risk-Based (10^{-6})(2)	Risk-Based (10^{-4})(3)
ethylbenzene	56,000	52,000 (5)	52,000 (5)
toluene	45,000	36,000 (5)	36,000 (5)
xylenes	8,200	58,000 (5)	58,000 (5)
1,1,1-trichloroethane	2,300	5,500 (5)	5,500 (5)
tetrachloroethene	140 (4)	8.4	840
trichloroethene	47	4.9	490

(1) Cleanup level based on groundwater cleanup level corresponding to the MCL or MCLG unless otherwise noted.
(2) Cleanup level based on a cumulative incremental cancer risk of 10^{-6} (groundwater use) unless noted otherwise.
(3) Cleanup level based on a cumulative incremental cancer risk of 10^{-4} (groundwater use) unless noted otherwise.
(4) Cleanup level based on an assumed groundwater cleanup level of 5 µg/l (similarity to other chlorinated aliphatics)
(5) Cleanup level based on a Hazard Index below 1 (i.e., 0.9).

TABLE 13

MANAGEMENT OF MIGRATION (GROUNDWATER) CLEANUP LEVELS
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Chemical	ARAR-Based(1) (μg/l)
benzene	5/ND(2)
toluene	2,000(50)(3)
xylenes	440(50)
chlorobenzene	488(20)(4)
1,2-dichlorobenzene	620/4.7
1,4-dichlorobenzene	75/4.7
1,1,2-trichloroethane	5(0.6)(5)
1,1,1-trichloroethane	200(50)
1,2-dichloroethane	5(0.8)
1,1-dichloroethane	5(50)(5)
tetrachloroethene	5(0.7)(6)
trichloroethene	5/10
1,1-dichloroethene	7(0.07)
vinyl chloride	2/5
chloroform	100/100
methylene chloride	100(50)
bromodichloromethane	100(50)
chlorodibromomethane	100(50)
N-nitrosodiphenylamine	4.9(50)(4)
2-butanone	172(7)
carbon tetrachloride	5

(1) ARAR-based cleanup levels based on MCLs/MCLGs unless noted otherwise.
(2) The first value is the Federal ARAR-based value. The second is the State Ambient Water Quality Standard for Class GA groundwater (ND - not detectable).
(3) Value in parentheses is the State Ambient Water Quality guideline.
(4) AWQC for the protection of public health through drinking water exposure.
(5) Based on MCL/MCLG for 1,2-dichloroethane.
(6) Based on MCL/MCLG for trichloroethene.
(7) EPA Lifetime Drinking Water Health Advisory.

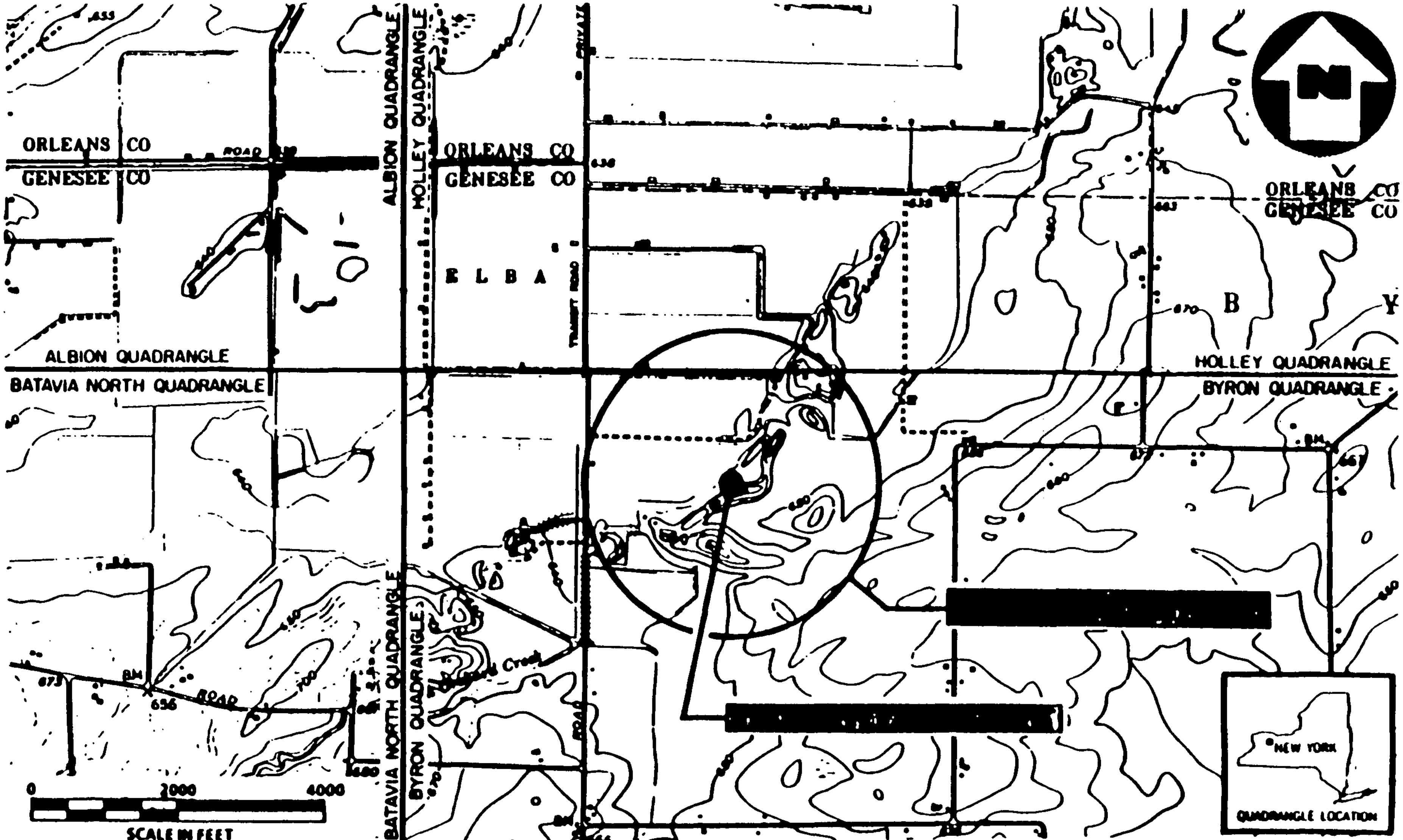
TABLE 14

COMPARATIVE COST ANALYSIS OF ALTERNATIVES
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

Alternative 1 No Further Action with Monitoring	Alternative 2 Deed and Groundwater Use Restrictions	Alternative 3 Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 4 Capping, Groundwater Pumping, Treatment, and Discharge to Surface Water
COSTS			
Capital: $0	Capital: $15,000	Capital: $1,506,000	Capital: $1,716,000
Annual O&M: $13,600	Annual O&M: $13,600	Annual O&M: $232,700	Annual O&M: $237,400
Present Worth: $265,000	Present Worth: $279,000	Present Worth: $4,874,000	Present Worth: $5,143,000
TIME TO IMPLEMENT			
Soil: -	Soil: -	Soil: -	Soil: 2 months
Groundwater: -	Groundwater: -	Groundwater: 20 years	Groundwater: 20 years

Alternative 5 Offsite Disposal, Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 6 Thermal Treatment, Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 7 In-Situ Vapor Extraction, Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 8 In-Situ Soil Flushing, Groundwater Pumping, Treatment and Discharge to the Subsurface
COSTS			
Capital: $3,899,000	Capital: $3,319,000	Capital: $1,761,000	Capital: $1,917,000
Annual O&M: $285,800	Annual O&M: $249,700	Annual O&M: $238,400	Annual O&M: $259,700
Present Worth: $7,929,000	Present Worth: $6,899,000	Present Worth: $5,200,000	Present Worth: $5,572,000
TIME TO IMPLEMENT			
Soil: 2 months	Soil: 2 months	Soil: 6 months	Soil: <10 years
Groundwater: 20 years	Groundwater: 20 years	Groundwater: 20 years	Groundwater: 20 years

APPENDIX 2 - FIGURES

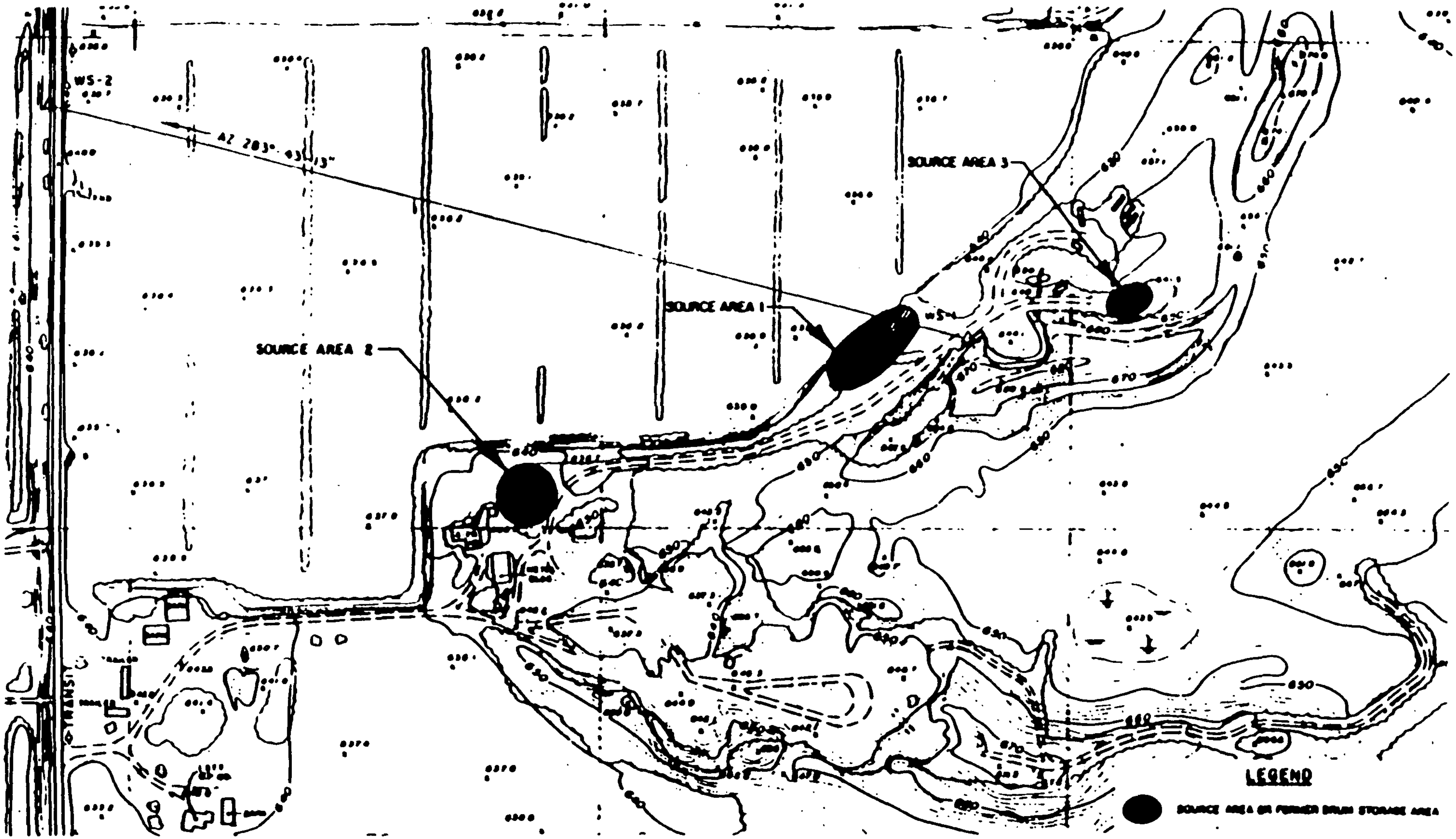


BASE MAP IS A PORTION OF THE BYRON, ALBION, HOLLEY, AND BATAVIA NORTH, NY QUADRANGLES (U.S.G.S., 7.5 MINUTE SERIES). CONTOUR INTERVAL TEN FEET.

FIGURE 1

LOCATION MAP

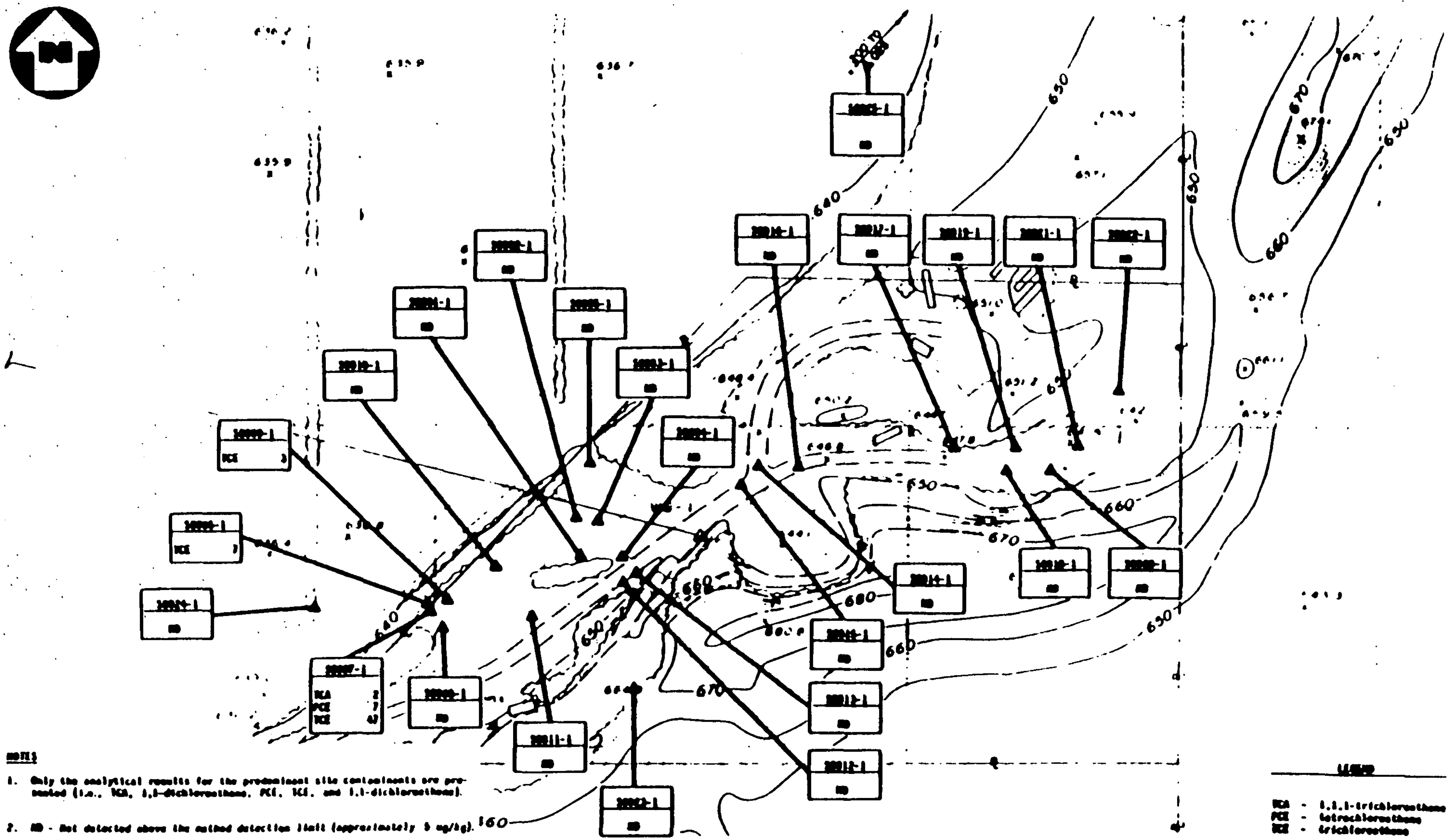
BYRON BARREL AND DRUM SITE, BYRON, NY



LOCATION OF SOURCES/FORMER DRUM STORAGE AREAS
BYRON BARREL AND DRUM SITE, BYRON, NY

SCALE IN FEET

FIGURE 2



NOTES

1. Only the analytical results for the predominant site contaminants are presented (i.e., TCA, 1,1-dichloroethane, PCE, TCE, and 1,1-dichloroethene).

2. ND - Not detected above the method detection limit (approximately 5 ug/kg).

LEGEND

TCA - 1,1,1-trichloroethane
PCE - tetrachloroethene
TCE - trichloroethene

FIGURE 3

0 100 200
SCALE IN FEET

CHLORINATED ALIPHATIC SURFACE SOIL CONTAMINATION (ug/kg)
BYRON BARREL AND DRUM SITE, BYRON, NY

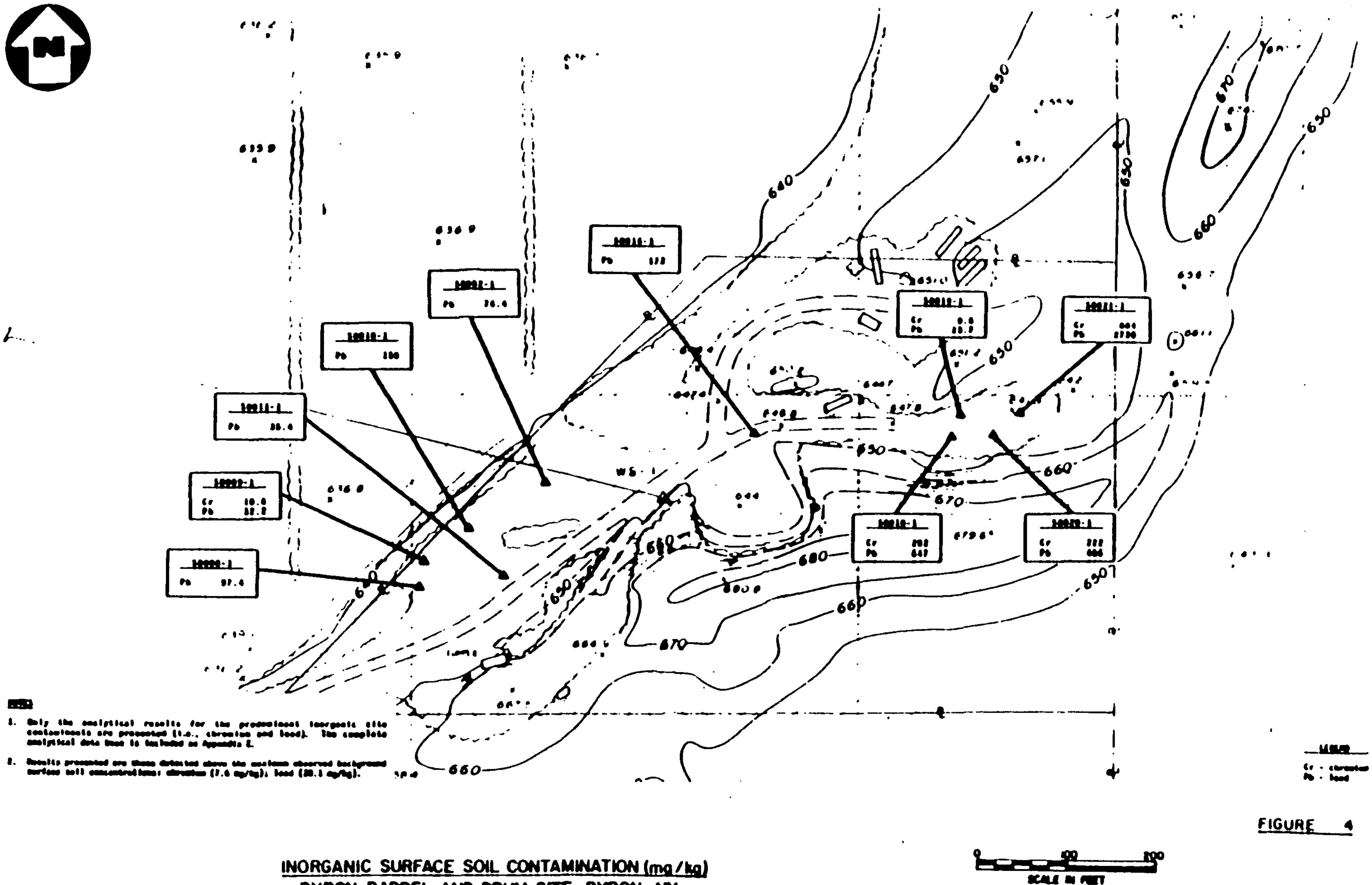
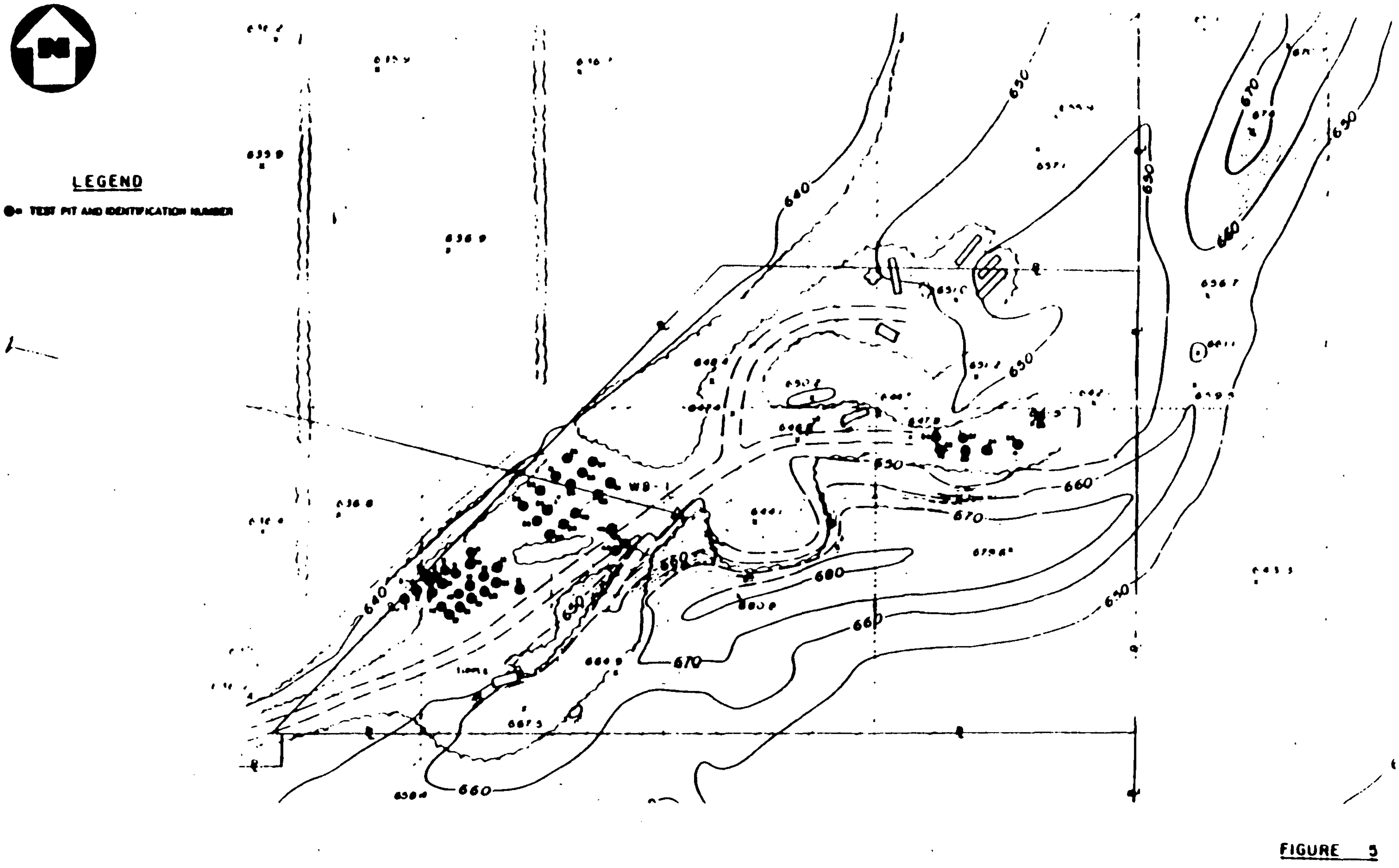
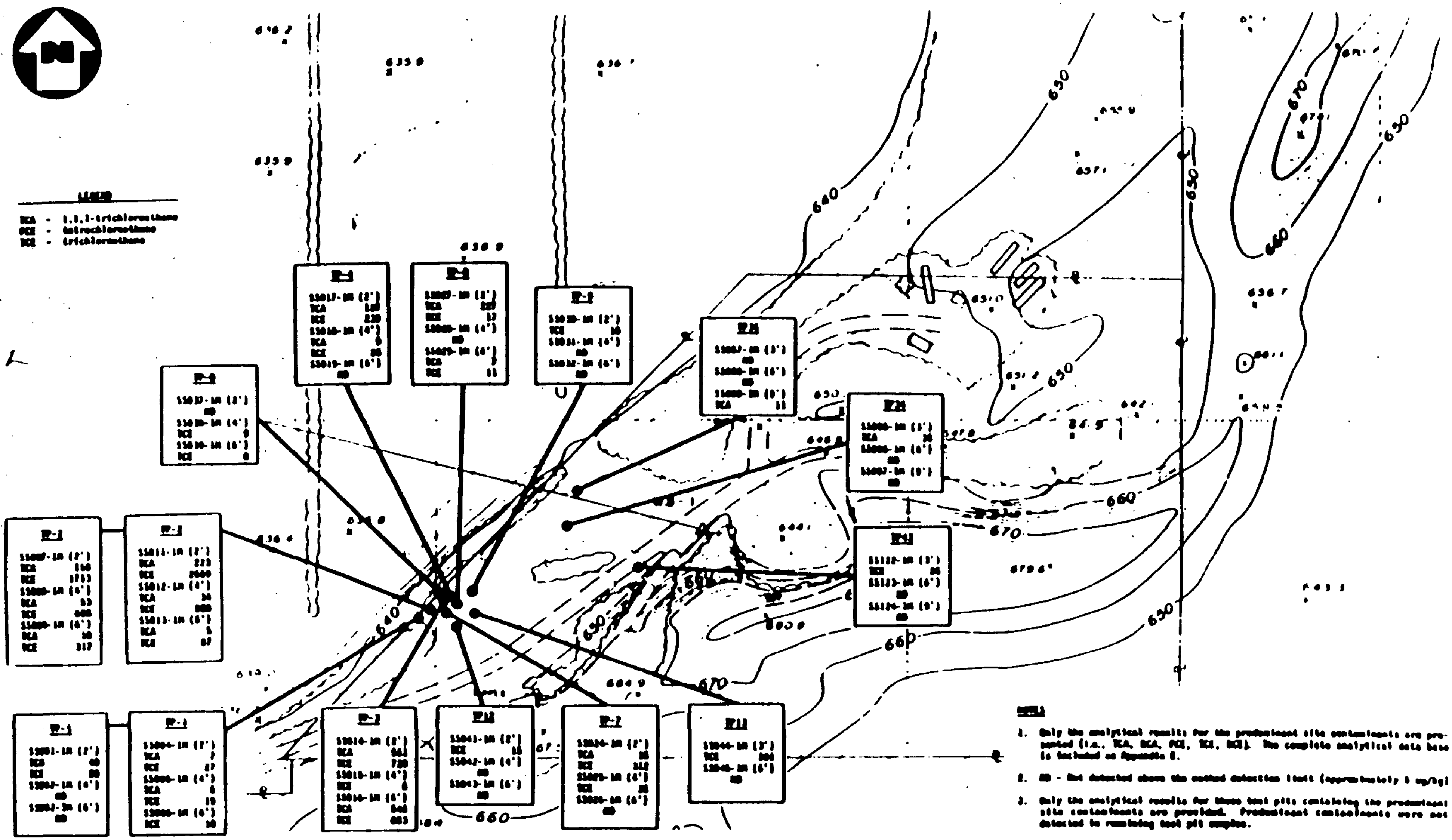


FIGURE 4

INORGANIC SURFACE SOIL CONTAMINATION (mg/kg)
BYRON BARREL AND DRUM SITE, BYRON, NY



LOCATION OF TEST PITS
BYRON BARREL AND DRUM SITE, BYRON, NY



NOTES

1. Only the analytical results for the predominant site contaminants are presented (i.e., TCA, DCA, PCE, TCE, DCE). The complete analytical data base is included as Appendix [illegible].

2. ND - Not detected above the method detection limit (approximately 5 ug/kg)

3. Only the analytical results for those test pits containing the predominant site contaminants are provided. Predominant contaminants were not detected in remaining test pit samples.

CHLORINATED ALIPHATIC SUBSURFACE SOIL CONTAMINATION (ug/kg)
- MOBILE LABORATORY RESULTS -
BYRON BARREL AND DRUM SITE, BYRON, NY

0 100 200
SCALE IN FEET

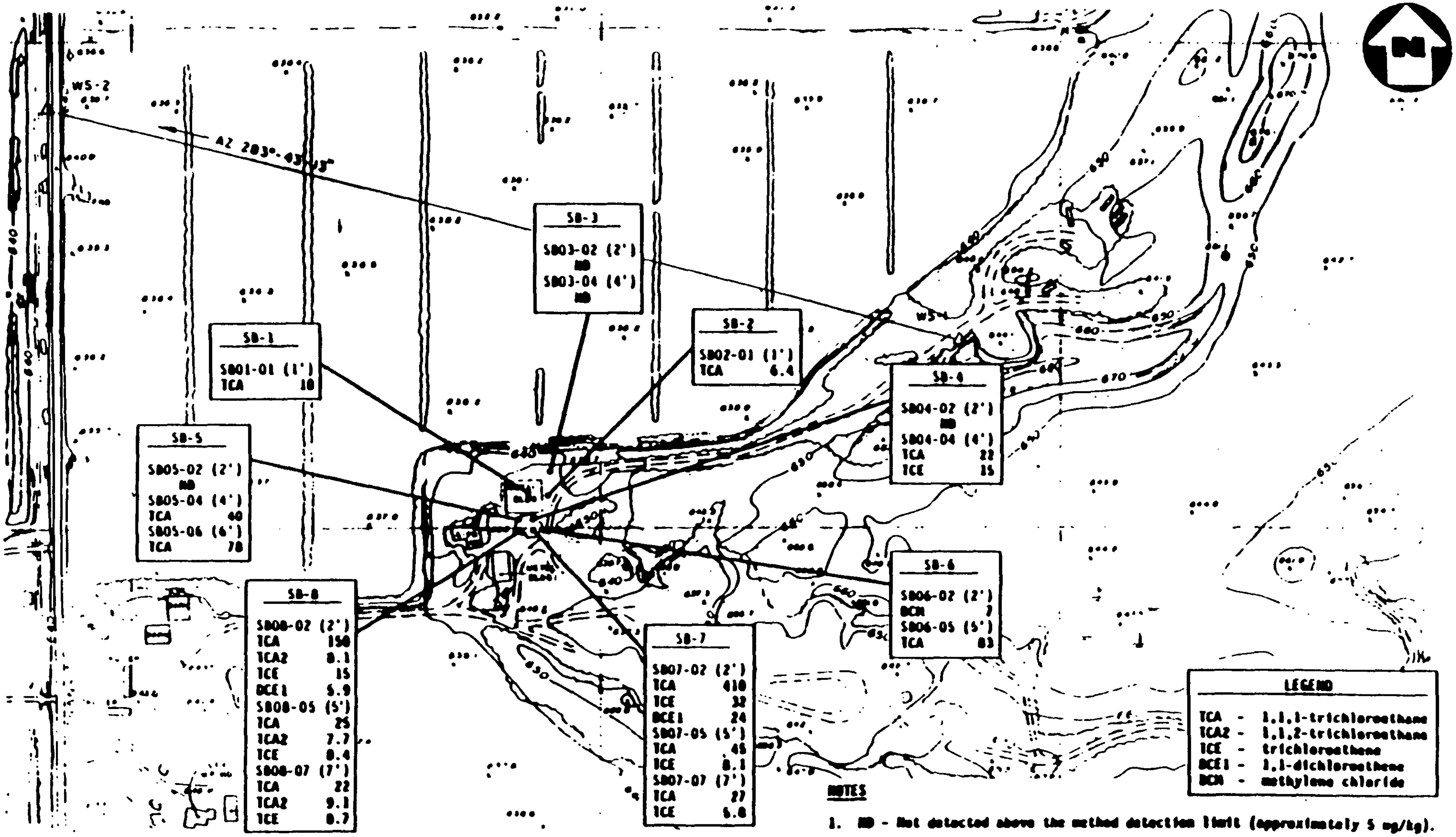


FIGURE 7

CHLORINATED ALIPHATIC SUBSURFACE SOIL CONTAMINATION (µg/kg)
MAINTENANCE BUILDING SOURCE
BYRON BARREL AND DRUM SITE, BYRON, NY

0 200 400
SCALE IN FEET

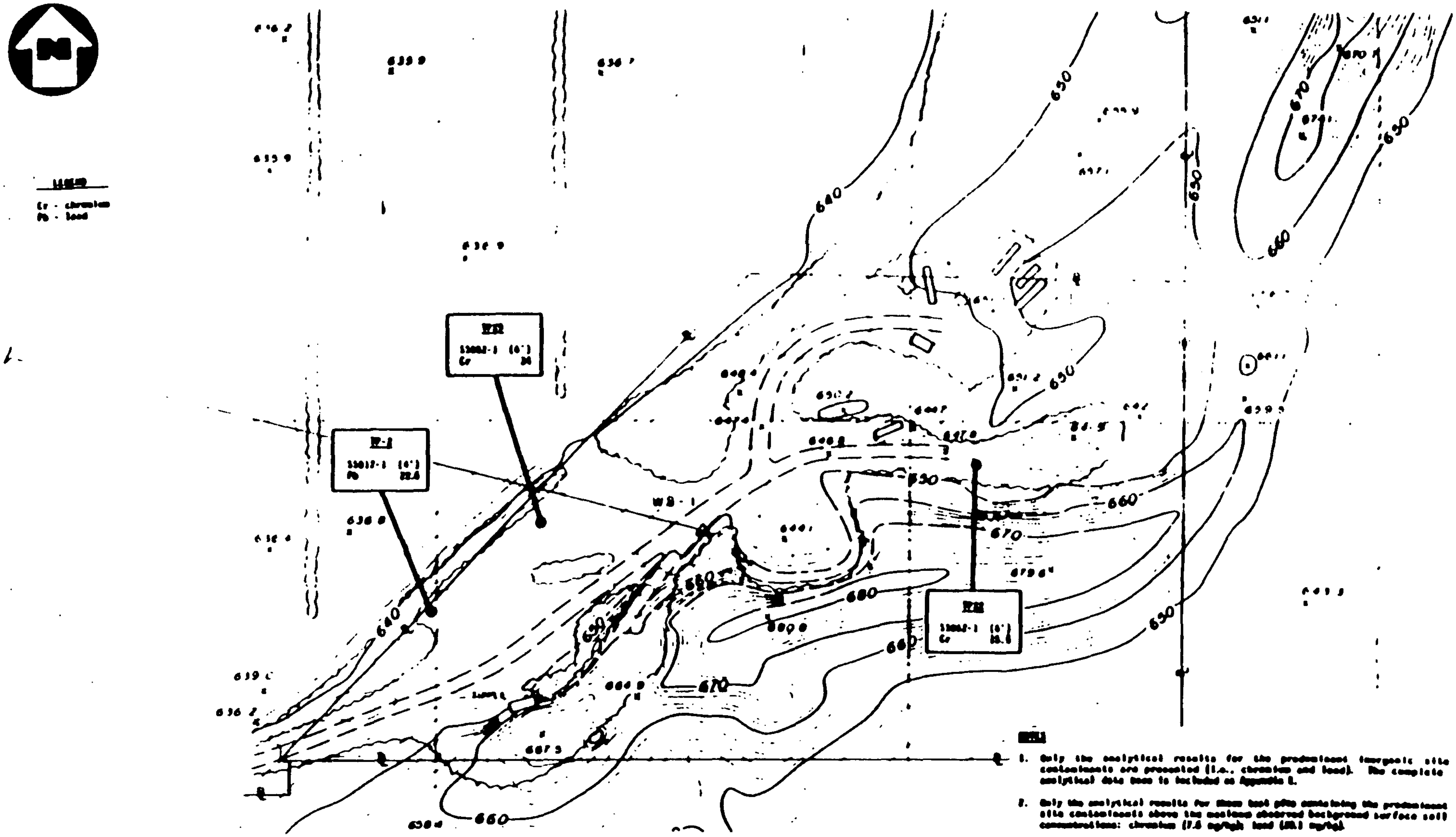
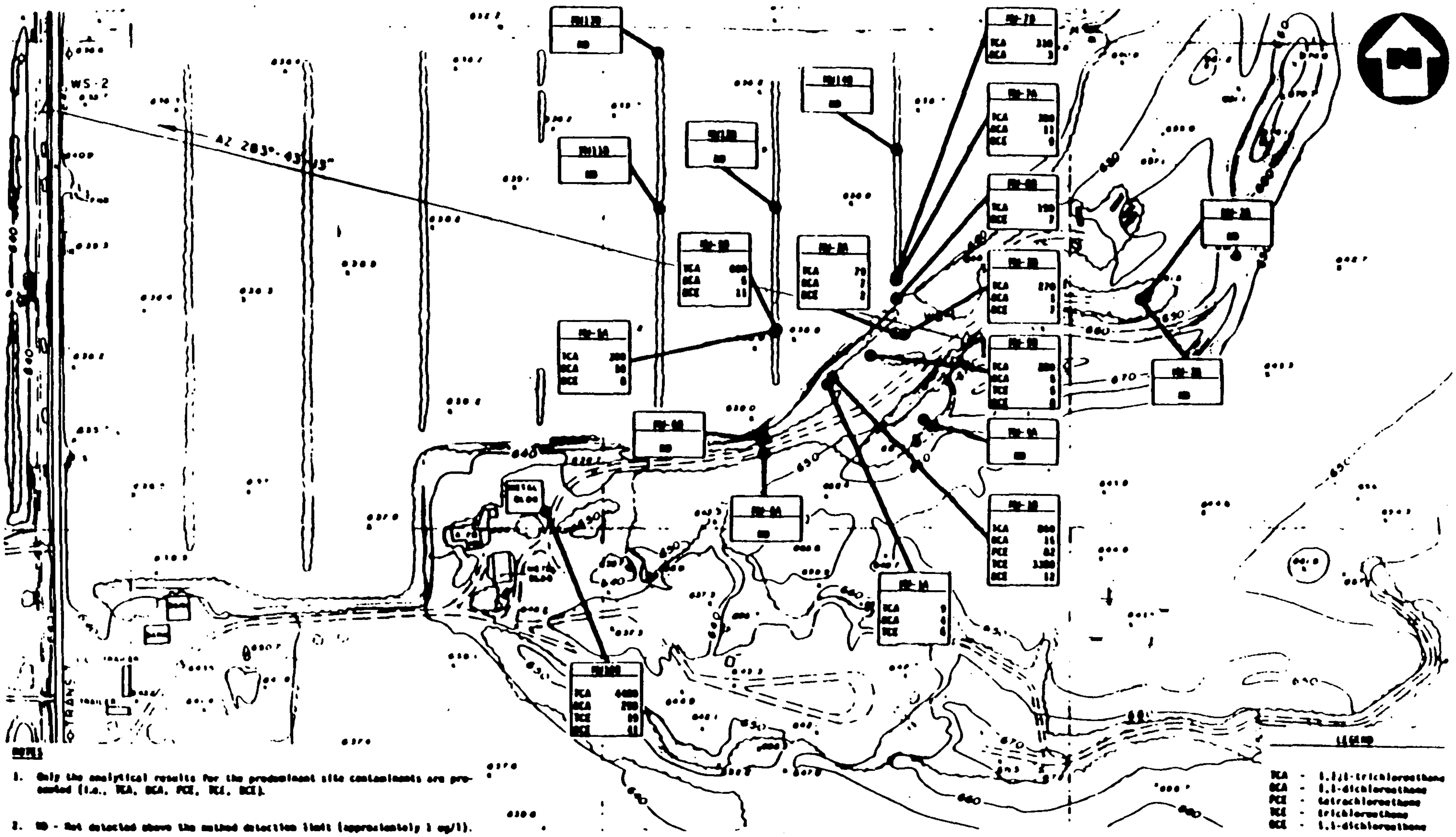


FIGURE 8

INORGANIC SUBSURFACE SOIL CONTAMINATION (mg/kg)
BYRON BARREL AND DRUM SITE, BYRON, NY

0 100 200
SCALE IN FEET



NOTES

1. Only the analytical results for the predominant site contaminants are presented (i.e., TCA, DCA, PCE, TCE, DCE).

2. ND - Not detected above the method detection limit (approximately 1 ug/l).

LEGEND

TCA - 1,1,1-trichloroethane
DCA - 1,1-dichloroethane
PCE - tetrachloroethene
TCE - trichloroethene
DCE - 1,1-dichloroethene

FIGURE 9

CHLORINATED ALIPHATICS DETECTED IN MONITORING WELL SAMPLES (ug/l) - 11/7-9/88
BYRON BARREL AND DRUM SITE, BYRON, NY

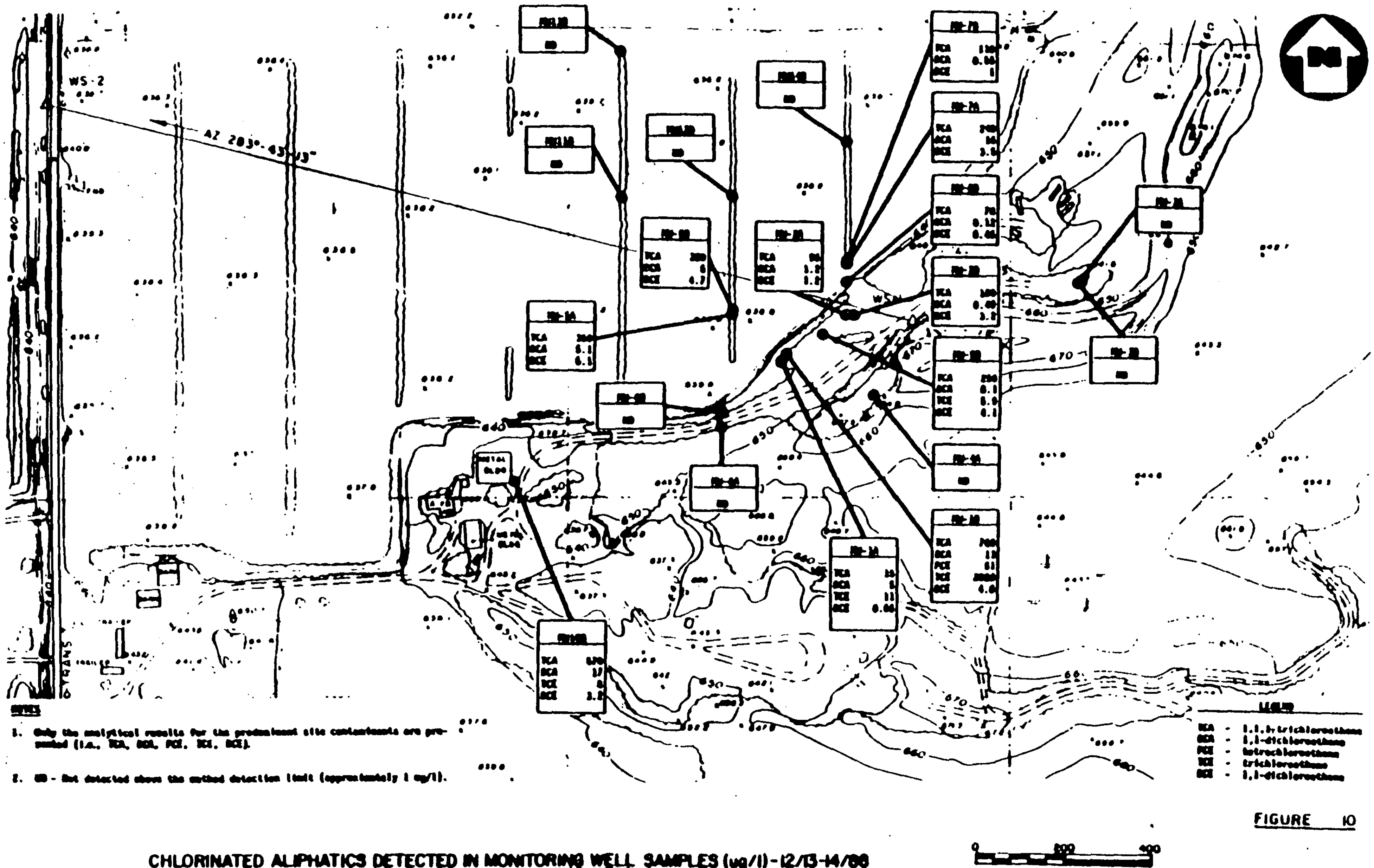
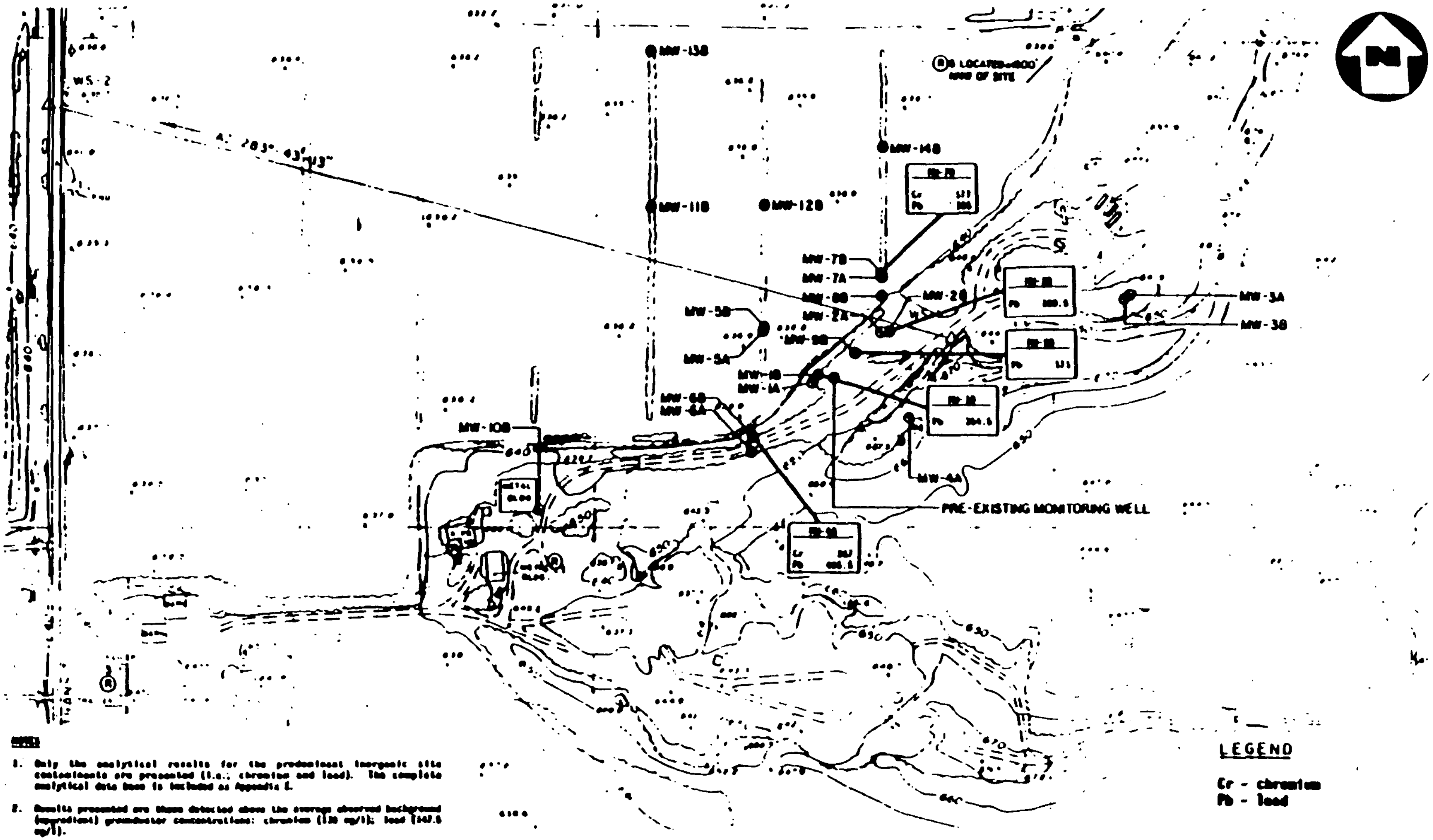


FIGURE 10

CHLORINATED ALIPHATICS DETECTED IN MONITORING WELL SAMPLES (ug/l) - 12/13-14/88
BYRON BARREL AND DRUM SITE, BYRON, NY



NOTES

1. Only the analytical results for the predominant inorganic site contaminants are presented (i.e.; chromium and lead). The complete analytical data base is included as Appendix [illegible].

2. Results presented are those detected above the average observed background (upgradient) groundwater concentrations: chromium ([illegible] ug/l); lead ([illegible] ug/l).

FIGURE 11

INORGANIC CONTAMINANTS DETECTED IN MONITORING WELL SAMPLES (ug/l)
BYRON BARREL AND DRUM SITE, BYRON, NY

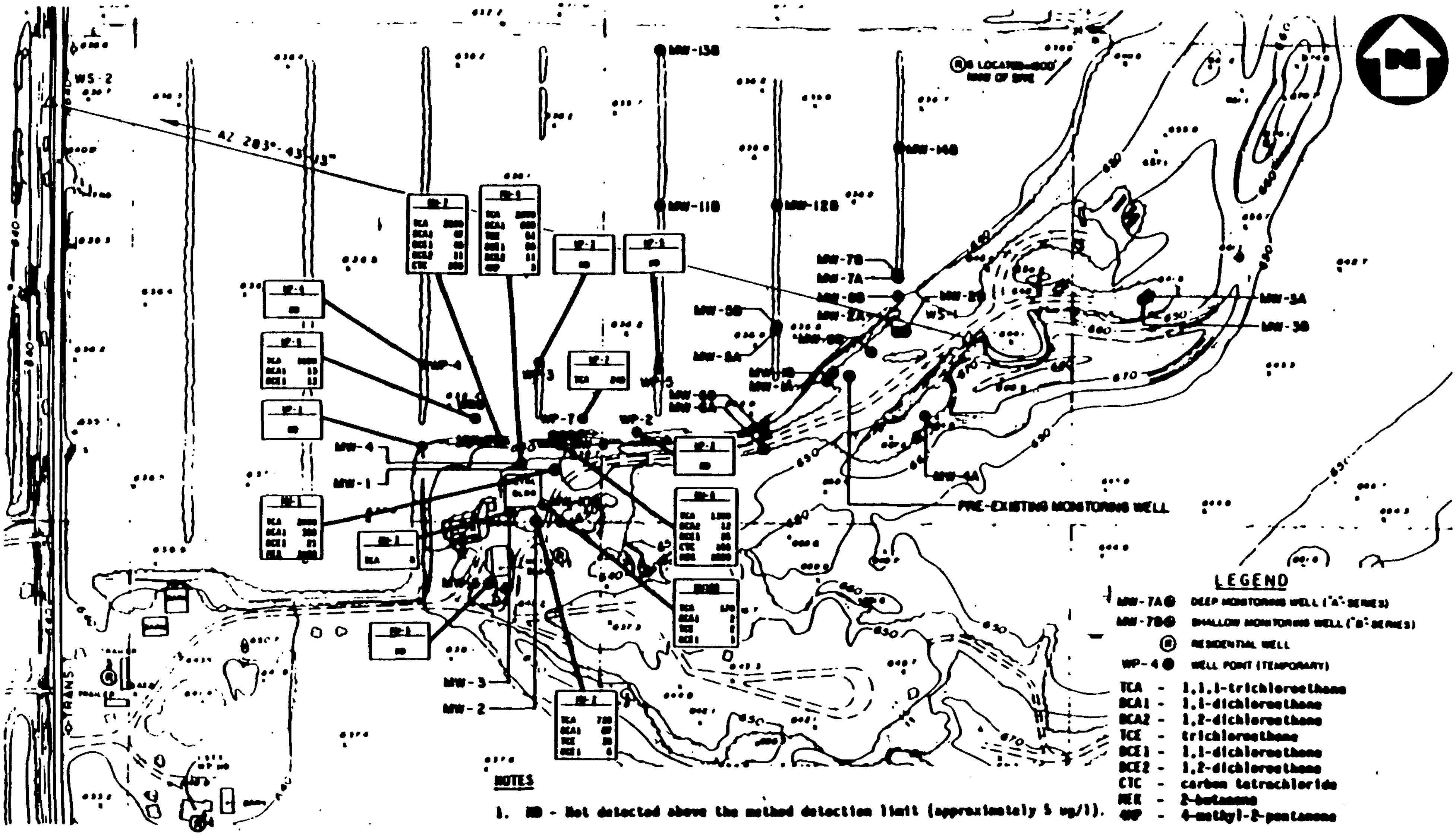


FIGURE 12

CHLORINATED ALIPHATICS AND KETONES DETECTED
IN MONITORING WELL AND WELL POINT SAMPLES (ug/l) - 4/21/89 TO 5/11/89
BYRON BARREL AND DRUM SITE, BYRON, NY

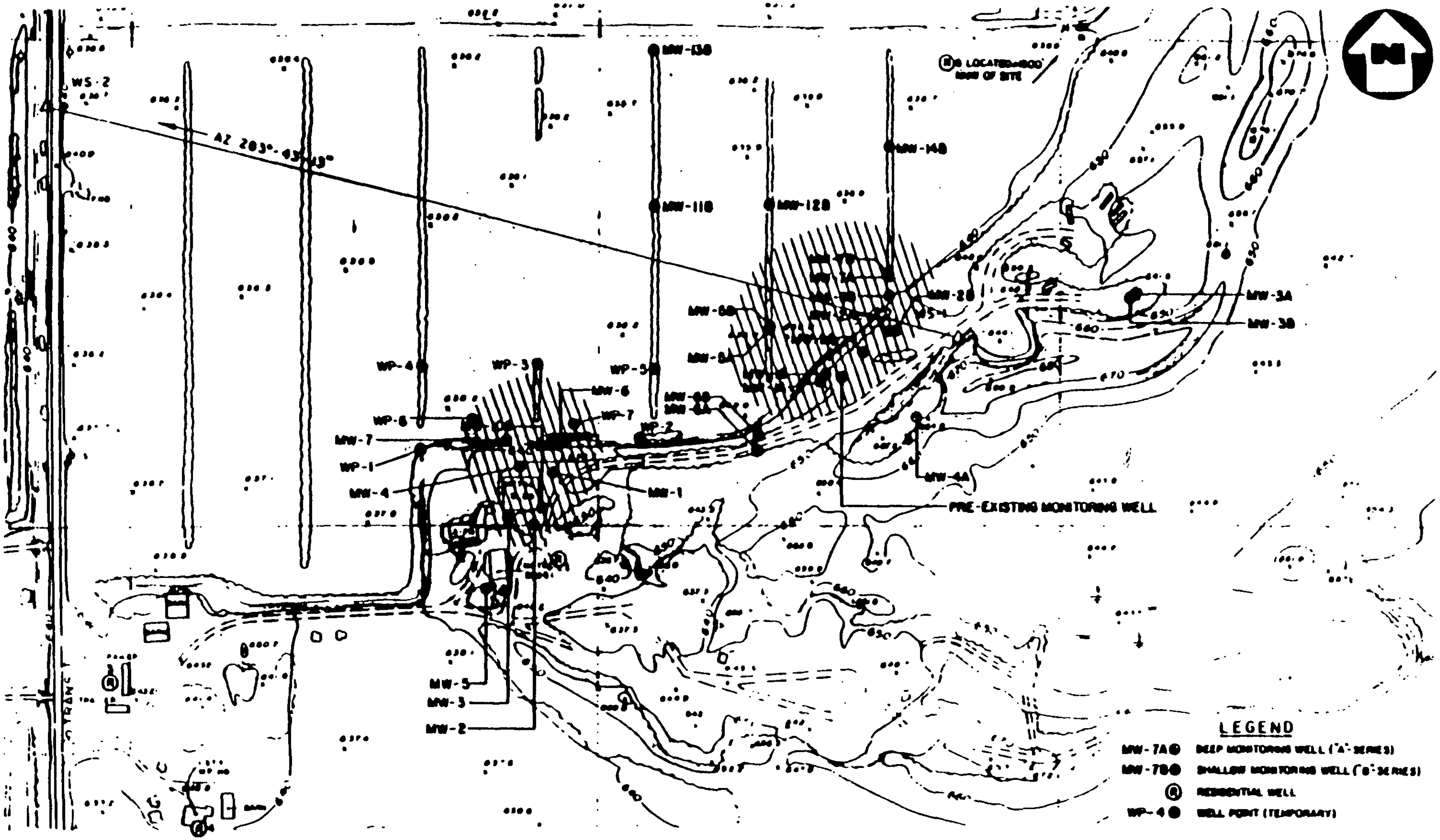


FIGURE 13

ESTIMATED EXTENT OF CONTAMINANT PLUMES
BYRON BARREL AND DRUM SITE, BYRON, NY

APPENDIX 3 - ADMINISTRATIVE RECORD INDEX

BYRON BARREL AND DRUM SITE
ADMINISTRATIVE RECORD FILE *
INDEX OF DOCUMENTS

REMOVAL RESPONSE

Sampling and Analysis Plans

P. 1-58 Letter to Mr. Eduardo Gonzales, U.S. EPA, from Mr. Robert Hubbard, NUS Corporation, re: Residential well sampling results, 11/13/87. The following are attached:

a) A laboratory analysis summary,
b) A record of communication concerning the CLP Organic Data Package,
c) Standard Operating Procedures,
d) A Supplemental Organic Analytical report.

Correspondence

P. 59-104 Letter to R. Salkie, F. Rubel, W. Mugdan, J. Czapor, G. Pavlou, T. Fields, and G. Turner from Mr. Bruce E. Sprague, U.S. EPA, re: Transmittal of the On-Scene Coordinator report, 12/8/87. The report is attached.

REMEDIAL INVESTIGATION

Sampling and Analysis Plans

P. 105-332 Report: Final Field Operations Plan, Remedial Investigation and Feasibility Study, Byron Barrel and Drum, Byron, New York, prepared by Ebasco Services, Inc., 3/88. References are listed on P. 221.

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* Administrative Record File available 8/22/89.

Note: Organizational and company affiliation is mentioned only when it appears in the record.

Work Plans

P. 333-346 Final Work Plan Memorandum for Remedial Investigation/ Feasibility Study, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 9/89.

P. 347-492 Report: Final Work Plan, Remedial Investigation/ Feasibility Study, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 2/88. References are listed on P. 458.

FEASIBILITY STUDY

Feasibility Study Reports

P. 493-681 Report: Final Remedial Investigation/Feasibility Study, Volume I, Remdedial Investigation Report, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 7/89. References are listed on P. 679.

P. 682-828 Report: Final Remedial Investigation/Feasibility Study, Volume II, Feasibility Study, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 7/89. References are listed on P. 825.

P. 829-1355 Report: Final Remedial Investigation/Feasibility Study, Volume III, Appendices A-E, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 7/89.

P. 1356-1615 Report: Final Remedial Investigation/Feasibility Study, Volume IV, Appendices F-I, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 7/89.

Proposed Plan

P. 1616-1631 Report: Proposed Plan for Byron Barrel and Drum Site, Byron, New York, prepared by U.S. EPA, 8/89.

ENFORCEMENT

Endangerment Assessments

P. 1632-1710 Report: Final Work Plan, Private Water Supply Sampling, Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 7/1/86. References are listed on P. 1645.

PUBLIC PARTICIPATION

Community Relations Plans

P. 1711-1737 Report: Final Community Relations Plan for the Byron Barrel and Drum Site, Byron, New York, prepared by Ebasco Services, Inc., 4/88.

Documentation of Other Public Meetings

P. 1738-1773 Report: Final Public Meeting Summary Report, Byron Barrel and Drum Site, Byron, New York, prepared by NUS Corporation, 10/5/88.

BYRON BARREL AND DRUM SITE
ADMINISTRATIVE RECORD FILE *
UPDATE
INDEX OF DOCUMENTS

RECORD OF DECISION

Record of Decision

P. 1774-1943 Declaration for the Record of Decision, prepared by the U.S. EPA, signed September 29, 1989. Record of Decision is attached.

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* Administrative Record File Update available October 11, 1989.

Note: Organizational and company affiliation is mentioned only when it appears in the record.

APPENDIX 4 - NYSDEC LETTER OF CONCURRENCE

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

Thomas C. Jorling
Commissioner

SEP 29 1989

Mr. Stephen D. Luftig, P.E.
Director
Emergency and Remedial Response Division
United States Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10278

Re: Byron Barrel and Drum Site, Genesee County, Site No. 8-19-005, Record of Decision

Dear Mr. Luftig:

The revised draft Record of Decision (ROD) for Byron Barrel and Drum site, received by the New York State Department of Environmental Conservation (NYSDEC) on September 25 1989, has been reviewed. The NYSDEC concurs with the selected remedy as presented in the draft ROD for in-situ soil flushing of contaminated soils in Source Areas 1 and 2, treatment of the contaminated groundwater emanating from Source Areas 1 and 2, and further evaluation of the inorganic contaminated surface soils in Source Area 3.

Notwithstanding this concurrence on the technical aspects of the remedy, the NYSDEC still objects to the United States Environmental Protection Agency (USEPA) assertions that the operation and maintenance (O & M) of the treatment system will not be funded at 90 percent with Federal funds after 10 years of operation. These objections are based on the fact that soil flushing is the remedy and should be funded just as any capital remedial cost i.e., excavation. Therefore, EPA should participate in all costs associated with the soil flushing remedy until its conclusion, including dismantling. While it is acknowledged that O & M of the groundwater treatment system will become NYSDEC's responsibility as per Section 104 (a) (6) of CERCLA as amended, however, the 10 year period should not start until after soil flushing is complete. EPA should acknowledge in the ROD this time table and make provisions for demobilization of the soil flushing system, as well as, the ground water treatment system/recovery wells at a 90/10 cost share once the project is complete. Also, the ROD should clarify whether EPA retains ownership of all equipment or this reverts to NYSDEC.

If you have any questions concerning this matter, please contact Mr. Michael J. O'Toole, Jr., P.E. at 518/457-5861.

Sincerely,

Edward O. Sullivan
Deputy Commissioner

cc: William McCabe, USEPA, Region II
Joel Singerman, USEPA, Region II
Sandra Stanish, NYSDOH, Albany

APPENDIX 5 - RESPONSIVENESS SUMMARY

EPA WORK ASSIGNMENT NUMBER: 161-2LD6
EPA CONTRACT NUMBER: 68-01-7250
EBASCO SERVICES INCORPORATED

RESPONSIVENESS SUMMARY
BYRON BARREL AND DRUM SITE
BYRON TOWNSHIP, NEW YORK

SEPTEMBER 1989

NOTICE

THE INFORMATION IN THIS DOCUMENT HAS BEEN FUNDED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) UNDER REM III CONTRACT NUMBER 68-01-7250 TO EBASCO SERVICES INCORPORATED (EBASCO).

September 22, 1989

Ms. Lillian Johnson
Community Relations Coordinator
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

SUBJECT: REM III PROGRAM - EPA CONTRACT NO. 68-01-7250
WORK ASSIGNMENT NO.: 161-2LD6
BYRON BARREL AND DRUM SITE
RESPONSIVENESS SUMMARY

Dear Ms. Johnson:

Ebasco Services Incorporated (EBASCO) is pleased to submit this Responsiveness Summary for the Byron Barrel and Drum site. If you have any comments, please call me at (201) 460-6463 or Joseph Ricciani at (201) 906-2400.

Very truly yours,

Dev R. Sachdev, PhD, PE
Regional Manager-Region II

cc: M. Shaheer Alvi
P. Enneking
E. Gonzalez

Ms. Lillian Johnson

ACKNOWLEDGEMENT OF RECEIPT

Please acknowledge receipt of this enclosure on the duplicate copy of this letter and return the signed duplicate letter to: Dr. Dev Sachdev, Ebasco Services Incorporated, 160 Chubb Avenue, Lyndhurst, New Jersey 07071.

______________________________ ____________

Lillian Johnson Date

EPA WORK ASSIGNMENT NUMBER: 161-2LD6
EPA CONTRACT NUMBER: 68-01-7250
EBASCO SERVICES INCORPORATED

RESPONSIVENESS SUMMARY
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

AUGUST 1989

Prepared by:

Joseph Ricciani
REM III Community Relations Specialist
ICF Technology, Inc.

Approved by:

Bert Hubbard
REM III Site Manager
NUS Corporation

Approved by:

Sheila Conway
REM III Region II Community Relations Manager
ICF Technology, Inc.

Approved by:

Dev R. Sachdev, Ph.D, P.E.
REM III Region II Manager
Ebasco Services, Inc.

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RESPONSIVENESS SUMMARY
BYRON BARREL AND DRUM SITE
BYRON TOWNSHIP, NEW YORK

The U.S. Environmental Protection Agency (EPA) held a public comment period from August 1, 1989 through August 31, 1989 for interested parties to comment on EPA's draft Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan for the Byron Barrel and Drum site.

EPA held a public meeting at 7:00 pm. on August 16, 1989 at the Fire Department Recreational Hall on East Main Street in Byron, New York. The objectives of the meeting was to outline the results of the RI/FS and to present EPA's preferred remedy for cleaning-up the Byron Barrel and Drum site.

A responsiveness summary is required by Superfund policy. It provides a summary of citizens' comments and concerns received during the public comment period, and EPA's responses to those comments and concerns. All comments summarized in this document will be considered in EPA's final decision for selection of a remedial alternative for the Byron Barrel and Drum site.

This responsiveness summary is organized into four sections. Each of these sections is described briefly below.

I. **RESPONSIVENESS SUMMARY OVERVIEW.** This section briefly describes the background of the Byron Barrel and Drum site, and outlines the proposed remedial alternative for cleaning-up the site.

II. **BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS.** This section provides a brief history of community concerns and interests regarding the Byron Barrel and Drum site.

III. **SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS.** This section summarizes both oral and written comments submitted to EPA at the public meeting and during the public comment period, and provides EPA's responses to these comments. Letters received from the public are included in Appenix C.

I. RESPONSIVENESS SUMMARY OVERVIEW.

The Byron Barrel and Drum site is located in Genesee County, New York, approximately 3.6 miles northwest of the Township of Byron. The site consists of approximately 2 acres of an 8-acre parcel of property off Transit Road.

The site was used as a salvage yard for heavy construction equipment such as graders, bulldozers, cement mixers, and cranes. Numerous pieces of such equipment are present on-site. In addition, metallic and nonmetallic debris litters the site. The site itself is relatively flat. Gravel was mined from a pit located on the site. The site is heavily vegetated except in the gravel pit and, to a lesser extent, along the access road.

The Byron Barrel and Drum site was discovered in July 1982, when an unidentified individual reported observing the disposal of approximately 400 55-gallon steel barrels that were filled with "noxious-smelling chemicals" to the New York State Police Major Crimes Unit.

A helicopter flight over the area by State Police revealed the presence of a number of drums on the property. Darrell Freeman, Jr., who owned the property, did not possess a permit from either NYSDEC or EPA for the storage or disposal of hazardous waste.

As a result of the investigation, a search warrant was issued and executed. Two drum storage areas were located at the site. The first area contained 121 barrels; the second contained 98 barrels. NYSDEC representatives obtained 11 drum waste samples during the search.

In 1983, NYSDEC initiated a preliminary investigation of the site. The results of this investigation led to the inclusion of the site on the Superfund National Priority List (NPL) in April 1984.

In response to a request from NYSDEC, in August 1984, EPA removed and disposed of the drums and approximately 40 cubic yards of contaminated soil and debris. In addition, soil and groundwater samples were collected. The primary contaminants detected were chlorinated aliphatic hydrocarbons, such as 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethene, and 1,1-dichloroethene. Various monocyclic aromatics, such as toluene and xylenes, were also detected in soil and groundwater, although groundwater contamination with these substances is minimal in comparison to contamination with chlorinated species. The ingestion of surface soils and subsurface groundwater are risks associated with the Byron Barrel and Drum site.

RESULTS OF THE REMEDIAL INVESTIGATION

In June 1987, a RI/FS was initiated at the site. The RI revealed that two major sources of contamination exist at the Byron Barrel and Drum site. The first of these sources is located in the southwestern portion of a former drum storage and waste disposal area (Source Area 1). The second source is located in the southwestern portion of the property in the vicinity of the maintenance building (Source Area 2). These sources are believed to have originated from solvent spills. Subsurface contamination in both areas consists primarily of chlorinated aliphatic hydrocarbons, including 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethene, and 1,1-dichloroethene. In Source areas 1 and 2, chromium and lead contamination was detected in soil samples in concentrations above background. Elevated chromium and lead concentrations were also detected in soil samples from a third source (Source Area 3), located in the eastern portion of the site.

Groundwater contaminant plumes, consisting of chlorinated aliphatic hydrocarbons, were found to be originating from Source Areas 1 and 2. Source Area 2 also shows high levels of methyl ethyl ketone (MEK). There does not appear to be a groundwater contaminant plume emanating from Source Area 3.

Although groundwater in the vicinity of the site is used as a drinking water source, the hydrogeologic and groundwater quality investigations revealed that no migration of contaminants to the domestic wells has occurred or is likely to occur in the future. These wells will, however, continue to be monitored.

A baseline health risk assessment was performed and indicated that significant carcinogenic and noncarcinogenic risks will be incurred if the aquifer at the Byron Barrel and Drum site were developed for potable use. The cumulative incremental cancer risk for use of site groundwater exceeds the upper bound of the EPA target risk range. The risk associated with direct contact to the site is minimal. There is, however, a risk associated with ingestion of surface soil in Source Area 3.

PROPOSED ALTERNATIVE FOR BYRON BARREL AND DRUM SITE

ALTERNATIVE:	In-Situ Soil Flushing, Groundwater Pumping, Treatment and Discharge to the Subsurface
PRESENT WORTH COST:	$5,572,000
IMPLEMENTATION TIME:	Soil <10 years/Groundwater 20 years

This remedy addresses the principal threat remaining at the site by treating the most highly contaminated groundwater and low-level residual surface and subsurface soil contamination. Groundwater will be collected using a series of extraction wells and pumped to an on-site treatment system. Treated groundwater will be reinjected to aquifer.

The groundwater extraction scenario will consist of a line of wells located between the source areas and the onion field. The wells will intercept contaminated groundwater in the water table aquifer.

To treat the volatile organic contaminant (VOCs) in the extracted groundwater, an air stripping column and activated carbon absorber will be constructed at the site. The air and VOC mixture exiting the air stripper would be treated by a vapor phase carbon absorption unit. The clean air would be emitted to the atmosphere. It is anticipated that a carbon absorption unit will be necessary for the removal of the MEK, since air stripping will not remove this contaminant from the groundwater. In addition, inorganic contaminants in the groundwater will be removed by precipitation prior to air stripping. The treated groundwater will be reinjected into the aquifer. Groundwater treatment will continue until federal and state standards for organic contaminants have been achieved, and until the levels of organic constituent are returned to background.

Environmental monitoring will be required during the life of the treatment process. In addition, monitoring of the groundwater at the site and its environs will continue for at least five years after the completion of the remediation to ensure that the goals of the remedial action have been met. Pre-construction, construction and post-construction air monitoring will also be performed.

While it does not appear that residential wells are threatened by contamination from the site, monitoring of these wells will be undertaken as part of the remedy. Interim measures will be provided to protect the wells if it is determined that the site poses a threat to them. In addition, the groundwater underlying the adjacent onion fields will be monitored. This will also attempt to restore groundwater quality and flush the residual contaminants from the subsurface soil.

A comprehensive description of all remedial alternatives is included in the Proposed Plan which can be found in Appendix A of this document, or at one of the following information repositories:

Gillam Grant Library
6966 West Bergen Road
Bergen, N.Y. 14416

Byron Town Hall
Townline Road
Byron, N.Y. 14422

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

U.S. Environmental Protection
Agency
Emergency and Remedial
Response Division
26 Federal Plaza, Room 10278
New York, N.Y. 10278

New York State Department
of Environmental Conservation
6274 East Avon-Lima Road
Avon, N.Y. 14414

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

According to local officials and residents interviewed during the preparation of this community relations plan, community interest in the site has been low with the exception of a few residents who live nearby. Community involvement was limited during the removal action conducted by EPA in August 1984. However, community interest and concern about the site did increase in April 1987 when a series of articles were reported in the Batavia Daily News.

The initial newspaper report advised residents with a drinking water well living within a three-mile radius of the site to have their wells periodically tested for contamination. This news account, reported by the Daily News, cited a NYSDEC report filed with the Genesee County Clerk's Office. Subsequently, many residents contacted the County Health Department and requested that both an explanation of the contamination problem, and testing to their domestic water wells. All inquiries were referred to NYSDEC. Several follow-up articles appeared in the Daily News during the weeks following the initial report. The reports focused on the lack of government action regarding well testing and jurisdiction disputes between the County Health Department and NYSDEC regarding testing authority.

The major concerns expressed by the community during preparation of the Community Relations Plan of 1988 are listed below.

- Public Health Effects
  Residents interviewed expressed concern that residential well water and groundwater in the area may be contaminated. They expressed fear that such a possibility could potentially pose a threat to the drinking water supply of nearby residents and irrigation water of neighboring farmers.

  One family, that lives in close proximity to the site, expressed concern about effects on family members from drinking potentially contaminated well water. Another resident interviewed expressed concern that cancer and mental retardation cases in the community may be attributable to the site. Another resident interviewed questioned whether there may be any health effects to approximately 150 migrant farm workers who are housed near the site. She speculated that the proximity of migrant farmers workers to the site may be cause for possible additional health concerns. While most residents interviewed expressed concern about possible crop contamination, local farmers did not share this concern according to one farmer and the local officials interviewed.

- Lack of Information to Affected Citizens
  Residents expressed a desire for more information regarding the site. They stated that past attempts to seek information from government agencies have been futile. One resident has not as yet been informed about the results of water samples taken from his and his neighbors wells in July 1986. He stated that his efforts to obtain this information have been unsuccessful. A farmer stated that, approximately two years ago, soil samples were taken from a drainage ditch on his farm that borders the northern edge of the site. He has never been informed of the results of the analysis. Conversations with EPA officials indicate that analysis of off-site soil sampling was not conducted since the results of on-site soil sampling revealed very low concentrations of contaminants.

- Batavia Landfill and Other Hazardous Waste Issues
  Recent press coverage of other hazardous waste issues in Genesee County has also stirred an interest in the Byron Barrel and Drum site problem. Local officials and residents interviewed stated the Batavia Landfill hazardous waste site is an issue of local concern. The Batavia Landfill site is also listed on the Superfund National Priority List (NPL). The Batavia Landfill site and the Byron Barrel and Drum site have been linked in recent newspaper reports. One resident interviewed mentioned that he has heard rumor that another hazardous waste site exists in nearby Sweden. He was uncertain as to the accuracy of this report, but was curious as to whether this alleged site was related to the Byron Barrel and Drum site.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS

Oral and written comments raised during the public comment period for the Byron Barrel and Drum site remediation are summarized below. The public comment period was held from August 1, 1989 through August 31, 1989. Comments received during this time were organized into three categories: Technical Questions/Concerns: Cost/Funding Issues; and Health Risk Assessments.

TECHNICAL QUESTIONS AND/OR CONCERNS

COMMENT: One resident was interested in knowing the actual process for removal of chemicals from the soil, and also how the treatment system operates.
EPA's RESPONSE: EPA explained that contaminated groundwater will be extracted (by pumping wells), and discharged to a treatment plant. The treated groundwater will then be recharged to the surface recharge basins where it will return (percolate) to the subsurface. This cycle is repeated until clean-up criteria are met. EPA made note that this remedial action is only a

conceptual design, and the actual treatment system will be determined during the remedial design phase for this site.

COMMENT: The same resident inquired into how long the whole process would take.

EPA's RESPONSE: EPA estimated that it would take approximately 7 years to flush the contamination out of the soil, and approximately 20 years to clean the groundwater, due to the fact that the contaminated groundwater is contained in a poor yielding aquifer.

COMMENT: One resident wanted to know what the source was for contamination in the north ditch.

EPA's RESPONSE: EPA stated the toluene that is present in the north ditch may be from paint strippers or gasoline, that was spilled in that area. It is not believed to site related.

COMMENT: One resident inquired into the relationship of the contamination detected throughout the site, questioning if what was found in Source Area 1 was the same or similar to what was found in Source Area 2.

EPA's RESPONSE: EPA replied that the primary contamination in Source Areas 1 and 2 is chlorinated aliphatic hydrocarbons, whereas the contamination in Source Area 3 are metals present in the surface soils.

COMMENT: The same resident wanted to know in what direction the contamination was traveling.

EPA's RESPONSE: EPA stated that contamination is migrating north, which is consistent with groundwater flow in the area. The only way contamination could be redirected would be if a large production well was installed to the south, and pumped at a high capacity, then the contamination could be drawn in a southerly direction.

COMMENT: A resident stated that much of this area is designated as wetlands, and cited Executive Order 11190 of the Clean Water Act which prohibits the development of wetlands. This resident questioned why EPA would want to clean up land for developmental purposes (as stated by EPA) when the law forbids development in such areas.

EPA'S RESPONSE: EPA stated they are not advocating development in the area. EPA, under the Superfund Program is mandated to protect the environment as well as the public health, whether future development in the area is to take place or not.

COMMENT: One citizen wanted to know why 5 years expired before any action was taken at the Byron Barrel and Drum site.

EPA's RESPONSE: In 1984, at the request of NYDEC, EPA removed drums and contaminated soil from the Byron Barrel and Drum site to reduce an immediate threat to public health and the environment. In April of that year the site was included on the Superfund National Priority List (NPL). In 1986 the Superfund Amendment Reauthorization Act (SARA) was approved by Congress. As part of this amendment, funds were allocated for site cleanup. In 1987 a work plan was approved by EPA to perform a Remedial Investigation and Feasible Study at the Byron Barrel and Drum site. Pursuant to this approval, site access was thwarted by Mr. Freeman, the property owner, and subsequently an Immediate Order in Aid of Access had to be obtained through the court system. This order was not issued until the end of 1987. From 1988 through May of 1989 the Remedial Investigation was conducted.

COMMENT: The same citizen asked if the community was opposed to the site's clean-up, would EPA clean it up regardless.

EPA's RESPONSE: EPA indicated the purpose for the public meeting was to discuss the remedial action proposed for the Byron Barrel and Drum site, and to solicit comments. These comments will be taken into consideration before a remedy is selected for the site.

COMMENT: Residents and local officials expressed concern about EPA's proposed remedial alternative since there is no threat to public health. Furthermore, the Byron Town Board passed a resolution recommending to EPA that the only institutional controls to the Byron Barrel and Drum site be deed and groundwater use, and that no further action be taken. One resident stated that the "environment will heal itself."

EPA's RESPONSE: EPA is mandated to protect public health as well as well as the environment. The groundwater in this area does not comply with federal and state water quality standards, and therefore groundwater contamination on-site must be remediated. Public health could be at risk if conditions were to continue as they presently exist.

COMMENT: One resident referred to the presentation of the proposed plan for the site, stating the areal extent of the contamination plume was mentioned. He wished to know what the vertical migration of contaminants were in the aquifer.

EPA's RESPONSE: EPA stated that a number of monitoring wells and soil borings were clustered in each of the source areas. They found a water bearing zone housed in sand and gravel overlaying a very compact layer of till fifty feet thick beginning at approximately twenty feet below surface level. EPA installed two wells, one in the water table and one at the base of the water bearing zones. They conducted hydraulic conductivity tests to see how the water would permeate into the till. Based on their findings, the till contained very impermeable material essentially equivalent to what would be used to install a cap over a landfill. EPA found the potential for vertical migration of contaminants through the till to be highly unlikely.

COMMENT: The same resident wanted to know if the contamination had settled, and what was the flow velocity of the contamination with respect to groundwater.

EPA's RESPONSE: EPA indicated they sampled both deep and shallow wells in the source areas, and found only the shallow wells to be contaminated. As they sampled farther downgradient, indications were found that the plume has dispersed in a vertical direction, resulting in contaminant concentrations roughly similar in both deep and shallow wells. However, there appears to be no potential whatsoever for degradation of the contaminants into the till. EPA stated that the contamination is moving very slowly. Their measurements indicate a horizontal migration of approximately 65 feet per year.

COMMENT: Another resident noticed there was no treatment designated for the groundwater in Source Area 3, and questioned why.

EPA's RESPONSE: EPA confirmed this by stating no groundwater contamination plume existed in Source Area 3.

COMMENT: One citizen noted that in Source Area 3 all drums were above surface, and believed all were retrieved.

EPA's RESPONSE: EPA stated that to the best of their knowledge, all drums had been removed from Source Area 3.

COMMENT: A resident recalled the sampling of residential wells approximately one week prior, and inquired into obtaining the analytical results.

EPA's RESPONSE: EPA replied that the State Health Department in Albany requested the County Health Department to obtain residential well samples. They are currently being analyzed in Albany, and the results would be available in approximately 2 weeks to one month.

COMMENT: One resident wished to know how EPA decides and documents the remediation plan for the Byron Barrel and Drum site.

EPA's RESPONSE: EPA stated that once the comment period closes, all comments that are received will be discussed by EPA and DEC. EPA will then prepare a Record of Decision (ROD). If the Regional Administrator agrees with the recommendations and findings of the ROD, he will sign it, formally selecting a remedy for the site.

COMMENT: A citizen asked EPA how deep the plumes were in the onion fields, and how will they be treated.

EPA's RESPONSE: EPA responded that the plumes in the onion fields are approximately 15 feet in depth. EPA proposes inducing degradation in the fields by drawing down the aquifer to enable the contaminated groundwater to flow from between the fields back to the source of contamination.

COST/FUNDING QUESTIONS

COMMENT: One resident wished to know who would be responsible for the operation and maintenance of the treatment plant.

EPA's RESPONSE: The responsibility of maintaining the treatment facility once it is fully operational would be that of the state. It is responsible for all operation and maintenance activities. The State may wish to delegate such responsibility to a lower authority, such as the county. The State, also, may decide to have a contractor perform the operation and maintenance at the facility. With respect to the funding for the remedy, the EPA will finance 90 percent of the remedial action, and the state will finance 10 percent. The operation and maintenance of the facility will also be funded 90 and 10 percent, respectively for ten years of operation. After 10 years, it becomes entirely the State's responsibility to finance the operation and maintenance of the facility.

COMMENT: Several residents questioned why EPA proposes spending $5 million dollars to cleanup the Byron Barrel and Drum site for conditions that do not appear to be too threatening. Many residents questioned if the proposed method is the most cost efficient and beneficial use for the funds allotted.

EPA's RESPONSE: The aquifer, a source of drinking water, is a natural resource that has been contaminated. EPA is mandated not only to protect the public health, but to restore impacted natural resources. The quality of groundwater in this area does not comply with federal and state drinking water standards, and therefore, groundwater contamination on-site must be remediated. The EPA would rather address the situation now while it is still localized, and remediate it so as to negate possible future, more widespread adverse effects. In addition, if conditions were to continue as they presently exist, public health could be at risk in the future.

COMMENT: One resident suggested putting a deed restriction on the property, and giving the $5 million dollars to the township for a water system.

EPA's RESPONSE: This does not address the contamination present in the aquifer. State and federal water quality standards are not being met. Under CERCLA, EPA is required to protect both the public health and environment.

COMMENT: One citizen wanted to know why the site owner, Mr. Freeman could not pay for the clean-up.

EPA's RESPONSE: Currently, EPA is attempting to obtain compensation for damages to the Byron Barrel and Drum site and vicinity, however, to date has yet been successful. Any party who contributed to the contamination of the site, may ultimately be held responsible for the clean-up or the financing of the clean-up.

HEALTH AND RISK CONCERNS

COMMENT: Several citizens were concerned whether private drinking wells were affected by the contamination.

EPA's RESPONSE: In 1988, private wells were tested in the area surrounding the site, the wells are not threatened by contamination from the site. The results indicated the wells are not threatened by contamination from the site.

COMMENT: One resident inquired about the risk to crops growing in the area.

EPA's RESPONSE: The contaminants that are migrating do not bio-accumulate in crops. Furthermore, drainage systems have been installed which help prevent contaminated water from being elevated into the root zone of the crops.

COMMENT: Several residents were concerned about what would constitute a risk at the site.

EPA's RESPONSE: A drinking water well installed in one of the contaminated plumes would constitute a risk.

COMMENT: One resident wanted to know what the risk to citizens in the immediate area are.

EPA's RESPONSE: Contamination is present on-site even though the drums and contaminated soil have been removed. The primary risk, however, is the potential exposure to groundwater contamination due to the contamination plume moving off-site.

COMMENT: One resident expressed concern with respect to what risks would be involved once work on the site began.

EPA's RESPONSE: In remediating the site, we will operate in a manner that will not adversely affect the surrounding population and on-site workers. Dust, vapor emissions, and surface water controls, would be employed as necessary to prevent migration of contaminants off-site.

APPENDIX A

EPA's PROPOSED PLAN FOR REMEDIAL ACTION AT THE BYRON BARREL AND DRUM SITE

PROPOSED PLAN
FOR
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

PREPARED BY
THE
U.S. ENVIRONMENTAL PROTECTION AGENCY
AUGUST 1989

Introduction

This Proposed Plan describes the remedial alternatives considered for the Byron Barrel and Drum site and identifies the U.S. Environmental Protection Agency's (EPA's) and the New York State Department of Environmental Conservation's (NYSDEC's) preferred remedial alternative and the rationale for this preference.

Site Location and Description

The Byron Barrel and Drum site is located in Genesee County, New York, approximately 3.6 miles northwest of the Township of Byron. The site occupies approximately 2 acres of an 8-acre parcel of property off Transit Road (see figure).

The site was used as a salvage yard for heavy construction equipment such as graders, bulldozers, cement mixers, and cranes. Numerous pieces of such equipment are present on-site. In addition, metallic and nonmetallic debris litters the site. The site itself is relatively flat. Gravel was mined from a pit located on the site. The site is heavily vegetated except in the gravel pit and, to a lesser extent, along the access road.

Site History

The Byron Barrel and Drum site was discovered in July 1982, when an unidentified individual reported the disposal of "approximately 400 55-gallon steel barrels that were filled with noxious-smelling chemicals" to the New York State Police Major Crimes Unit.

A helicopter flight over the area by the State Police revealed the presence of a number of drums on the property. Darrell Freeman, Jr., who owned the property, did not possess a permit from either NYSDEC or EPA for the storage or disposal of hazardous waste.

As a result of the investigation, a search warrant was issued and executed. Two drum storage areas were located at the site. The first area contained 121 barrels; the second contained 98 barrels. NYSDEC representatives obtained 11 drum waste samples during the search.

In 1983, NYSDEC initiated a preliminary investigation of the site. The results of this investigation led to the inclusion of the site on the Superfund National Priorities List in April 1984.

In response to a request from NYSDEC, in August 1984, EPA removed and disposed of the drums and approximately 40 cubic yards of contaminated soil and debris. In addition, soil and groundwater samples were collected. Residential well sampling was conducted in the vicinity of the site in June 1986. No contaminants were detected in the residential well samples.

In June 1987, a remedial investigation and feasibility study (RI/FS) was initiated at the site. The RI revealed that two major sources of contamination exist at the Byron Barrel and Drum site. The first of these sources is located in the southwestern portion of a former drum storage and waste disposal area (Source Area 1). The second source is located in the southwestern portion of the property in the vicinity of the maintenance building (Source Area 2). This source is believed to have originated from solvent spills. Subsurface contamination in both areas consists primarily of chlorinated aliphatic hydrocarbons, including 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethene, and 1,1-dichloroethene. In Source Areas 1 and 2, chromium and lead contamination was detected in soil samples in concentrations above background. Small quantities of elevated chromium and lead concentrations were also detected in soil samples from Source Area 3, which is located in the eastern portion of the site.

Groundwater contaminant plumes, consisting of chlorinated aliphatic hydrocarbons, were found to be originating from Source Areas 1 and 2. Source Area 2 also shows high levels of methyl ethyl ketone (MEK). There does not appear to be a groundwater contaminant plume emanating from Source Area 3.

Although groundwater in the vicinity of the site is used as a drinking water source, the hydrogeologic and groundwater quality investigations revealed that no migration of contaminants to the domestic wells has occurred or is likely to occur in the future. These wells will, however, continue to be monitored.

A baseline health risk assessment was performed and indicated that significant carcinogenic and noncarcinogenic risks would be incurred if the aquifer at the Byron Barrel and Drum site were developed for potable use. The cumulative incremental cancer risk for use of site groundwater exceeds the upper bound of the EPA target risk range. The risk associated with direct contact to the site is minimal. There is, however, a risk associated with the ingestion of surface soil in Source Area 3.

PURPOSE OF THE PROPOSED PLAN

The Proposed Plan outlines the remedial alternatives evaluated for the site, and presents the rationale used in making the preliminary selection of the preferred alternative to protect human health and the environment from exposure to any residual contamination remaining on-site.

The Proposed Plan is distributed to solicit public comments pertaining to all the remedial alternatives evaluated and the preferred alternative.

The detailed information and data used in determining the nature and extent of the residual contamination remaining on-site, and in the development of remedial alternatives, is contained in the RI/FS report.

Copies of the RI/FS report and supporting documentation are available at the Gillam Grant Library, Byron Town Hall, NYSDEC's Albany office, and EPA's Region II office. Addresses for these repositories are listed below:

- Gillam Grant Library
  6966 West Bergen Rd.
  Bergen, N.Y. 14416
  Albany, N.Y. 12233

- Byron Town Hall
  Townline Road
  Byron, N.Y. 14422

- New York State Department
  of Environmental Conservation
  6274 East Avon-Lima Road
  Avon, N.Y. 14414

- New York State Department of
  Environmental Conservation
  Division of Hazardous Waste
  Remediation
  50 Wolf Road, Room 222
  Albany, N.Y. 12233

- U.S. Environmental Protection
  Agency
  Emergency and Remedial
  Response Division
  26 Federal Plaza, Room 747
  New York, N.Y. 10278

SUMMARY OF REMEDIAL ALTERNATIVES

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund, requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, treatment as a principle element for reduction of toxicity, mobility, or volume of the hazardous substances, is preferred.

The findings of the RI, which establishes the basis for the development of remedial alternatives, are summarized as follows:

- Prior federal clean-up actions have already addressed most of the soil contamination at the Byron Barrel and Drum site and have significantly reduced health or environmental risks posed by the site;

- Environmental contamination at the site consists primarily of residual organic and inorganic subsurface soil and groundwater contamination in two locations: Source Area 1 and Source Area 2. Elevated inorganic concentrations were detected in Source Area 3 soils.

The remedial alternatives considered in the FS were developed to meet the following objectives:

- Ensure protection of groundwater and surface water from the continued release of contaminants from soils;

- Prevent exposure (ingestion and inhalation) to groundwater having contaminant concentrations in excess of state and federal standards;

- Prevent migration of residual contaminants from the subsurface soil such that groundwater concentrations will not exceed standards; and

- Restore contaminated groundwater to concentrations attaining standards.

Accordingly, eight remedial alternatives for addressing the contamination at the Byron Barrel and Drum site were evaluated in detail in the FS report.

These alternatives are:

ALTERNATIVE 1 - NO ACTION WITH MONITORING

The Superfund program requires that the "no-action" alternative be considered at every site. Under this alternative, EPA would take no further action to control the source of contamination. However, long-term monitoring of the site would be necessary to monitor contaminant migration.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions would be implemented at that time to remove or treat wastes.

ALTERNATIVE 2 - DEED AND GROUNDWATER-USE RESTRICTIONS

This alternative would not require implementation of remedial actions to address groundwater or subsurface soil contamination. Deed restrictions would be imposed to prevent excavation in areas of contamination. Groundwater-use restrictions would be implemented in the affected area to prevent the use of contaminated groundwater for drinking or irrigation purposes. These institutional controls would also alert future property owners to potential site-related risks. A long-term monitoring program would also be implemented.

ALTERNATIVE 3 - DEED RESTRICTIONS AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative would not require implementation of remedial actions to address subsurface soil contamination. Deed restrictions would be imposed to prevent excavation in areas of subsurface soil contamination. Groundwater would be collected using a series of extraction wells and pumped to an on-site treatment system. Treated groundwater would be discharged to the drainage ditch located north of the onion field or to Oak Orchard Creek.

The groundwater extraction scenario would consist of a line of wells located between the source areas and the onion field. The wells would intercept contaminated groundwater in the water table aquifer.

To treat the volatile organic contaminant (VOCs) in the extracted groundwater, an air stripping column and activated carbon absorber would be constructed at the site. The air and VOC mixture exiting the air stripper would be treated by a vapor phase carbon adsorption unit. The clean air would be emitted to the atmosphere. It is anticipated that a carbon adsorption unit would be necessary for the removal of the MEK, since air stripping would not remove this contaminant from the groundwater. In addition, inorganic contaminants in the groundwater would be removed by precipitation prior to air stripping. Discharge piping would be installed to pump the treated water to the drainage ditch located north of the onion field or to Oak Orchard Creek. All air and surface water discharges would comply with state and federal standards.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the site and its environs would continue for at least five years after the completion of the remediation to ensure that the goals of the remediation action have been met. Pre-construction, construction and post-construction air monitoring would also be performed.

ALTERNATIVE 4 - SOIL CAPPING AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternative 3, except that synthetic membrane caps would be installed over the areas of soil contamination.

Under this alternative, the maintenance building would be dismantled, decontaminated, if necessary, and disposed of off-site. Prior to capping, the areas would be graded to control surface water and erosion. A protective soil cover would be placed over the synthetic membrane, topsoil would be spread, and the capped areas would be revegetated.

The groundwater pumping, treatment, and discharge scenario would be the same as that discussed for Alternative 3. Monitoring would be the same as in Alternative 3.

ALTERNATIVE 5 - SOIL EXCAVATION AND OFF-SITE DISPOSAL AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternatives 3 and 4, except that contaminated soil would be excavated and hauled to an off-site RCRA landfill for disposal.

Under this alternative, the maintenance building would be dismantled, decontaminated, if necessary, and disposed of off-site. Contaminated subsurface soil would be excavated, loaded into trucks, and hauled to an approved off-site RCRA landfill for disposal. (So as to comply with RCRA land disposal requirements, treatment of the contaminated soil might be required prior to disposal.) The excavations would be backfilled with clean fill material from an off-site source. These areas would be covered with a layer of topsoil and revegetated.

The groundwater pumping, treatment, and discharge scenario would be the same as for Alternative 3. Monitoring would be the same as Alternative 3.

ALTERNATIVE 6 - SOIL EXCAVATION AND THERMAL DESORPTION AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternatives 3, 4, and 5, except that contaminated subsurface soil would be excavated and treated on-site using low-temperature thermal desorption to remove volatile organic contaminants.

Under this alternative, the maintenance building would be dismantled, decontaminated, if necessary, and disposed of off-site. Contaminated soil would be excavated and hauled to a mobile thermal desorption unit that would be set up at the site. Treated soil would be used to backfill the excavations. The areas would be covered with a layer of topsoil and revegetated. Because of the presence of inorganic constituents in the soil, which thermal desorption would not remove, treatment of the residual by chemical fixation might be necessary before backfilling to comply with RCRA land disposal requirements.

The groundwater pumping, treatment, and discharge scenario would be the same as for Alternative 3. Monitoring would be the same as in Alternative 3.

ALTERNATIVE 7 - IN-SITU SOIL VAPOR EXTRACTION AND GROUNDWATER PUMPING, TREATMENT, AND DISCHARGE TO SURFACE WATER

This alternative is similar to Alternatives 3, 4, 5, and 6, except that contaminated subsurface soil would be treated by in-situ vapor extraction using air extraction and injection wells.

Under this alternative, the maintenance building would be dismantled, decontaminated, if necessary, and disposed of off-site. Vapor extraction wells would be installed at the centers of Source Area 1 and 2. Air injection wells would be installed around the perimeters of the Source Areas 1 and 2. A vacuum would be induced and the air that would be collected would be treated using vapor-phase carbon adsorption. A synthetic membrane would be used to prevent air leakage from the soil surface between the air extraction and injection wells.

The groundwater pumping, treatment, and discharge scenario would be the same as for Alternative 3. Monitoring would be the same as Alternative 3.

ALTERNATIVE 8 - IN-SITU SOIL FLUSHING AND GROUNDWATER PUMPING, TREATMENT, AND RECHARGE

This alternative is similar to Alternative 3, except that a portion of the treated groundwater would be discharged to the aquifer through recharge basins constructed over the areas of subsurface soil contamination. This alternative would attempt to restore groundwater quality and flush the residual contaminants from the subsurface soil.

The maintenance building would be dismantled, decontaminated, if necessary, and disposed of off-site to allow construction of one of the recharge basins.

Monitoring would be the same as in Alternative 3.

PREFERRED ALTERNATIVE

Based upon an evaluation of various alternatives, EPA and NYSDEC recommend, for Source Areas 1 and 2, Alternative 8, in-situ soil flushing, for treatment of the residually-contaminated subsurface soil, and air stripping and carbon adsorption, for treatment of the groundwater, followed by the recharge of a portion of the treated water through recharge basins, as the proposed site remedy. In addition, a small quantity of soil in Source Area 3 with elevated inorganic concentrations will be further evaluated to determine what its ultimate disposition (i.e., off-site disposal or placement on the soil to be flushed) will be.

Upon completion of the remedy, the recharge basins would be closed consistent with RCRA requirements.

While the levels of contaminants present in the subsurface soils do not pose a risk to public health, localized "hot spots" in these areas may be contributing to the contamination of the aquifer. The concentrations of contaminants present in the aquifer exceed state and federal standards. Flushing the residual contaminants from the soil would prevent possible leaching of contaminants into the aquifer once groundwater treatment ceases.

Groundwater treatment would continue until the federal and state standards for the organic contaminants have been achieved. It is estimated that 20 years would be required to meet these standards.

Section 121 (c) of CERCLA, as amended, requires review of remedial actions at least every 5 years, for as long as site contaminants pose a threat to public health or the environment. This review would not be required once aquifer restoration has been achieved. If the remedy is not determined to have effectively remediated the site, further remedial action would be necessary.

While it does not appear that residential wells are threatened by contamination from the site, monitoring of these wells would be undertaken as part of the remedy. Interim measures would be provided to protect the wells if it is determined that the site poses a threat to them. In addition, the groundwater underlying the adjacent onion fields would be monitored.

RATIONALE FOR SELECTION

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely short-term effectiveness, long-term effectiveness and permanence, reduction of toxicity, mobility or volume, implementability, cost, compliance with applicable or relevant and appropriate requirements (ARARs), overall protection of human health and the environment, state acceptance, and community acceptance.

Each criterion will be briefly addressed, in order, with respect to the preferred alternatives for both soil and groundwater.

A. Overall Protection of Human Health and the Environment.

The preferred alternative, Alternative 8, would eliminate the potential risk to human health and the environment. The discharge of treated groundwater to recharge basins would flush volatile organic contaminants from the subsurface soil, thereby eliminating the potential risk associated with any excavation under future land-use scenarios.

Alternatives 3, 4, 5, 6, 7, and 8 would be protective of human health and the environment, but Alternative 8 provides a higher degree of confidence in its ability to permanently remove the contaminants from the soil.

Under Alternatives 1, 2, and 3, residual subsurface contaminants would continue to leach into the groundwater, and continued off-site migration of contaminants would result.

The aquifer at the site has a low yield due to its low transmissivity. Because increasing the pumping rate would cause excessive drawdown of the water table, Alternatives 3, 4, 5, 6, 7, and 8, would take approximately 20 years to decrease groundwater contaminant concentrations to levels based on ARARs. Alternative 1 would not reduce the present and future risk to human health and the environment. Although, under Alternative 2, the risk to human health would be eliminated by restricting groundwater use and soil disturbance, the risk to the environment would remain unchanged.

B. Compliance with ARARs

All technologies proposed in Alternatives 3 through 8 would be designed and implemented to satisfy all action-, contaminant-, and location-specific requirements. Since no federal or New York State regulations specify clean-up levels for contaminants in the soil, soil cleanup goals were calculated such that the aquifer will be protective of public health and the environment. The preferred alternative, Alternative 8, would achieve the federal and state groundwater quality standards for the organic contaminants and would remove subsurface soil contamination. Alternatives 1 and 2 are not effective in complying with groundwater ARARs.

Alternative 1 would not comply with state or federal drinking water standards or criteria or those ARARs required for protection of the groundwater resources. This is in contrast to Alternative 2, which would not comply with chemical-specific ARARs for ingestion of groundwater, but would meet all other ARARs.

C. Long-term Effectiveness and Permanence

The preferred alternative, Alternative 8, would effectively treat the most mobile wastes in on-site soil, thus, effectively reducing the source of groundwater contamination. Alternative 8 is considered more effective since recirculating the groundwater would prevent potential aquifer drawdown and would enhance the removal of contaminants adsorbed to the saturated soil. Although Alternatives 4 through 7 would also provide a high degree of effectiveness for the removal of volatile organics from the unsaturated soil, aquifer drawdown could lengthen the time required to complete the remedial action.

Under Alternative 6, excavation, thermal desorption, and backfilling, inorganic contamination in subsurface soil would not be removed. Hence, further treatment might be necessary before ultimate disposal of the soil could occur.

Alternatives 3 through 8 would effectively reduce the potential risks associated with the migration of contaminants in the groundwater by extracting and treating them. Alternative 3 would not be effective in mitigating the leaching of subsurface soil contaminants with subsequent migration to groundwater.

Alternatives 1 and 2 would not be effective in mitigating potential risks associated with future development of the aquifer and future land-use scenarios, including excavation in areas of subsurface soil contamination. In addition, the contaminants would be left untreated in the subsurface soil and groundwater and a long-term monitoring program would be implemented to determine if the contamination is migrating from the site.

D. Reduction of Toxicity, Mobility, or Volume

The preferred alternative, Alternative 8, as well as Alternatives 3 through 7, would reduce the toxicity, mobility, and volume of the organic contaminants in the groundwater. Under Alternative 8, the discharge of treated effluent to recharge basins would result in in-situ flushing of subsurface soil contaminants that then would be collected by the extraction system and treated. In contrast, Alternatives 6 and 7 would reduce toxicity by in-situ vapor extraction and thermal treatment, respectively. Alternatives 3 through 5 do not employ treatment to reduce the toxicity, mobility, or volume of soil contaminants. However, in Alternative 4, capping, would reduce the mobility of subsurface soil contaminants.

Alternatives 1 and 2 do not reduce the toxicity, mobility, or volume of contaminants.

E. Short-Term Effectiveness

The preferred alternative, Alternatives 8, as well as Alternatives 4 through 7, would effectively reduce the potential risks posed by groundwater contamination. For all of the groundwater treatment remedies (Alternatives 3 through 8), a pumping time of 20 years would be required to attain ARARs for groundwater.

Under Alternatives 4 through 8, dust may be generated during excavation and other material handling activities; therefore, dust control procedures would be needed. Air monitoring would be required to determine whether steps are needed to protect on-site workers and the general public from adverse air emissions.

Alternatives 3 through 8 include activities that could result in potential exposure of workers and residents to volatilized contaminants during the installation of the groundwater extraction and reinjection systems. The threat to on-site workers, however, would be mitigated through the use of protective equipment.

There would be no risk to the public and on-site workers during implementation of the preferred alternative, Alternative 8, and Alternative 3. In contrast, Alternative 5 could pose a risk to the public if a spill occurred during off-site transport.

Groundwater sampling under Alternatives 1 and 2 would not result in a risk to the public, on-site workers, or the environment. However, workers would need protective clothing during sampling of on-site wells.

F. Implementability

The technologies and process options proposed in Alternatives 3 through 8 for pumping and treatment are all demonstrated and commercially available. These systems are reliable, if properly maintained.

All components of the preferred alternative, Alternative 8, utilize relatively common construction equipment and materials and could be easily implemented. Also, in-situ soil flushing, the preferred alternative, has been successfully pilot tested and has performed on a full-scale basis for similar organic contaminants. In contrast, the treatment technology for Alternative 7 (in-situ soil vapor extraction), although successfully demonstrated for the removal of volatile organics from unsaturated soil, has had limited use to date. Furthermore, in-situ soil vapor extraction is currently available from only a few vendors nationwide.

All components of Alternatives 1 and 2 would be relatively easy to implement. Groundwater monitoring can be performed using previously installed monitoring wells and residential wells.

Under Alternative 4, approximately 2 months would be required to construct the cap. It would take approximately 1 to 6 months to remove the contaminated soil under Alternative 5 (excavation and landfilling), Alternative 6 (excavation and thermal desorption), and Alternative 7 (in-situ vapor extraction). Under Alternative 3, the cap could be constructed within 1 to 2 months. It would take approximately 10 years to remediate the soil under Alternative

8 (soil flushing). The groundwater treatment scenario for Alternatives 3 through 8 would require approximately 20 years for the groundwater to meet state and federal standards.

Table 1 summarizes the implementation times for the eight alternatives for comparison purposes.

G. Cost

The capital cost of the preferred alternative, Alternative 8, to achieve the clean-up goals, is estimated to be $1,917,000. Annual operation and maintenance costs are estimated to be $259,700. The total present worth of the alternative is approximately $5,572,000.

Table 1 summarizes the costs for the eight alternatives for comparison purposes.

H. State Acceptance

NYSDEC concurs with the preferred alternative.

I. Community Acceptance

Community acceptance of the preferred remedy will be assessed in the Record of Decision (ROD), the document which formalizes the selection of the remedy, following a review of the pubic comments received on the RI/FS report and the Proposed Plan.

CONCLUSION

EPA considers the preferred remedy for the site to represent the best balance among the evaluation criteria, and anticipates that it will satisfy the following statutory findings of being:

1. Protective of human health and the environment;

2. In compliance with ARARs; and

3. Cost-effective.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site.

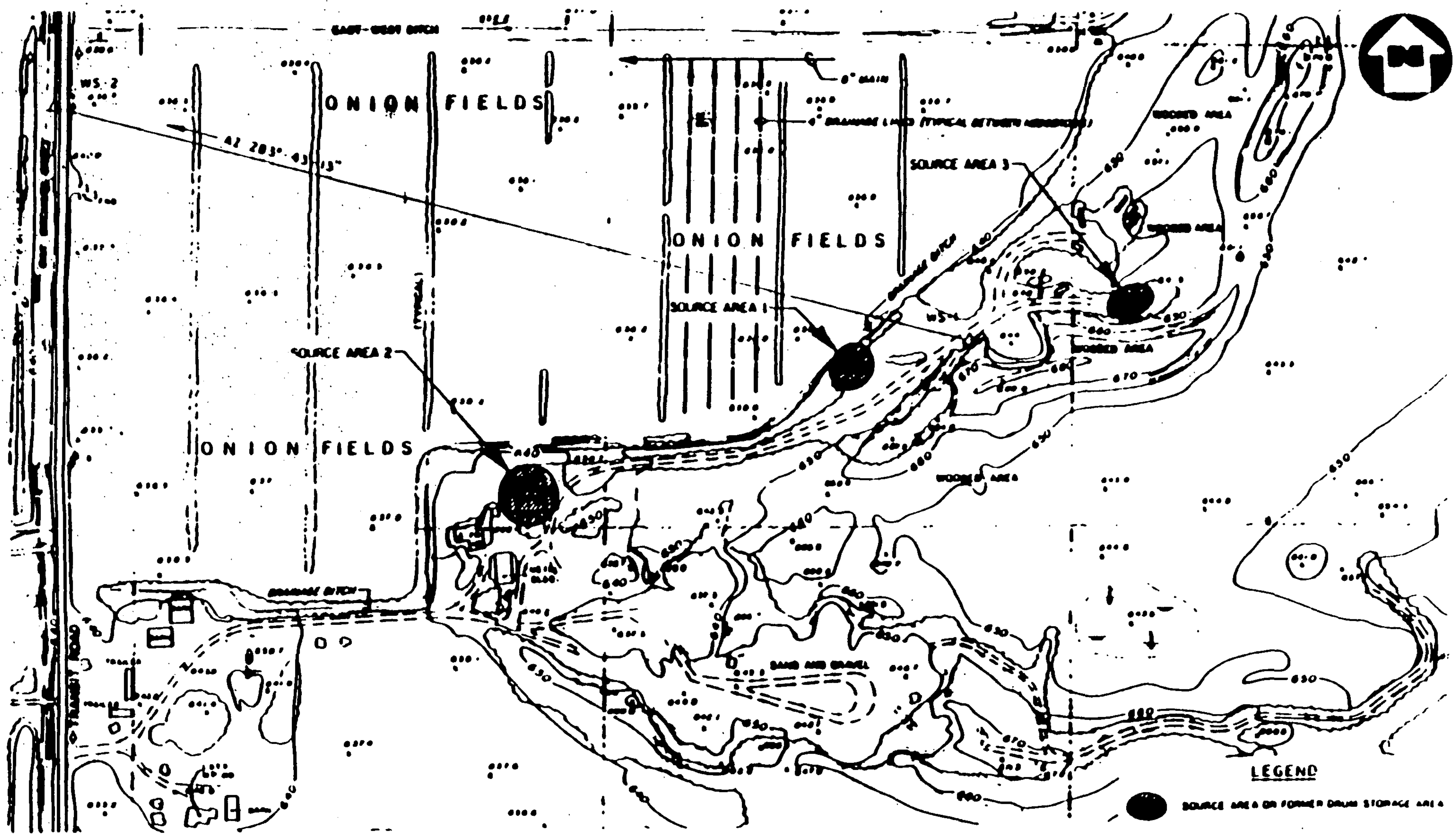
To this end, the RI/FS report has been distributed to the public for a comment period which concludes on August 31, 1989. The Proposed Plan is being provided as a supplement to this report and to inform the public of EPA's and NYSDEC's preferred remedy.

A public meeting will be held during the comment period at Byron Fire Department Recreation Hall, Byron, N.Y. on August 16, 1989 at 7:00 p.m., to allow EPA to present the conclusions of the RI/FS, to further elaborate on the reasons for recommending the preferred remedy, and to receive public comments. Written and verbal comments will be documented in the Responsiveness Summary section of the subsequent ROD.

All written comments should be addressed to:

Eduardo R. Gonzalez
Project Manager
U.S. Environmental Protection
 Agency
26 Federal Plaza
New York, N.Y. 10278

It is important to note that the remedy described above is the preferred remedy for the site. The final selection will be documented in the ROD only after consideration of all comments on any of the remedial alternatives addressed in the Proposed Plan and the RI/FS report.



STUDY AREA
BYRON BARREL AND DRUM SITE, BYRON, NY

FIGURE

TABLE 1

COMPARATIVE COST ANALYSIS OF ALTERNATIVES
BYRON BARREL AND DRUM SITE
BYRON, NEW YORK

	Alternative 1 No Further Action with Monitoring	Alternative 2 Deed and Groundwater Use Restrictions	Alternative 3 Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 4 Capping, Groundwater Pumping, Treatment, and Discharge to Surface Water
COSTS				
Capital:	$0	$15,000	$1,306,000	$1,716,000
Annual O&M:	$13,600	$13,600	$232,700	$237,400
Present Worth:	$265,000	$279,000	$4,874,000	$5,143,000
TIME TO IMPLEMENT				
Soil:	-	-	-	2 months
Groundwater:	-	-	20 years	20 years

	Alternative 5 Offsite Disposal, Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 6 Thermal Treatment, Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 7 In-Situ Vapor Extraction, Groundwater Pumping, Treatment, and Discharge to Surface Water	Alternative 8 In-Situ Soil Flushing, Groundwater Pumping, Treatment and Discharge to the Subsurface
COSTS				
Capital:	$3,899,000	$3,319,000	$1,761,000	$1,917,000
Annual O&M:	$285,000	$269,700	$238,400	$259,700
Present Worth:	$7,929,000	$6,899,000	$5,280,000	$5,572,000
TIME TO IMPLEMENT				
Soil:	2 months	2 months	6 months	<10 years
Groundwater:	20 years	20 years	20 years	20 years

APPENDIX B
SIGN-IN SHEETS

The following Sign-in sheet(s) are from the Public Information Meeting held 8/16/89 in the Byron Fire Department Recreation Hall on East Main Street, Byron Township, New York

Superfund Update

Byron Barrel and Drum Site

Byron, New York

EPA Region 2 — August 1989

SIGN-IN SHEET

	NAME	ADDRESS
1	-AVID KAUFMAN	7212 LAKE RD S. / BERGEN 14
2	Jeffrey E. Loney	6028 Bird Rd Byron NY 144
3	Gloria Smith	6663 Transit Rd Elba NY. 140
4	John W. Baker	6213 Searls Rd Byron NY 144
5	Corabelle Wright	5399 Watson Rd Elba
6	Ida Johnson	5397 Watson Rd Elba NY
7	[illegible]	5397 Watson Rd. Elba, NY 14
8	[illegible] W. Winters	Gen. Co. Health Dept. Batavia, N.
9	Dan Callahan	Gen C Health Dept - - -
10	John [illegible]	6383 Tonline Rd Byron
11	L. Ralph Gillard	35 Chapel St - Elba, NY 1405
12	Reggie Macdonald	6666 Merriman Rd Byron 14
13	John Sackett	6548 Rt 262 Byron
14	Richard E. Hamm	6461 Swamp Rd Byron 14422
15		
16		
17		
18		
19		

Superfund Update

EPA Region 2

Byron Barrel and Drum Site

Byron, New York

August 1989

SIGN-IN SHEET

	NAME	ADDRESS
39	George Spark	15 A White
40	Karen Sparks	15A White St. Holley
41	Jewell F. Irwin	6715 Townline Rd, Byron
42	Francis Davenport	7780 Byron Rd Byron
43	Leo Stenowitz	7520 Stenowitz Rd ELBA
44	Alan F. Clayton	6065 Transit Rd, Elba
45	Elgin Chapel	6539 Swamp Rd Byron
46	Art Wilkin	6403 Mill Pond Rd. Byron
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APPENDIX C
WRITTEN COMMENTS

The following are written comments submitted during Public Comment Period held from August 1, 1989 to August 31, 1989

TOWN OF BYRON
Byron, N.Y. 14422

August 28, 1989

Mr. Edvardo Gonzelez, Project Manager
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Dear Mr. Gonzelez, Project Manager:

This letter is to certify a true and exact copy of the resolution, regarding the "Byron Barrel and Drum Site", that was passed by the Byron Town Board, Byron, New York on August 9, 1989.

RESOLUTION #93

Councilman Sackett offered the following resolution and moved for its adoption:

RESOLVED, that the Town Board recommend to the Environmental Protection Agency that the only restrictions are deed and ground water use and that no further action be taken.

Councilman Bater seconded the resolution which was adopted by the following vote:

Vote: Ayes 4 Nays 0 Absent 1

Sincerely,

Mr. Gerald Ivison
Byron Town Supervisor

GI/jf

Byron N.Y. 1442

Aug 29, 1989

Eduardo R. Gonzalez
U.S. Environmental Protection Agency
26 Federal Plaza
New York, N.Y. 10278

Dear Sir:

In connection with the Byron Barrel + Drum superfund site I would like to cite the opin of several Byron residents.

As I and my family have drank the water from the nearest well since 1975 (while I ... as I do not live on the premises) we have absol no fear of it being contaminated. I have visit the site many times and feel this incident h been blown out of proportion.

No action should be taken

Concerned citizen

TOXICS IN YOUR COMMUNITY COALITION

September 28, 1989

Joel Slingerman, Chief
W.N.Y. Remedial Action Section
USEPA Reg. II
Jacob Javits Federal Building
New York, NY 12233-7010

Dear Mr. Slingerman,

The Byron Barrel and Drum site in Byron, New York, has recently come to my attention. As the regional representative for the Toxics In Yor Community Coaltion (TIYCC), I am writing to express our concerns about the site and offer comment on the proposed remedial activities.

In reviewing the Record of Decision draft, I noticed several inconsistencies which I felt should be brought to your attention:

It was noted that all contaminated soil had been excavated from the site. This statement is contradictory because the report indicted that approximately 40 cubic yards of contaminated soil and debris had been removed (pg 4) while areas one and two list a total of over 4,000 cubic yards of contaminated soil (pg 8) which is continuing to migrate into the groundwater and drainage ditch. This drainage ditch, as well as the north-northwest flow of groundwater, eventually discharges into Oak Orchard Creek.

Oak Orchard Creek, although currently a Class D stream, is the major water source for Iroquois National Wildlife Refuge, New York State's Tonawanda Refuge and DEC's Oak Orchard Environmental Learning Center. This creek and the surrounding wetlands, covering tens of thousands of acres, provide habitat for many endangered and threatened speices, including the Bald Eagle. As is evident, the classifation of Oak Orchard Creek should be upgraded. **All measures must be taken to protect it from contamination.**

Another inconsistency in the report deals with private wells. The report stated that no migration of contaminants to domestic wells had occured (pg 5). Yet in June of 1986, residential sampling revealed that contaminants were present. (pg 4)

In light of the above inconsistencies, as well as others not mentioned, further investigation and expedient cleanup of the site is warranted. In an effort to achieve EPA's goal of permanant cleanup of hazardous substances that threaten environmental and public health, it is most important not to delay the selection and implementation of a groundwater treatment program.

For a safer environment,

Diane Heminway

cc: Ronald Tramontano, NYSDOH
Gerald Ivison, Byron Town Supervisor

APPENDIX D
PUBLIC NOTICE

The following is the Public Notice announcing the Public Meeting for the Byron Barrel and Drum site

Affidavit of Publication . . . . .

STATE OF NEW YORK } ss.:
GENESEE COUNTY }

Karen D. French being duly sworn,

deposes and says that he is Legal Billing Clerk of Batavia Newspapers Corporation, Publishers of "The Daily News," a newspaper printed and published in Batavia, and that a notice, of which the annexed is a copy, was duly printed and published in said Newspaper one time on the 9th day of August 1989

Karen French

Sworn to and subscribed before me this 25th day of August 1989

Rebecca L. Nichols
REBECCA L. NICHOLS
Notary Public, State of New York
Genesee County
My Commission Expires
January 31, 1991

LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL

THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY ANNOUNCES PROPOSED REMEDIAL ALTERNATIVE FOR THE BYRON BARREL AND DRUM SUPERFUND SITE BYRON TOWNSHIP, GENESEE COUNTY, NEW YORK

The U.S. Environmental Protection Agency (EPA) recently completed a Remedial Investigation/Feasibility Study that evaluated alternatives for dealing with contamination at the Byron Barrel and Drum Superfund site in Byron Township, New York. Based on the work done at the site to date, EPA is announcing a proposed remedy for the clean-up.

Before selecting a final remedy, EPA will consider written and oral comments on this proposed alternative, as well as the other alternatives that were considered. Comments must be received on or before August 31, 1989. The final decision document will include a summary of public comments and EPA responses.

EPA will hold an informational public meeting on August 16, 1989, at 7:00 p.m. in the Fire Department Recreational Hall, located on East Main Street (Route 262) in Byron, New York. The purpose of this meeting is to discuss the findings of the Feasibility Study and the preferred remedial alternative.

EPA's Feasibility Study evaluated 8 alternatives for remediation of the Byron Barrel and Drum site. These are:

1. No Action With Monitoring
2. Deed and Groundwater-Use Restrictions
3. Deed Restrictions and Groundwater Pumping, Treatment, and Discharge to Surface Water
4. Soil Capping and Groundwater Pumping, Treatment, and Discharge to Surface Water
5. Soil Excavation and Offsite Disposal, and Groundwater Pumping, Treatment, and Discharge to Surface Water
6. Soil Excavation and Thermal Desorption of Soil, and Groundwater Pumping, Treatment, and Discharge to Surface Water
7. Soil Excavation and In-Situ Soil Vapor Extraction, and Groundwater Pumping, Treatment, and Discharge to Surface Water
8. In-Situ Soil Flushing and Groundwater Pumping, Treatment, and Discharge to the Subsurface

All of the alternatives are outlined and discussed in the Proposed Plan. EPA's proposed remedial alternative is Alternative 8. Under this alternative, the groundwater would be treated to remove volatile organics and metals, with a portion being recharged to the ground in order to flush organic contaminants from the soil. Treatment of the groundwater would continue until all pertinent federal and state cleanup requirements have been achieved. In addition, a small quantity of surface soil, with elevated organic concentrations, located in the eastern part of the site, will be further evaluated to determine what its ultimate disposition (i.e., off-site disposal or placement on the soil to be flushed) will be.

The Remedial Investigation/Feasibility Study, Proposed Plan, and other site-related documents can be consulted at the information repositories listed below:

Gillam Grant Library
6966 West Bergen Road
Bergen, N.Y. 14416

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

U.S. Environmental Protection Agency
Emergency and Remedial Response Division
26 Federal Plaza, Room 747
New York, N.Y. 10278

Written comments on the Proposed Plan should be sent to:

Eduardo R. Gonzalez, Project Manager
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Comments submitted to the above address should be postmarked on or before August 31, 1989

APPENDIX E
TRANSCRIPTS

The following are the transcripts from the Byron Town Meeting held on August 16, 1989

PROPOSED PLAN

for

BYRON BARREL and DRUM SITE

Byron, New York

Prepared by

the

U. S. Environmental Protection Agency

Public Hearing at the Byron Fire Department

August 16, 1989, 7:00 p.m.

Appearances: Joel Singerman, Chief Western New York Remedial Action Section
U. S. EPA (New York City)

Bert Hubbard, Site Manager,
NUS (Consultants to EPA)

Eduardo Gonzales,
Project Manager, EPA.

MR. SINGERMAN: Before we get start this meeting, I would like to call your attention to the sheet over there. We'd like you to sign in to make sure you have your name on the mailing list. We also have an agenda which looks like this, and we have a proposed plan which looks like this.

So before you leave the meeting, if you haven't signed in, please sign in.

The purpose of tonight's meeting is to discuss the results of the remedial alternatives evaluated for the site report and the EBA's and DEC's proposed remedy for the Byron site.

There are reports available in several possibilities. The exact locations are identified in this proposed plan handout over there on Page 4. Just to summarize, locally they are throughout the Grant library, on Bergen Road and the Town Hall on the Town Line Road. There is also, if you happen to be in New York City, at their office in the Federal Plaza, you can look at copies there. There is also the Albany office of the DEC, and there is also the Environmental office.

Right now, we are during the -- this is part of the public commentary which ends on August 31st. If, after tonight's meeting, if you think of any questions you might have or any comments you want to make, you can contact either Eduardo. the address is identified by Page 14 of the proposed plan of our New York office by writing or you can call him at 212 264-5714.

If you do submit comments in writing, we ask that you postmark them by the 31st of August. If you wish to call to submit the comments, we ask you call by the 31st.

Okay. Well, we are going to have several very short presentations: and afterwards, we'll allow ample time for any questions you might have. We'd ask you to defer any questions you might have and hold them until the end of the presentation.

Just to give you a brief overview of the history of the site, in the late 70's or early 80's there were drums that were present along the site. The State Police identified the presence of the drums in 1982 and they did investigate the site. A subsequent investigation by the New York State Department of Environmental Conservation led to the removal of the drums and contaminated soil by the EPA in '84.

Between 1984 and '86, residential wells were sampled, in addition to a consultant sampled wells in April and August and December of '88 and dewage, I believe, sammple wells as evidenced last week. Those of you that were here in April of '88 when we had the scoping meeting.

at that time. we identified that the fact we were starting to re-investigate a feasibility study: and at this point in time. we just completed. reinvestigation a remedial study and proposed a remedy and the purpose of this meeting is to solicit public comments.

Now. Bert Hubbard will discuss the results of the investigation of these remedial feasibility studies that he prepared.

MR. HUBBARD: I am going through this pretty rapidly, so we can leave a lot of time for questions. This figure shows the location of the Byron barrel and drum site. This is essentially right along this area here. The major features in this area are adjacent farmland. a hill along one side of the site. and a couple surface water bodies. One is a drainage ditch that runs along here into Oak Orchard Creek and there is another drainage creek that rungs along here. right along the boundary of the site.

This figure shows the general location of source areas that we identified at the site. Source Area No. 1. consists of two source areas actually. In the work zone we have identified two former drum storage areas in this area. they are so close together. we are now considering them to be one soruce.

Source Area No. 3. here. is also drum

storage area. and Source Aréa No. 2 is an area that was unknown at the time we initiated the investigation that was identified near the close of the investigation.

Briefly, summarizing the field investigation for you, we did a number of different investigations out at this site, in more or less a phased approach. We installed 253 soil gas borings to search for volatile organic chemicals which are believed to be the primary contaminants. We also obtained 25 surface soil samples, most of which were obtained in a specified source area. Others were obtained in areas that we believed to be locations where erosion soils may be deposited.

A 130 subsurface samples were collected at the site from soil borings and from test pits. The test pits were excavated so that we did search for buried drums and also to allow us to obtain samples and to visually inspect for the presence of contamination.

We installed a total of 27 permanent monitoring wells at the site and 7 temporary well points. We tested those wells for hydraulic productivity which is kind of an indication how fast the water can move through the material. We conducted 5 rounds of water level measurements to determine which way the groundwater was falling. We took 5 rounds of samples from these monitoring wells. The first 2 rounds were conducted in a phase manner. to assist us in locating additional wells. 2 complete rounds of samples were taken from all the wells that were installed during the initial phases of the remedial investigation.

When we discovered there was additional an source we went out and installed 7 more permanent monitoring wells and 7 temporary well points. The well points are removed.

We also conducted 2 rounds of residential well sampling, as Joe alluded to. in August and September of 1988. We did geophysical survey using a magnetometer. which is more or less a fancy metal detector and that was designed to help us located any possible buried drums.

We also did some topographical mapping of the site. We had a fly-over done by an airplane to help us generate some of the figures that -- the figure that I showed you earlier for example.

I am going to briefly run through all the samples of the locations for you.

This is the original soil gas grid that was laid out on the site. We took the soil gas samples and a majority of the nodes that are shown on this. okay, so a number of the points couldn't be accessible because of the presence of heavy construction equipment.

When we discovered the additional source area. we also conducted a sôil gas survey in that area. Those locations will show on this figure. they were around this maintenance program here. This figure displays the locations of the 25 surface soil samples that we took. These here are source -- what is normally called Source Area 1. These are in the former Source Area 2 here. This is -- the entire thing is now called Source Area 1. These were taken in Source Area 3. the ones with the triangles around them are background samples.

This figure displays the location of the test which they excavated. As you can see we had a number of test pits in the 3 -- the 3 source areas that were known at the time we initiated the investigation. The most concentrated test being operated was conducted in this Source Area 1 because that's where we found contamination.

We also installed a number of soil borings around the maintenance building source. We had samples from those borings analyzed to determine the extent of contamination in that area.

This figure displays the 20 monitoring wells that were initially installed at the site. We had a number of them in the vicinity of the Source Area 1. several in Source Area 3. and a number in the downgrading well. The groundwater is falling in this direction. We put these wells in to track how far the contamination had migrated down-grading.

We also have a number of wells around the maintenance building source here. This figure shows additional wells that were installed in the vicinity of the maintenance building source. and the locations of the contemporary well points that were installed. These were installed long enough to obtain samples and then were removed so as not to infringe upon the agricultural practice that takes place in the area.

This figure displays the location of the surface water and sediment samples that were obtained. A number were obtained in the drainage ditch along the site and a number were obtained in this drainage ditch to the north of the site.

In addition. we obtained samples along Oak Orchard Creek. both above and below the concourse of the drainage ditches and its streams.

To briefly summarize. what we found at the site contamination consists prinmarily of volatile organic chemicals which is what we expected when we initiated the investigation. The priority contaminate sources area is on the southwestern Source Area No. 1. Contamination and soils in that area consists of clorinated organic chemicals such as 1. 1. 1-trichloroethane. dichloroethane. trichloroethene. They are common salts.

We also found contamination in the vicinity of this maintenance building, although the concentrations were much lower in that location. We found some concentrations of metals that were above background levels in both Source Area No. 3 and in Source Area No. 1.

As a result of the installation of samplings of the well points and the permanent monitoring wells, we identified 2 contaminant plumes originating from the site. They are depicted on this figure. Source Areas 1 and 2 have a contaminate plume originating from what is shown here, and the maintenance building also has a contaminated farm.

These photos are constrained pretty much to the vicinity of the source, groundwater flows relatively slowly and they haven't moved far. You can see that they are following in a general direction of the groundwater flow.

I might also, while we are on this figure, point out that, as I said, we did sample a number of residential wells in the area. One was located about 2,000 feet north of where the map is up here, and there are a number of others, one here, here, one here and one here. We found some low level contamination in a couple of these samples. We don't believe it originated from the site and it's well below any of the maximum contaminant levels that are permitted under the safe drinking water act and also it is on the order of the instrument detection levels. which we use a pretty sophisticated analytical method which detects the down flow. about 10 parts per foot.

Based on the analytical results that we have gathered and what we know about the land and water use in the area. we conducted a risk assessment. Risk assessment takes into consideration 4 components. one is exposure, how can possibly people be exposed. The next thing you do is select indicator chemicals. These are chemicals that are most indicative of the potential adverse health and environmental effects. To select these indicator chemcials, you must select things like their environmental mobility, their persistence, their toxicity, etcetera. Once we have determined the exposure roots and the indicator chemicals. we can estimate those using -- who are general worse case assumptions. Base on those assumptions we can make estimates of what the noncarcinogenic and carcinogenic risks are to the public.

The exposure roots we consider were dermal contact, ingestion of soils. inhalation of dust that's emitted by wind erosion. inhalation of chemicals that are emitted as a result of their volatility and exposure just through groundwater use. That includes both ingestion and inhalation of volatile chemicals emitted during like taking a shower. We also considered the impact of residential monitors.

As a result of the public health evaluation, we determined that with the exception of the groundwater use on the site itself, noncarciongenic risks and carcinogenic risks are acceptable: and by acceptable, I mean, they are below the advisory level. The EPA has a level developed. If you were to develop groundwater on the site itself, or in one of the contaminate plumes, and use that for a drinking water source, that is pretty likely that some adverse health effects would occur.

I have asterisked a couple of these things here because right now there is a slight amount of disagreement between us and the Department -- New York Department of Health regarding some of the concentration of metals that are present in the soil. That is something we are presently working out and will ultimately be considering in the remedial design phase.

Once the risk assessment is completed, we establish some objectives for remedial action at the site. One of the objectives is we want to protect the public health and the environment. Not only that, the EPA is also being charged to restore all remedial resources to their best practical uses. The specific criteria we use to obtain these objectives or to meet state and federal requirements and to obtain acceptable noncarcinogenic and carcinogenic risks for the groundwater on the site itself.

To achieve these goals. 8 remedial alternatives were designed. First of these is no action with monitoring, really doesn't obtain a goal. but is required under the national contingency plan. This is kind of a base-line information that you can measure the efficacy of all the remaining alternatives. The second alternative is to restrict any development of the acquifer within the plume areas and to restrict any excavation or building within the areas of the contaminated soil.

The remaining alternatives are all basically oriented towards cleaning up the groundwater. and all the groundwater treatment scenarios in the Alternatives 3 through 8 are the same. The major difference is the various approaches taken to clean the soil.

No. 3, does not require any soil cleanup and cleaning of the soils would occur as a result of natural flushing by rain water.

Alternative No. 4 would include placing of caps over the areas of contaminated soil to prevent this infiltration and therefore protect the acquifer from any further degradation.

Alternative No. 5 calls for excavating the soil and disposing it in an off-site location, such as an approved facility.

Alternative No. 6 calls for excavating the soil and treating it in a low temperature incineration unit. essentially.

Alternative No. 7. calls for using vacuum wells to extricate volatile chemicals from soils above the water table.

Alternative No. 8 calls for accelerating the flushing of contaminant from the subsurface soils by discharging the treated groundwater back to the surface of the site.

The feasibility study report states all of these alternatives are analyzed with respect to how well they meet these 9 criteria. They have to be protective of the human health and the environment. effective and permanent. etcetera. and. in general. treatment technologies that are conducted on site or favored by the EPA.

This is basically the bottom line here. How much it is all going to cost. As you can see. the costs vary quite a bit. depending on whether we take no action and the capital cost of no action is zero dollars. However. if we were to pursue no action. we have to continue to monitor the migration of the plumes. and also to monitor the residential area. Hence. there are some costs incurred for long term.

The most expensive alternative includes off-site disposal of excavated soils. You can see that these alternatives generally range on the order of about $5,000,000 for those that deal with both the soil and groundwater.

And at this time I would like to turn it back over to Joe.

MR. SINGERMAN: Based upon the evaluations of the alternatives of the EPA and DEC, they are recommending for Source Area 1, the source area here, and Source Area 2, the Alternative No. 8, which includes groundwater pumping and treating followed by recharge and treated water to help flush out the contaminants of the soil. These are essentially the components, the ground recovery wells, the treatment plants at the various treatment system facilities, the metal partakes of metal and absorption, the organics and any water would be recharged for flushing and continued flushing of contaminants from the soil.

For Source Area 3, which is this area right here, a small quantity of the soil in this area would be detected to build up and elevated in organic concentrations. We are going to further evaluate that during the time phase to determine whether its ultimate disposition would be such as off-site disposal and perhaps placement on top of the soil would be flushed to remove metals.

While it appears that the residential wells are not impacted by any contamination at the site. we would continue to monitor the wells to make sure to see what is happening: and if necessary, implement measures to be put in place for future. for some reason if contamination appears to be showing up in residential wells.

In addition, throughout the life of the remedy. we will continue to monitor the media. the groundwater area. whatever is around the site. to make sure the public and the environment would not be adversely effected.

At the completion of the remedy for 5 years afterwards we will monitor and make sure the remedy is doing what it is supposed to be doing, essentially cleaning up the site.

Now. the reason we prefer Alternative No. 8. is that remedies protectred of the public health and the environment. resource goundwater -- contiminated soil and groundwater. includes demonstrated and effective technologies. enhancing the flushing of groundwater contaminants. employs site treatment technologies which EPA prefers and it is a permanent long-term solution and it is cost effective. This is a preferred remedy, even though it is EPA's and DEC's preferred remedy. It is not a selected remedy for the site. We won't make a final selection until after we consider all public comments and concerns.

Returning once again, this is a Superfund process. We are at this point right now, soliciting public comments. Upon consideration of public comments, we will sign the document called record of decision which essentially selects the remedy and the decision document which identifies -- it is like a remedy. It is signed th administrator of the EPA.

Subsequent to selecting a remedy, we will design and implement the remedy and then once the remedy is implemented, the site will be closed and monitored, if necessary.

In a moment, we will give you an opportunity to ask me questions, if you want, but just as a reminder, if you have any questions or comments subsequent to the meeting, make sure you get them to us, either verbally by August 31st; or if you send them in writing, make sure you have them postmarked by August 31st, so we can consider any concerns you have before we make our final selection. And before you do ask any questions or make any comments, we have a court stenographer recording the transcript of the meeting. So we would appreciate it if you would identify yourself before speaking. So if there are any questions. I will be happy to entertain them.

MS. SPARKS: Sir, my name is Karen Sparks. What I am trying to find out is. how we pay. We ended up living on the site for a year and a half about 3 or 4 months ago. We finally moved. What I am trying to find out is there is 2 wells contained in the house. One that was listed as a well to use for drinking water, the other comes from a buried pond in the back that was used for bathing and such. I am trying to find out, if I understand correctly, there is really no risk levels for these wells, for us being exposed or to our children for that amount of time.

MR. HUBBARD: We sampled both of those wells. One is a dug well and one was a well used for drinking water purposes. on 2 separate occasions. The first sampling round analysis was done using EPA method 624. which has an instrument detection limit of about 5 parts per billion. We didn't find anything in either of those wells at that detection level.

Similarily, the previous times those wells were sampled in 1984 and '86, the same result was found. The second sampling round we analyzed the samples with a much more sensitive analytical method. EPA method 601 and 602. Those have detection levels below 1 part per billion.

The water that is used for flushing and so forth we found carbon tetrachcloride in one of the samples at a concentration of 9 parts per trillion, which actually reported below the detection limit. for that method it could either indicate there is contamination there, there are laboratory artifacts, or there is a misidentifcation. at that concentration it is really hard to say what is the origin of what that was. At any rate the bottom line is that concentrate at that compound takes a risk that is well below the guidelines the agency comes up with.

Specifically, it constitutes a carcinogenic risk on the order of 1 and 10 millions chance.

MS. SPARKS: Thank you.

MR. SINGERMAN: Any more questions?

MR. IVISON: What is going to be the actual process now for removing the chemicals from the soil? Jerry Ivison.

MR. SINGERMAN: The removing process itself?

MR. IVISON: Yes, how is it actually going to happen?

MR. SINGERMAN: The actual process itself, we'll show you some generalized plan, how it is set up, the actual setup itself will be determined during the design, but if you want, we can generalize the scenario.

This is essentially the process. The groundwater will be extracted from the contaminated areas which are here and here. We'll go to the treatment system and then the water will be treated, essentially placed back in the area of contamination and this is just a generalized cross-section of how it would be set up. Water will be extracted drawing down the acquifer, contaminated groundwater, going to a treatment plant right here, discharged to recharge basins will trickle through and picking up the contamination and picking it up again in a continued cycle. Again, the exact details will be determined during design. This is just a general conceptual plan how it is going to work.

MR. IVISON: What is the treatment plant type? How does it actually treat the water, the treatment plant itself?

MR. SINGERMAN: The metals would be precipitated out, adjusting the pH causing it to precipitate out. The organics will be removed. This is kind of complex, but basically, the -- the metals -- this is the adjustment of pH, the metals -- some metals may be removed here. They are attached so far or what -- the organics will be stripped in this air stripper, where essentially air is blown in and removes the organics, and they will be cleaned before they are emitted to the environment. And there are various other polishing procedures; but, again, this is all conception. We have to do treatability studies, both mentioned policy, at the site to determine what the exact scenario will be. This is just a standard boiler plate scenario for this particular treatment. Does that answer you question?

MR. IVISON: Yes.

MR. SINGERMAN: Just again, it is just a conceptual design right now. We are going to have, say, six months to a year's worth of actual design to fine tune the actual program.

MR. IVISON: Any guess how long the whole process would take?

MR. SINGERMAN: It's been estimated it would probably take 7 years to flush the soils, contamination out of the soils and it's estimated it may take 20 years to clean the groundwater. Again, that's just an estimate. Apparently, one of the problems with the groundwater it is a poorly yielding acquifer and as a result, you can't get much water out of the acquifer. So, as a result, it is going to take a long time to flush it. So, at most, 20 years, perhaps, it will be much less time. Again, that's a lot of fine tuning, depending on -- all the groundwater treatment scenarios take 20 years. There is really no way around it. This particular alternative, such as flushing soil, there is an added benefit for cleaning the soil as well. It would be concurrent activities.

MR. CHAPEL: Edgar Chapel. I understand now that this water, that is flowing north?

MR. HUBBARD: Yes, generally north, a northwest direction.

MR. CHAPEL: Under the farmlands?

MR. HUBBARD: That's correct.

MR. CHAPEL: Is there any risk there with crops?

MR. HUBBARD: The chemicals that are migrating do not bio-accumulate. Furthermore, there is a drainage system installed in that field that helps to prevent the water to be elevated into the root zone of crops.

MR. CHAPEL: Did you find any contaminants in that ditch to the north, the one on the north side of that plan?

MR. HUBBARD: Yes, we did. We found -- we had 2 hits of toludine and metalefelsotone.

MR. CHAPEL: What were the limits on it?

MR. HUBBARD: I believe we found toludine upon 1,600 parts per billion in one of these samples

MR. CHAPEL: That isn't considered a risk?

MR. HUBBARD: No.

MR. CHAPEL: So what you are saying is actually this water is not a risk to anybody at this point?

MR. HUBBARD: That's correct.

MR. CHAPEL: What would make it a risk in the future?

MR. HUBBARD: If you were to put a well in a contaminant plume and started to use it for portable use.

MR. CHAPEL: Pardon?

MR. HUBBARD: If you were to put a well in one of the contaminant plumes and to develop that for human consumption, that would constitute a risk.

MR. CHAPEL: But, as this moves out of the area, what you are saying is that the risk is less, as far as the parts per billion that you just mentioned? So if a well was put in the area of that ditch to the north, it would not create a test that would not be acceptable to the Genesee County Health Department or New York State?

MR. HUBBARD: The groundwater contaminated plume could not extend that far. We can't really figure out a way we found toludine in that ditch that we were working. It is possible that it is as a result of --

MR. CHAPEL: You didn't find much in the ditch right next to it.

MR. HUBBARD: No, we didn't, right.

MR. CHAPEL: You found more farther off.

Are you sure that stuff came from that particular site or could it have come from some other site, from some other material, we'll say, or some other source?

MR. HUABBARD: Well, that's my belief, it originated from some other source.

MR. CHAPEL: What would be a source -- what would that -- the ones that you are talking about on that north ditch, what would be some of the sources that can come from, anything in the spray material or anything --

MR. HUBBARD: Well, Toludine is a component of paint stripers.

MR. CHAPEL: Is a component of paint stripers? Just put that cover down. I could hear you better. I can't hear you.

MR. HUBBARD: I am sorry. It is a component of paint strippers, Toludine. It is also a constituent of gasoline or diesel fuel.

MR. CHAPEL: Right.

MR. HUBBARD: I know a lot of things.

MR. CHAPEL: But, really, you have no way of knowing that this is part of this particular site, accept that -- it is not right, but you have no way of knowing where that water came from when your first ditch doesn't show it.

MR. HUBBARD: Well, we didn't find it in

the water samples from the ditch.

MR. CHAPEL: Right.

MR. HUBBARD: We found it in the sediments.

MR. CHAPEL: But what you -- what you are saying, though, if they want to eat the potatoes out of that lot, they can harvest the potatoes, but what you are also saying is that we should spend 5 million dollars to clean this up when what are we going to do, what are we going to accomplish by spending 5 million dollars?

MR. HUBBARD: The acquifer is a source of drinking water, it is a natural resource that has been contaminated and the EPA charter dictates that not only do you protect the public health, but you try and restore all natural resources.

MR. CHAPEL: But what you are saying within a 150 feet of where this source was, that water is not contaminated in that well, you just told that lady just now.

MR. HUBBARD: That's correct.

MR. CHAPEL Than why are we concerned about this outside of the area of 1 and 3. I don't understand -- I don't understand where the 1 came in, because that was not any in the dump. Now, all at once we find it in No. 1. Where did that come from? Was there a gas tank leak or something, do you know what I mean? No. 1, where the building was, you didn't find that until the last -- when you found that, could that have come from gasoline, diesel fuel or whatever. You said that other did, well, that source is not --

MR. HUBBARD: No, that source is not -- it's clorinated salts, similar to the ones that were found in the other area.

MR. CHAPEL: But not the same thing though, similar, but not the same. In other words, it isn't the same stuff that was found where the drums were.

MR. HUBBARD: That's correct. Okay.

MR. CHAPEL: So, I think you've got -- what you have got here, is the situation that you are not finding the same stuff all over and still it isn't going anywhere. This is what I am concerned with. It isn't going north.

MR. HUBBARD: Well, it is migrating very slowly to the north.

MR. CHAPEL: It is not going south.

MR. HUBBARD: That's contrary to the direction of the groundwater flow.

MR. CHAPEL: Thank God.

MR. HUBBARD: But we know a very shadow hydraulic reading, that's like how deep the water table is. Some of you may be more familiar with hydroeology, it is very similar. the water table is steep and you have got a coarse material. you can have the water move there very rapidly. But if the water table is essentially flat. which is very much the condition that we have. the water even. if it is a real permeable material. the water won't move rapidly, and that's pretty much the situation we have.

MR. CHAPEL: That water table. that's a considerable amount of feet in the year.

MR. HUBBARD: That's true. but it flows essentially uniformly. across the area of the site. It raises up in the onion field and it raises up over on the site and escar as well. It does move quite a bit.

MR. CHAPEL: There is no way of any of that movement coming south. is what you are saying?

MR. HUBBARD: If you were to put in a big production well to the south and start pumping it like crazy. you could draw contamination in that direction. but since the acquifer is pretty low yielding, it is unlikely you are going to do that. We don't antdicipate that contaminants are going to migrate in any direction contrary to what they have and it is consistent with the hydrogeology.

MR. SINGERMAN: Just to supplement the answer to your question regarding why we are spending so much money to address the problem that doesn't appear that significant. You are right. it doesn't appear to be a significant threat to public health. We are tying to protect the environment. We are also mandated to protect the environment as well as the public health. And if we were allowed to continue the way it is going. we could jeopardize public health. So we are trying to address the situation now while it is still localized and clean it up so it won't become a problem in the future. So this area is something we can use in the future. As it is now we can't develop it or use it.

MR. GRANT: John Grant.

MR. SINGERMAN: The gentleman over there has a question. He was cut off.

MR. HUPPA: At the time you were showing this treatment plant. it looks like quite an operation there. I was wondering who would be responsible for the operation of that thing, what agency or person is going to operate it.

MR. SINGERMAN: You have to identify yourself.

MR. HUPPA: My name is Francis Huppa.

MR. SINGERMAN: The responsibility of the maintenance of the facility would be that of the state. the state is responsible for all operations and maintenance. They may delegate to a lower authority, such as the county or some other authority, but the ultimate responsiblity is the state's.

MR. HUPPA: Would that ultimately be the responsibility of some contractor of the state?

MR. SINGERMAN: Perhaps, the state may decide to have a contractor do the operation and maintenance, it is really up to them.

MR. HUPPA: Thank you.

MR. SINGERMAN: See, the thing is, as far as the remedy goes, the EPA will finance 90 percent of the remedy and the state will finance 10 percent and for a certain period of years, the operation maintenance facility won't be costing you anything. But eventually, after 10 years, the state's responsibility to operate a 100 percent -- to finance and operate it is a 100 percent.

MR. GRANT: My name is John Grant. Talking about the government, but a lot of that is wetland and the food and security act of 1987 prohibits a lot of that development of wetland because it is wetland and that will preclude a lot of the development up there. So you have one law that says you can't develop it a great deal and now you are talking about protecting it so it can be used for development, and by law you can't develop it.

MR. SINGERMAN: Well, we are trying to protect the environment. The main reason we are trying to protect the environment, if for some reason in the future it is devleoped --

MR. GRANT: Congress passed a law that said it can't be developed because it is wetland.

MR. SINGERMAN: Well, if for some reason -- essentially the rules are no net loss, or if you develop a wetland somewhere or some area in the vicinity, you transmit another.

MR. GRANT: That's not what that law says.

MR. SINGERMAN: It is either something of higher quality or something, the bottom -- regardless whether or not it's developed or not, we are not advocating development of the area. We are saying that if for some reason in the future it is devleoped, or we are just trying to protect it, if it is developed or if not developed, we are mandated to protect the environment as well as the public.

MR. GRANT: You also have to be cost efficient, right?

MR. SINGERMAN: Right.

MR. GRANT: And I don't see any benefit for 5 million dollars.

MR. SINGERMAN: Well, the benefit is we are cleaning up the environment, there is a threat to the environment.

MR. GRANT: You are cleaning up a very small threat to the environment.

MR. SINGERMAN: Well, it may be a small threat, but it is still a threat. I mean, the mandate of the Superfund is to clean it up to a level that protects of the public health and the environment. For us to, for example, to take no action and not remediate the site is not consistent with our environment.

MR. GRANT: You are like all the other federal agencies, you do not have an unlimited budget, and if you use 5 million dollars, that's 5 million dollars you can't use somewheres else?

MR. SINGERMAN: That's right.

MR. GRANT: And is this the environment -- and living in a clean environment, but is this the most beneificial use for this 5 million dollars?

MR. SINGERMAN: Well, perhaps another site may be more dangerous, but we are not necessarily prioritizing money that has to be spent. Our feeling is this site poses a risk and we need to remediate it. Does that answer your question?

MR. CHAPEL: It doesn't answer mine. To the point that you've got a risk.

MR. SINGERMAN: We do have a potential risk, due to the contaminant plume moving off site.

MR. CHAPEL: Pardon?

MR. SINGERMAN: If we are not remediating the contamination, the plume would continue to move.

MR. CHAPEL: I understand what you are saying.

MR. SINGERMAN: Just to let it to continue going, continue to move, I mean, sometime eventually it is going to effect someone.

MR. CHAPEL: But you have taken the contaminants out of it, all right, all of the stuff has been taken out, all of the drums have been removed, so there is no more contaminant there. So the only thing that we have got is what is there right now in the water, right, and you can't develop any more, right?

MR. SINGERMAN: We have contamination present there even though we have taken out the drums, and taken out the contaminant odor, there is still contamination -- residual contamination left.

MR. CHAPEL: Where?

MR. SINGERMAN: In the soil.

MR. CHAPEL: In the water or in the soil?

MR. SINGERMAN: Well, in the soil.

MR. CHAPEL: Okay. Then, let's get the soil out of there and forget the water, you won't have any more contaminant in the water, if we remove the soil.

MR. SINGERMAN: Well, we have contamination in the acquifer as well, in the saturated portion of the soil and because of that -- in order to get it out, we have to excavate it, we have to take it somewhere, we have to treat it. We looked at various alternatives, and one of the alternatives was to take it out and take it somewhere, but the most appropriate alternative that the EPA and DEC feel is appropriate for the site is Alternative No. 8.

MR. CHAPEL: But you can treat that soil, there is an alternative in there, that that can be treated on site, put right back, am I right?

MR. HUBBARD: Maybe I can answer your question this way. Most of the cows have already gone out of the fence.

MR. CHAPEL: Pardon?

MR. HUBBARD: Most of the cows have alreay gone out of the fence.

MR. CHAPEL: No, but you have got them all, supposedly.

MR. HUBBARD: They are in the groundwater. Residual contamination, low level of residual contamination will flow, or the contaminants that were left in the flushing of water.

MR. CHAPEL: Okay. I will give you that. Another question. Why did it wait 5 years before we got rid of it. Why wasn't it done in 1982 when it was first developed? Who is to blame for this going as far as it has? Why should the federal fund or Super fund or whatever -- I mean, somebody had a responsibility to that. Who took acceptance to that when they found it, the state, right? EPA OR DEC, one of them, or both of them. Those people did nothing with this site for 5 years. Now, in 2 years, they took the drums. Now, there is testament and I got much smart, but I don't see the point to this. somebody should had done this a long time ago, and we wouldn't have the contaminants in the water. Now, we have got to go ahead and fix all this.

MR. HUBBARD: The EPA was requested to conduct a removal as of April, 1984.

MR. CHAPEL: Who requested it?

MR. HUBBARD: The DEC did.

MR. CHAPEL: Okay. Then, why didn't the DEC do something between '82 and '84?

MR. HUBBARD: I can't really say.

MR. CHAPEL: You've got the DEC man here.

MR. HUBBARD: I can't really say that the EPA conducted any removal action and at that time they installed monitoring wells and conducted some surface soil sampling as well as sampling residential wells to determine --

MR. CHAPEL: Not in '84?

MR. HUBBARD: Yes, in '84. Yes, they did.

MR. SINGERMAN: The site was already identified in July of '82 and subsequent to the stage they performed the investigation and took samples to determine what the threat was and based on the state's request, the EPB went in.

MR. CHAPEL: Well, nevertheless, it is here, but the next thing --

MR. SINGERMAN: We are just finishing up the job. We started the job in '84, took off the drums, took off the contaminated soil and if we hadn't done that probably the situation would had been much worse. We would have had a much greater plume and a much greater problem.

MR. CHAPEL: But it would had been a lot quicker and a lot less --

MR. SINGERMAN: Well, the problem is we can't just go out and create a site without an investigation. We are allowed to go out as to what is an immediate threat to the public health environment. If we have drums sitting there readily leaking, we are going out and we can immediately address them. We did. But as far as a long term threat, such as we have this plume moving, we have to do a very detailed investigation because since we have limited funds we want to make sure we take the appropriate action, and we really can't take action unless we know what the problem is, and we know what exactly the problem is, and we had to do this very intense investigation.

MR. CHAPEL: What you are also saying is that out of the 50 people here tonight that if we all said we didn't want to fix it, you would still fix it anyway?

MR. SINGERMAN: The reason we are here, is to get your input as far as --

MR. CHAPEL: What you are also saying that if we say we don't want it fixed, you are going to fix it?

MR. SINGERMAN: No, we are not saying that. We identified the remedy, Alternative No. 8, that's addressing the contamination problem. The reason we are here tonight, is to get your comments. We will take into considration your comments and select a remedy.

MR. LOMNEY: Jeffrey Lomney. Your presentation tonight addressed the aerial extent of the contaminant plume. What I -- part of your investigation defined the vertical instrument that you considered, leaking and deeper acquifers in your remedial scenario.

MR. HUBBARD: We installed a number of monitoring well clusters, particularly in the 3 source areas. We installed a cluster of wells and each of the 3 sources that we knew were there originally. We ran a number of borings down to about 85 or 90 feet. and we found there is a very compact layer of till both beneath the site. It is overlaying by land, gravel and cobbles and with water bearings out. and there is a real dense till. We ultimately -- we originally planned on installing deeper wells down. essentially on top of the bedrock. and once we discovered the till is there and over 50 feet thick. we decided to cluster our wells since the water table and once at the base of that water bearings of the till. We conducted the hydraulic conductivity testing in the till place, by driving casings into the drill and then essentially doing slug tests to see how fast the water would permeate into the till itself. Now. based on that we found the till has a permeability that's essentially equivalent to what you would use to fill a cap over a landfill. really permeable material.

MR. LOMNEY: Had the amount settled?

MR. HUBBARD: Approximately, yes. We also found in our shadow well clusters. there is no verital grading whatsoever. Additionally, when we sampled the deep and the shadow wells, we found that the shadow wells were contaminated and the deeper wells were not in the source areas. As you move down radiant, into the onion field. we did have some well clusters there and they indicated the plume that disbursed in the vertical direction and the concentrations were roughly similar in the deep and shadow well, but there appears to be no potential whatsoever for degradation of the contaminants into the fill.

MR. LOMNEY: What type of flow volacities were calculated?

MR. HUBBARD: Really can't recall off the top of my head, but based on the most recent ground level measurements we took and use is average hydraulic contamination, most of the sites were not included novice areas, I came up with 65 feet per year. It is not moving real fast.

MR. GRANT: During this cleanup, you are still going to allow them to grow onions, right?

MR. SINGERMAN: Well, the plume is not impacting onions.

MR. GRANT: If it is permissible to grow human food in the plume area, it seems to show an extremely minimal risk because there is very few things that you do with an onion before you eat it, except for washing it off, and slicing it and putting it on your hamburger, there is not much more preparation to it, unless you like fried onions. It would be the same as drinking the water, because the onions are going to absorb a lot of water to produce it, and if it is safe to eat onions out of that field, I can't see spending 5 million dollars to proect well sites that are not going to be there to start with.

MR. HUBBARD: If we can expand a little bit on the environment impact condition. Ultimately these plumes are going to reach the drainage ditch to the north of the adjacent farmland. Once they get there, they are going to end up in Oak Orchard creek and it's my belief that Oak Orchard Creek ultimately goes into Oak Orchard swamp, there is a sensitive eco system. While we are dealing with outcasts, the surface water volume, it can't be absorbed, some of these things are not particularly involved.

MR. GRANT: You have a known -- you have X amount of contaminants and the amount of contaminants is not increasing, not X plus Y and I. As the plume expands, the concentration has got to decrease?

MR. HUBBARD: That's correct.

MR. GRANT: And if it is no risk level to start with, how can it get to the risk level by expanding it over a much larger surface.

MR. HUBBARD: Well, if it were -- if the concentration of the ground water right now were present in the surface, it could be a risk. It certainly would be a risk if people were drinking it.

MR. GRANT: Only in the plume area?

MR. HUBBARD: Under existing conditions

there is no risk, but in the future, there could be a risk.

MR. GRANT: I think to me anyway you are having a hard time proving your cost effective benefit ratio.

MR. HUBBARD: Well, again, we are trying to remediate the cite. We feel it's a risk to the environment.

MR. GRANT: And I realize that our rules and regulations require that, but they are like every other federal law that is ever written and 16 others that come into play on it also and there is no federal regulations that stands by itself and that in order to show the -- you must show some sort of cost benefit ratio, you want to spend a tremendous fortune unless you work for DOD to do something very small.

MR. SINGERMAN: One of the things we have to comply with, state and federal drinking water strandards and also any other standards that apply. And this standard, the groundwater in the plumes, doesn't comply with the state's standards. So therefore we are required to remediate the site.

Mr. SACKETT: May I make a comment, please? John Sackett. I think you have got about 2 acres, you might have 3 acres now with the plume, possibly 4. Why not put a deed restriction on, give the 5 and a half million to the Town of Byron and we'll put in a water system for those people that don't have good water in the town. I think that would be the perfect situation.

UNIDENTIFIED SPEAKER: Amen.

UNIDENTIFIED SPEAKER: I second the motion.

MR. SINGERMAN That doesn't solve the problem. Any more questions?

MR. KAUFMAN: David --

UNIDENTIFIED SPEAKER: It's obvious that most of your gentlemen that are up here directing this ha never worked in your life for a living. You always worked off the taxpayers and it's quite obvious tonight from your comments. That's all I have got to say. I'd say anybody that works would not come to the conclusion you have. Amen. Nature will heal itself. Give it a chance.

MR. KAUFMAN: David Kaufman. In your map of the treatment areas. you don't show any treatment for Source Area 3. why is that? There is also - I didn't see anything in the plume map either. is it because there is no plume there?

MR. HUBBARD: That's correct.

MR. SINGERMAN: There is no plume. Also as far as our treating the soil. we have to learn to determine the full extent of any contaminated area. It's primarily metals contamination and exactly how we address it we have to determine that during the design, whether taking it outside or placing it on top of the areas that would be flush or some other approach.

MR. CHAPEL: Also, Joe, those were all above ground, thsoe barrels were above the ground in No. 3, so I think they got them before anything ever happened, before they -- I think they got them. No. 1 was the one that -- No. 3 -- I think they were all above ground and they've got them all.

MR. SINGERMAN: I hope we have got all the drums.

MR. CHAPEL: Pardon?

MR. SINGERMAN: Hopefully we've got all the drums.

MR. CHAPEL: Yes.

MR. SINGERMAN: That No. 3 was above ground, it was very obvious. I think there is no problem there. That's why I think you found very little.

MR. SINGERMAN: In relative terms, the threat from that area is much less than the other areas.

MR. CHASER: Al Chaser. You mentioned here you wanted one -- you know, one of the things on here is closing the site. How far does that extend; I mean, does that mean -- does that affect the housing there?

MR. SIGNERMAN: What do you mean, closing?

MR. CHASER: Well, you mentioned on --

MR. SINGER: Essentially closing means the site has been remediated and it's closed up, that's what we meant by closing, not restricting or anything like that.

MR. CHASER: Because I live about 50 foot from that entrance or whatever, I wondered what effect that would have on me and my family.

MR. SINGERMAN: Whatever operation is implemented at the site, we would take into consideration the people living at the area, such things as noise and dust and whatever which is being generated in the process. We would keep down the level as to not effect the people in the area. I mean, all these things we have to determine in the design and when the remedy is finally completed we provide this cover over the area that was remediated, that means the closing site.

MR. CHASER: I was just wondering about the situation, once work begins if I would have to leave that house.

MR. SINGERMAN: We hope we'll be able to do it in a way that we would implement -- in a way we would adversely have an impact on the area so you would be able to stay in your house and would not be impacted, because we don't want to spread the problem. In treating the situation, we don't want to create a situation where we spread dust or scrapers or anything else in the vicinity, but impact other areas or potentially threaten the health and the people in the vicinity.

MR. CHASER: Only other thing I am wondering about, was there some sampling of the residential well just last week. All right. I have been told the only way I could get results of that is going through the Freedom of Information Act to find out if they are now contaminated or anything like this at all?

MR. SINGERMAN: I believe these were sampled by the county.

UNIDENTIFIED SPEAKER: It was the state, department of health.

MR. MIRACHI: I work for the state, for the DEC, and it was my understanding that the health department, the state health department in Albany requested the county health department actually obtain stamples. I understand they are being analyzed in Albany, and the results would be available upon order in a couple of weeks to a month. I will be happy to get that information directly back to you, if you'd like.

MR. CHASER: Yes.

MR. MIRACHI: Are you on the sign-up sheet?

MR. CHASER: I will be.

MR. MIRACHI: I will make sure I have your name and address and I will give you my card before I leave and as soon as we hear anything back on the results. I will get in touch with you directly.

MR. SINGERMAN: Any other questions? Going once, going twice --

UNIDENTIFIED SPEAKER: How is the ultimate decision finally made, a group, a single person or what?

MR. SINGERMAN: Well, once the comment period closes, we take all the comments that were collected and we'll essentially discuss it amongst ourselves, EPA and DEC, and we'll come up to a consensus as to what remedy is preferred, or if not a remedy, and then we'll make a recommendation to the regional administrator of the EPA, and if he agrees with the recommendation, and he signs off the decision which makes that a selective remedy. It is not one person. It is a collective body of both agencies having input in the DOH and various other agencies. Any more questions?

MR. KAUFMAN: Dave Kaufman. Again, basically you are not going to treat the plume in the fields to the north at all, right, you are just going to treat -- you are going to treat the berm around the areas to the 2 source areas, treat those 2 areas and then let th plume in the fields go?

MR. SINGERMAN: No.

MR. KAUFMAN: How will the plumes in the fields be treated?

MR. HUBBARD: Well. includes the reversal of the degrading in the fields. by drawing down -- to induce the gradation change in the fields by drawing down the acquifer so the water will flow from between the fields back.

MR. KAUFMAN: Go back this way. Now flowing this way and now going back this way, pulling it back?

MR. HUBBARD: That's one of the reasons it takes so long to achieve it. it's 20 years. Not only is the water out there contaminated. but the contaminant is also absorbed in the soil. We have to pull all that stuff off. If the water doesn't move fast. you have to pump it out.

UNIDENTIFIED SPEAKER: How deep is the plume in the fields?

MR. HUBBARD: About 15 feet deep.

MR. SINGERMAN: Any more questions? No more questions. I guess the meeting is over. Again. if you do have any questions when you go home tonight or anytime in the next few weeks. either write to us at the address of the proposed plan or give us a call. If you stay around for a while we'll -- question?

UNIDENTIFIED SPEAKER: Why can't Mr. Freeman pay for it?

MR. SINGERMAN Can you identify yourself?

UNIDENTIFIED SPEAKER: Let him pay the government to clean it up.

MR. SINGERMAN: What we are attempting to do, if we can convince the people responsible for the problem of the site to clean up the site, we'll atetmpt to recover in court after we expend the monies. So anyone, that means Mr. Freeman as well as anyone who contributed the waste to the site, is responsible for the cleanup or financing the cleanup, if we do it ourselves.

UNIDENTIFIED SPEAKER: Should be the owner of it and since I heard he is in Florida, where he is or not, I don't know.

MR. SINGERMAN: We are pursuing him for the cost.

Any further questions. We'll stick around here, we won't leave.

(Proceeding adjourned at 8:05.)

C E R T I F I C A T E

I, Edith E. Forbes, do hereby certify that I have reported in stenotype shorthand the proceedings in the matter of the Public Hearing of the Byron Barrel and Drum Site, reported at the Byron Fire Department Recreation Hall, Byron, New York:

And that such transcript, numbered pages one through forty-seven is an accurate and correct record of my stenotype notes.

Edith E. Forbes, Notary Public.