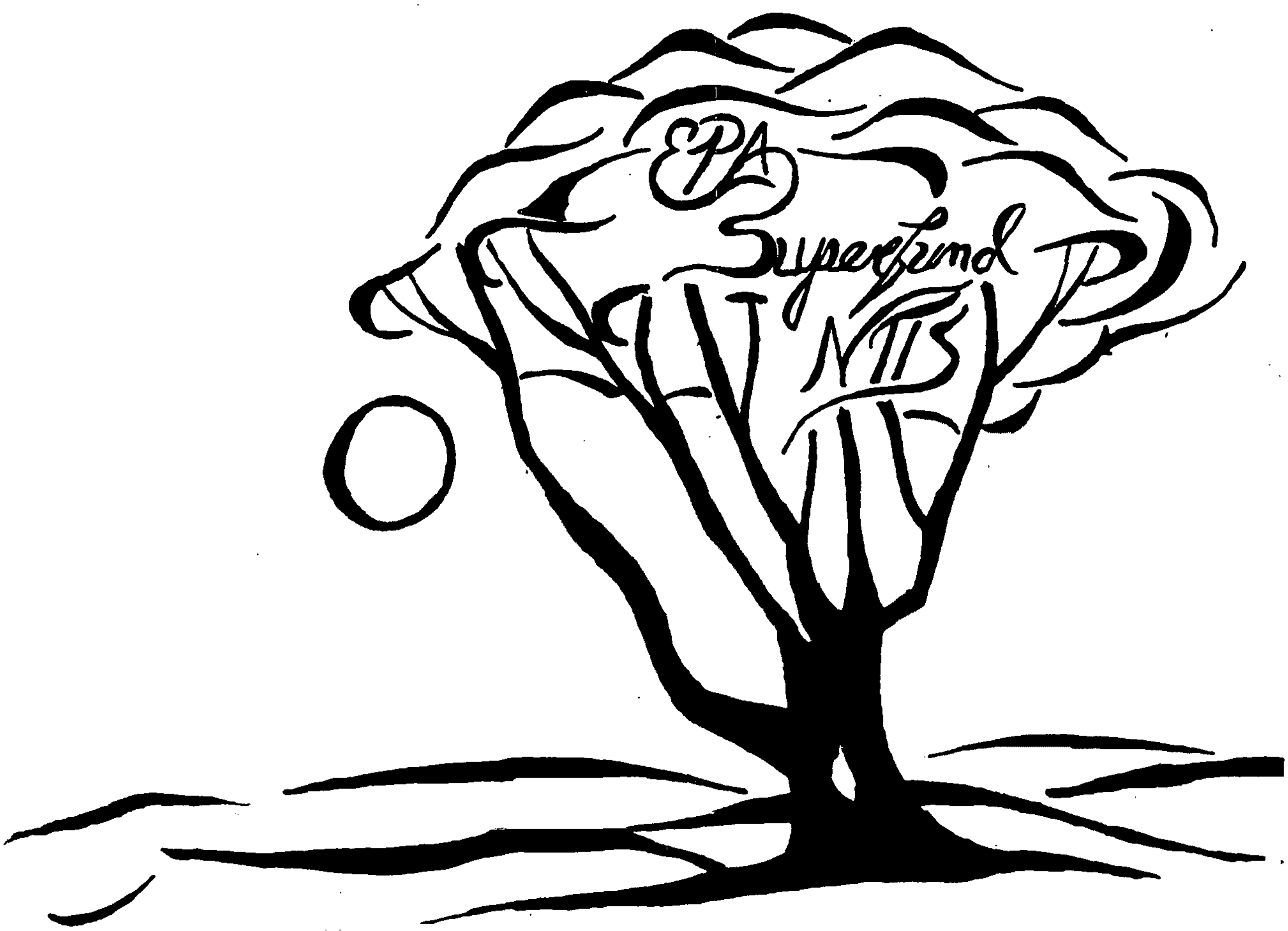
PB94-964052
EPA/ROD/R04-94/181
September 1994

# EPA Superfund Record of Decision:

## BMI-Textron Site, Lake Park, FL, 8/11/1994



RECORD OF DECISION
FOR THE
BMI-TEXTRON SITE

THE DECLARATION

## SITE NAME AND LOCATION

BMI-Textron Site
Lake Park, Florida

## STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Basic Microelectronics, Incorporated (BMI)-Textron Site (BMI-Textron Site or the Site), in Lake Park, Florida, chosen 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), 42 U.S.C. Section 9601 et.seq. and the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the Remedial Investigation and Feasibility Study (RI/FS) process for the Site. In accordance with 40 CFR 300.430, as the support agency, FDEP has provided the Environmental Protection Agency (EPA) with input. While EPA expects written concurrence will be forthcoming from FDEP, a letter formally recommending concurrence of the remedy has not yet been received.

## 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 (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

## DESCRIPTION OF THE REMEDY

This remedy addresses the contaminated principal threat of ground water at the Site. This remedy addresses the principal threat remaining at the Site, by using existing institutional controls, and monitoring ground water contaminated with arsenic, cyanide, sodium and fluoride. Transport modeling indicates that natural attenuation of on-site ground water contaminants to drinking water standards should occur within 3 years. The ground water will be monitored quarterly for one year to verify modelled decrease of contaminant concentration. During the remaining two years, EPA would conduct by an annual review of monitoring frequency. Selected wells within the existing monitor well network would be used to provide confirmation of historical data and modeling transport data that indicates the contaminant of potential concerns (COPCs) will naturally degrade and/or attenuate with time. However, EPA reserves the right to increase monitoring frequency should sampling data indicate the necessity. If after the three years of monitoring, data shows that Performance Standards are achieved, then the Site will be considered for deletion from the National Priorities List (NPL). Should monitoring indicate that the Site has contaminants at concentrations greater than Federal and State standards, EPA in consultation with the State of Florida, will reconsider the protectiveness of the selected alternative.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. Due to the documented naturally occurring attenuation of ground water contamination at the Site, this remedy can be considered as a permanent solution that satisfies the statutory preference for reduction of the toxicity, mobility and volume of hazardous substances. Based on the limited area of the ground water plume; the ground water contaminants present and their concentrations, relative to drinking water quality standards; and the fact that the source of the contamination (the soil), was removed in 1984 and 1990, EPA concluded that it was impracticable to treat the ground water effectively. This remedy does not satisfy the statutory preference for treatment as a principal element since treatment would be impracticable in this matter.

This remedy will serve to mitigate the threat to human health through the natural attenuation of hazardous substances released from the Site. Because this remedy may result in hazardous substances remaining on-Site above health-based levels, a review of the remedial action will be conducted within five years after the initiation of the remedy to ensure that the remedy continues to provide adequate protection to human health and the environment unless drinking water standards are achieved prior to the five-year period.

EPA has determined that its response at this site is complete. Ground water monitoring will be conducted to insure the effectiveness of natural attenuation. Therefore, the site now qualifies for inclusion on the Construction Completion List.

Patrick M Tobin for
John H. Hankinson, Jr.
Regional Administrator

August 11, 1994
Date

# Record of Decision

## Summary of Remedial Alternative Selection

BMI-Textron Site
Lake Park, Florida

Prepared by:
U.S. Environmental Protection Agency
Region IV
Atlanta, Georgia

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## RECORD OF DECISION
The Decision Summary
BMI-Textron Site

## 1.0 SITE LOCATION AND DESCRIPTION

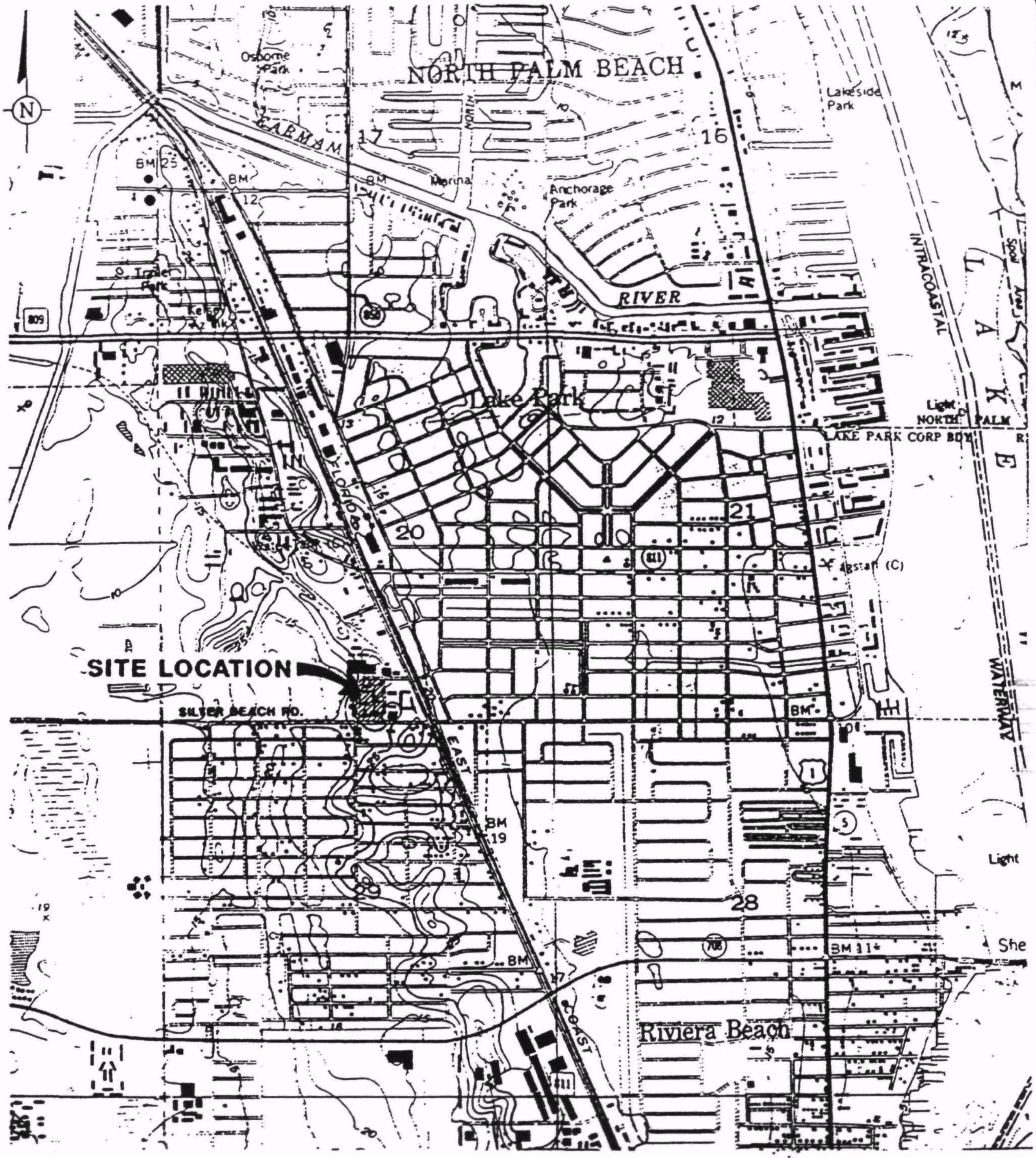
The Basic Microelectronics, Incorporated (BMI)-Textron Site (the Site) is a 3.4 acre area located within the Tri-City Industrial Park on Silver Beach Road in Lake Park, Palm Beach County, Florida. A Site location map is provide as Figure 1. The Site is comprised of several buildings and paved areas. Industrial areas surround the Site to the north, east and west and a residential area is located south of the Site across Silver Beach Road. A Site plan is shown in Figure 2.

Presently, most of the surface-area on the Site is either paved or covered by buildings. The average rainfall in this portion of Palm Beach County is 60 inches per year and more than 70 percent of the rain falls between May and October. Stormwater runoff is directed to shallow swales located along the streets. Excessive stormwater runoff flows south (toward Silver Beach Road) then either east or west, further down from the Site. The nearest known surface-water body is the Earman River situated about one mile north of the Site.

The nearest residents are located to south (across from Silver Beach Road) of the Site and there are no known private drinking-water supply wells within the vicinity. The nearest known drinking-water production well is Riviera Beach Utility Supply Well #16 located approximately 3,000 feet (ft) south-southeast of the BMI Textron Site. A recovery well, screened between 100 and 125 ft below land surface (bls) to capture a release of volatile organic compounds (VOC), is currently operated at the Trans-Circuit plant situated in an area which could be considered slightly downgradient and about 300 ft north-northwest of the BMI-Textron Site. No other wells are known to exist in the immediate downgradient area. The nearest known wells that would be considered downgradient of the BMI Textron Site are the two Price Funeral Home irrigation wells.

## 2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

BMI began manufacturing operations in Lake Park, Florida in October 1969. Textron Inc. acquired BMI in January 1981 and began operating the Site as BMI-Textron. The facility manufactured chromium-backed glass plates used in the production of electronic components. The actual process involved cutting, cleaning, and polishing glass plates prior to chromium deposition. Liquid waste from the process was disposed of on Site through a combination of percolation ponds and drainfields. BMI discharged cyanide containing wastes into Percolation Pond (PP)-1 which was abandoned in August 1984. Permit compliance sampling required by Florida Department of Environmental




BASE MAP SOURCE: U.S.G.S. 7.5 MINUTE SERIES (TOPOGRAPHIC) RIVIERA BEACH QUADRANGLE.

SCALE
0 — 2000
FEET

| | | |
|---|---|---|
| | SITE LOCATION MAP<br><br>FORMER BMI-TEXTRON SITE<br>LAKE PARK, FLORIDA | FIGURE<br>1 |

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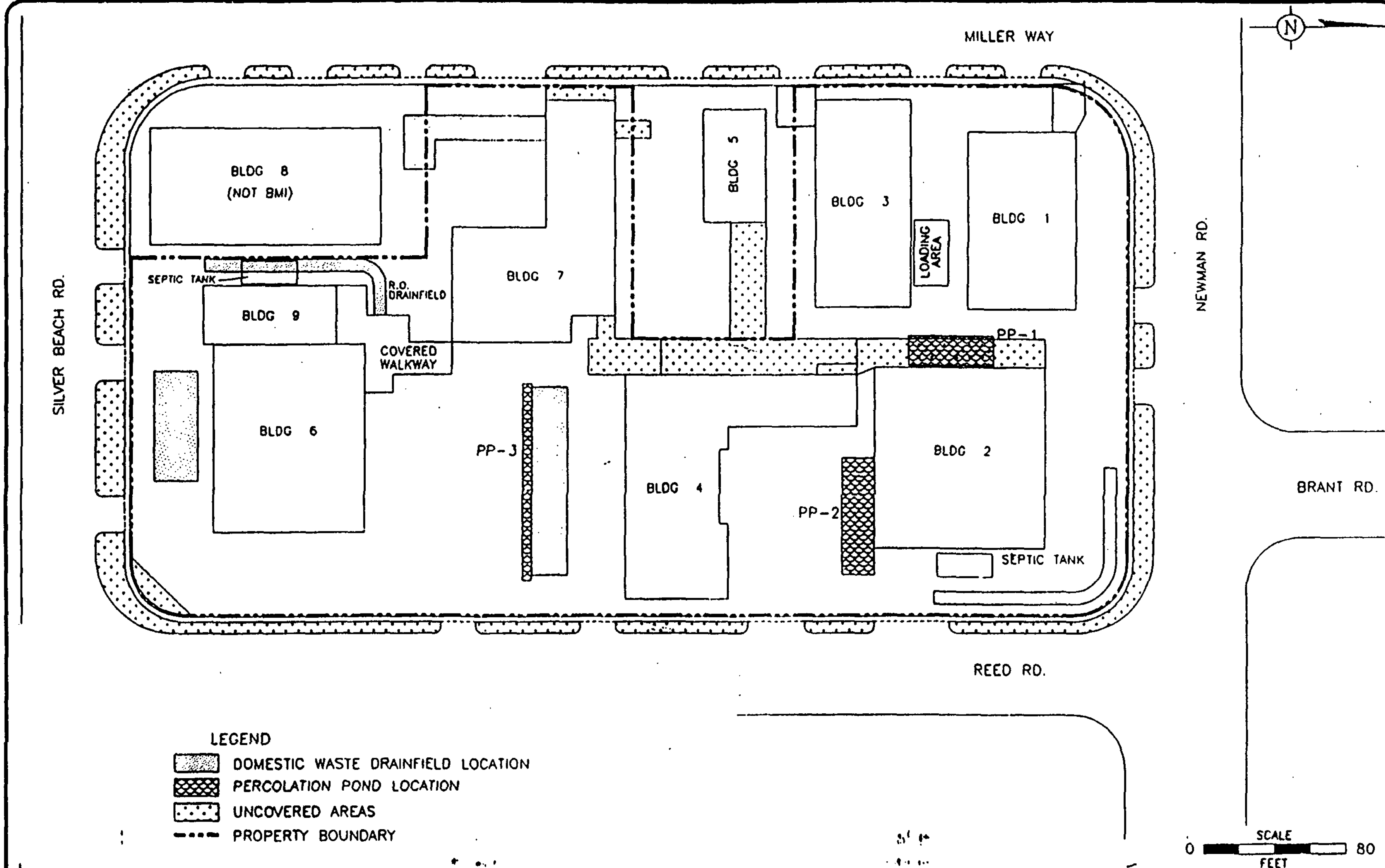


SITE PLAN

FORMER BMI-TEXTRON SITE
LAKE PARK, FLORIDA

FIGURE
2

Protection (FDEP), formerly Florida of Department Environmental Regulation (FDER), revealed cyanide contamination of the soil and ground water at the Site.

BMI-Textron and the FDEP entered into a Consent Agreement to remove contaminated soils at the Site, in December 1984. Pursuant to the agreement, approximately 680 cubic yards of cyanide contaminated soil were removed to a hazardous waste facility regulated under Subtitle C of the Resource Conservation and Recovery Act. The excavated soil was taken from PP-1, formerly located at the center of the north end of the Site.

Analytical data from samples taken by FDEP in 1986 showed elevated concentrations of cyanide and fluoride in three on-Site monitoring wells and in the soil near PP-2 (see Figure 2). On November 18, 1986, BMI-Textron and FDEP entered into another Consent Agreement to develop a ground water remediation plan. In April 1990, as part of the ground water remediation plan and in compliance with the second Consent Agreement, Textron removed 206 cubic yards of soil. Concentrations of chromium and cyanide were removed from PP-2.

In June 1988, Federal Register (52 No. 122) of the United States EPA proposed listing the BMI-Textron Site on the National Priority List (NPL). In August of 1990, BMI-Textron was finalized on the NPL with a hazardous ranking system (HRS) score of 37.93. On February 26, 1992, EPA Region IV, under the authority of Section 104(e) of the CERCLA, 42 U.S.C. §9604(E), issued a Request for Information to Textron. The request notified Textron of the existence of a Superfund hazardous substance Site at their former BMI-Textron facility and sought information regarding Textron's involvement at the Site. Also, on February 26, 1992, EPA Region IV, issued General and Special Notice Letters for Remedial Investigation/Feasibility Study (RI/FS) to previous BMI principal officers (William E. Eaton, Theodore T. Tarone), and Textron, notifying them of potential liability as potentially responsible parties under CERCLA and establishing a period of formal negotiations. The General and Special Notice Letters initiated a period of negotiation on an agreement to perform the RI/FS at the Site. On April 24, 1992, Textron submitted a Good Faith Offer to EPA, stating it was willing to conduct an RI/FS at the Site.

In June 1992, Textron and EPA entered into an Administrative Order by Consent (AOC) for the RI/FS. Textron agreed to undertake all actions required by the terms and conditions of the AOC for the conduct and implementation of the (RI/FS). The RI/FS was conducted to evaluate Site risks and technologies available to respond to these related risks. The RI found arsenic, cyanide, fluoride, and sodium in ground water beneath the Site.

## 3.0 HISTORY OF COMMUNITY PARTICIPATION

In February of 1993, EPA started its community relation efforts by conducting community interviews and holding a public meeting at the Palm Beach County Library. The meeting was held to address concerns expressed by the citizens and inform local residences of EPA's planned RI activities. This meeting was attended by five citizens of West Palm and two representatives from FDEP.

A public comment period for the proposed remedial action was held from April 18, 1994 through May 17, 1994. During this time a Proposed Plan fact sheet was released to the public in order to inform the citizens of EPA's findings during the RI/FS event and of EPA's preferred remedial alternative for Site cleanup. This event was also held to notify the public that the details of the RI/FS reports could be found at the Lake Park Library. In addition, a public meeting was held on April 21, 1994. In the course of this meeting, EPA answered questions about the potential risk posed by the Site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision (ROD). This decision document presents the selected remedial action for the BMI-Textron Site, in Lake Park, Florida, chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. The decision for this Site is based on the Administrative Record, located in the EPA's repository at the Palm Beach County Library and Region IV repository.

## 4.0 SCOPE AND ROLE OF RESPONSE ACTION

This ROD discloses the planned remedial activities at the BMI-Textron Site, addressing ground water. The cleanup remedy will address the ground water contaminants which remain at the Site. The function of this remedy is to reduce the risks associated with exposure to contaminated ground water and to protect the surficial aquifer system present beneath the Site. The ROD is the only ROD anticipated for this Site since the contamination present at this Site will be addressed as a single operable unit.

## 5.0 SUMMARY OF SITE CHARACTERISTICS

Information on soils, geologic and hydrogeologic conditions at the BMI-Textron Site are presented in this section, including the results of the well inventory ecological assessment and human population survey conducted as part of the RI. Site surface features and meteorological data were briefly discussed in the Site Description.

## 5.1 Regional Hydrogeology

The geologic formations underlying the area of Palm Beach County near the former BMI-Textron Site consist of the Pamlico Sand, the Anastasia Formation, the Fort Thompson formation, and the Calaoosahatchee Marl.

The Pamlico Sand (Unit 1) mantles all of eastern Palm Beach County and consists of sand and shell. The Anastasia Formation (Unit 2) underlies the surficial sand and is composed of sand, sandstone, limestone, coquina and shell. The Caloosahatchee Marl (Unit 4) underlies the Fort Thompson Formation (Unit 3) and is composed of shelly sand, sandy shell, marl, limestone and sandstone.

Two surficial aquifers are present in Palm Beach County: the Turnpike Aquifer and the Sandy Ridge Aquifer. Because the Turnpike Aquifer is situated greater than 3 miles to the west and upgradient of the BMI-Textron Site, it is unlikely that this aquifer has been affected by the Site. This discussion concentrates primarily on the Sandy Ridge Aquifer. The Sandy Ridge Aquifer is comprised of sand, shell, sandstone, limestone or mixtures of these. In the area of the BMI-Textron Site, the Sandy Ridge aquifer is reported to extend to a depth of approximately 210 feet below mean sea level (MSL) (See Figure 3). Regional ground water flow in this aquifer is reported to be toward the east.

The Sandy Ridge Aquifer can be divided into four hydrologic units. Unit 1, at the surface, is generally 20 to 40 feet thick and is composed of sand and layers of shell. Unit 2 is approximately 60 feet thick and is composed of unconsolidated sand and shell with occasional sandstone. Unit 3 is approximately 50 feet thick and consists of very fine sand and shell and is generally the lowest in permeability of the four units. Unit 4 is approximately 100 feet thick and consists of firmly cemented calcareous sand and shell with occasional layers of marl. Most of the drinking water supply (DWS) wells in the area of this Site are completed within Unit 4 because it is the thickest and generally the most permeable section in the aquifer. This zone may have a hydraulic leaky confined aquifer, but is still considered a component of the shallow ground water system.

According to the FDEP, along the Coastal Ridge (the area of the BMI-Textron Site) the hydraulic conductivity of the sediments is estimated to range between 1 and 50 feet/day; the transmissivity of the Sandy Ridge Aquifer as a whole, estimated from pump test data, is 7,000 $feet^2$/day and the transmissivity of Unit 4 is estimated as 4,000 $feet^2$/day.

The Sandy Ridge Aquifer is underlain by approximately 250 to 350 feet green, shelly clay that is a unit of the Hawthorn Group.

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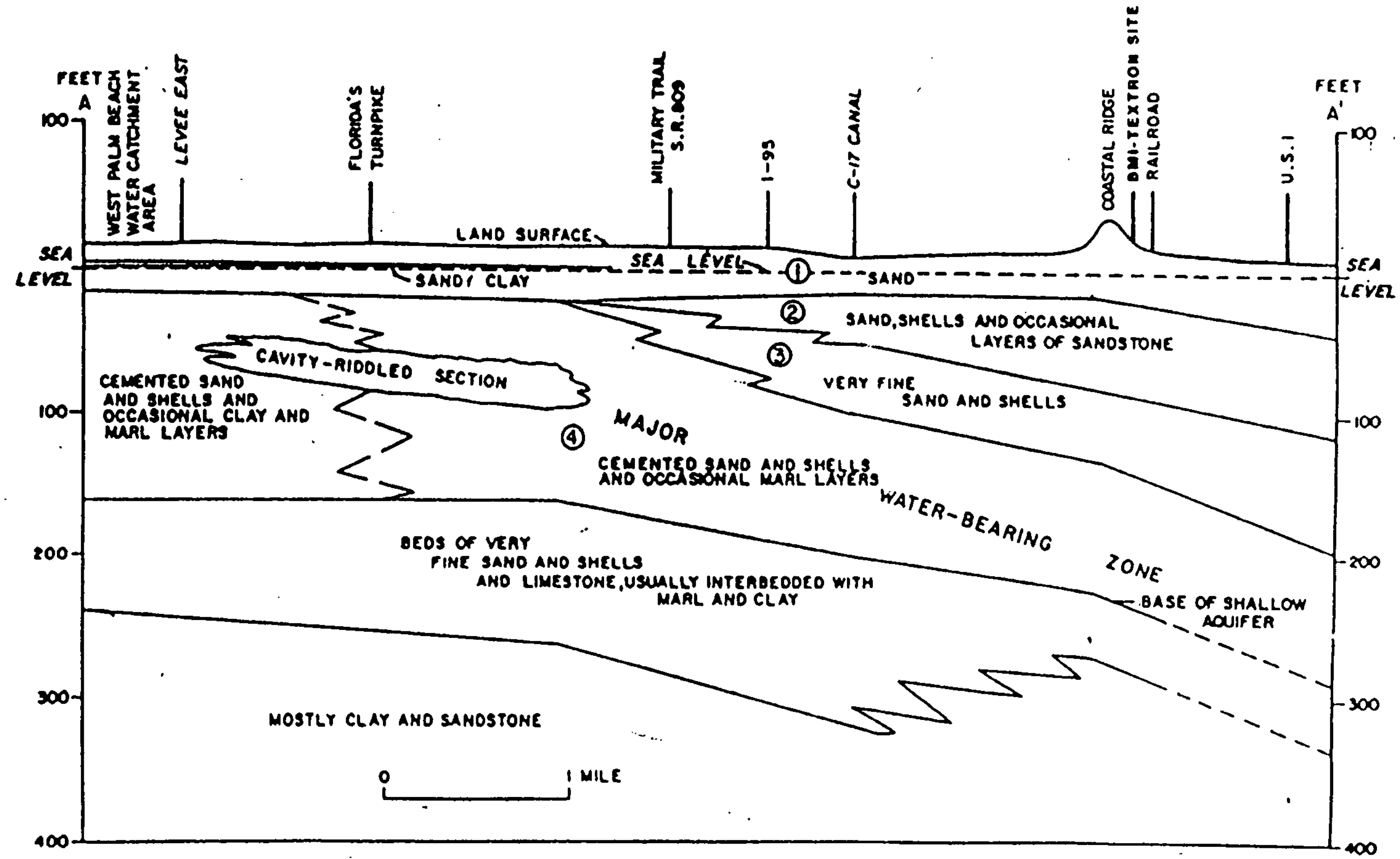



SOURCE: FDER RIVIERA BEACH WELLFIELD CONTAMINATION REPORT (WATTS & BROWN 1985).

GERAGHTY & MILLER, INC.
*Environmental Services*

GEOLOGIC CROSS SECTION OF THE SANDY RIDGE AQUIFER

FORMER BMI-TEXTRON SITE
LAKE PARK, FLORIDA

FIGURE 3

This forms the main confining unit that separates the Sandy Ridge Aquifer from the underlying Floridan Aquifer. The top of the Floridan Aquifer is approximately 1,000 feet below land surface. In the area of the BMI-Textron Site, the Floridan Aquifer is not an important water supply because the water is brackish (i.e., 1,000 milligrams per liter [mg/L] to 4,000 mg/L of chlorides).

## 5.2 Site-Soils and Hydrogeology

The BMI-Textron Site is situated on the Coastal Ridge physiographic province on soils of the Paola series. The Paola soil consists of nearly-level, excessively drained, deep sandy soils.

The Site is underlain predominantly by unconsolidated, fine-to medium-grained sand to a depth of 210 feet below land surface (bls). The top 20 to 40 ft of subsurface material consists of sand with occasional layers of sandstone and limestone.

The hydraulic conductivity in the uppermost portion of this aquifer ranges from 30 to 50 feet per day (ft/day). Values of transmissivity (35,000 gallons/day-foot) and storage coefficient (0.2) were obtained for the deeper sections of the aquifer at this Site from the performance of short-term (two day) pumping test performed at a near-by facility which FDEP has investigated. In April 1987 a recovery well screened between 100 and 125 bls was pumped continuously at a rate of about 45 gallons per minute (gpm). The calculated values are consistent with range of transmissivity and storage coefficients presented in the Riviera Beach Well Field Contamination Report prepared by the FDEP in September 1985.

Based on the three rounds of (February 19, April 5 and July 15, 1993) water-level data, collected during the RI, the dominant flow direction in both the upper and lower zones of the surficial aquifer, is to the north/northeast; the depth to ground water ranged between the 15 and 20 feet bls; little or no variation in the water-level elevations between the upper and lower surficial aquifer zones, indicating a lack of a downward ground water flow component. The data also indicated a flatter hydraulic gradient and slower ground water movement than indicated in previous Site investigations; and average hydraulic gradient at this Site of about 0.0004 ft/ft was calculated from this information; the ground water velocities at this Site averaged about 0.05 feet/day or 19.5 feet/year.

## 5.3 Summary of Remedial Investigation Results

Sampling conducted during the RI at the Site indicates the primary contaminated media is ground water which contains cyanide, fluoride, arsenic, and sodium.

The absence of surface water bodies in the immediate vicinity of the Site eliminated the need for surface water and sediment sampling. The lack of exposed surface soils preclude the generation of dust containing the inorganic constituents disposed of at the Site.

5.3.1 Soils

Soil samples were conducted during the months of February and March 1993, sampling event. Twelve soil borings were installed, and 14 soil samples were collected from those borings. The borings were placed at, or as close as possible to, the suspected source areas including the three percolation ponds, reverse Osmosis (R.O.) Drainfield, two septic tanks and six domestic waste drainfields. Soil samples also were collected from two soil borings in areas hydraulically upgradient of the Site to develop background soil quality conditions. Sample location are shown in figure 4.

The results of the analyses of the soil samples from the source areas were compared to twice the average concentration of the constituents detected in the background soils. For metals, the results also were compared to the concentration of the constituent that is common to the South Florida area. If a constituent was detected in some but not all of the background soils, then the average was calculated using the detected results and one-half the detection limit concentration for those background samples that were free from the constituent. If a constituent was not detected in any background sample, the results of the analysis of the soil samples from the source areas were compared against the average detection limit of the background samples.

Organics Constituents

As shown in Table 1, out of the list of TCL constituents analyzed only acetone and fluoranthene were present above detection limits. Acetone was reported above twice the average background concentration in the soil samples collected from Soil Borings 93-2 and 93-3 (81 µg/kg and 170 µg/kg, respectively). Fluoranthene was reported to be present in the soil sample from only one Soil Boring, 93-3. The concentration reported was 7 µg/kg. The low detection frequency of organic constituents (3 detections) and the low concentrations reported do not appear to indicate that, at the locations sampled, the waste disposal areas investigated are a consequential source of organic constituents.

TABLE 1 Results of the Analysis of Subsurface Soil Samples for the Former BMI-Textron Site, Lake Park, Florida



| PARAMETER 1/ | TEST METHOD | UNITS | DATE / G&M ID / SAVANNAH ID | 2/25/93<br>93/1-14-16<br>57708 | 2/24/93<br>Dup (93-1-14/16)<br>99R-2<br>57709 | 2/24/93<br>93/2-13-15<br>57707 | 2/24/93<br>93/3-10-12<br>57704 | 2/24/93<br>93/4-13-15<br>57705 | 2/24/93<br>93/5-13-15<br>57706 | 2/23/93<br>93/6-9-12<br>55105 | 2/23/93<br>93/7-10-12<br>55104 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | CLP (GC/MS) | | | | | | | | | | |
| Acetone | | ug/Kg | | - 2/ | - | 81 | 170 | - | - | 12 | - |
| **Base Neutral and Acid Extractable Organic Compounds** | CLP (GC/MS) | | | | | | | | | | |
| Diethylphthalate | | ug/Kg | | - | - | - | - | - | - | - | - |
| Phenanthrene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Anthracene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Carbazole | | ug/Kg | | - | - | - | - | - | - | - | - |
| Di-n-butylphthalate | | ug/Kg | | [15] U | [18] U | [11] U | [18] UJ | - | [18] U | [16] U | [14] U |
| Fluoranthene | | ug/Kg | | - | - | - | [7] J | - | - | - | - |
| Pyrene | | ug/Kg | | - | - | - | [9] UJ | - | - | - | - |
| Butylbenzylphthalate | | ug/Kg | | - | - | - | [13] UJ | - | - | - | - |
| Benzo(a)anthracene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Chrysene | | ug/Kg | | - | - | - | - | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | | ug/Kg | | - | - | - | [7] UJ | - | - | - | [12] U |
| Di-n-octylphthalate | | ug/Kg | | - | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Benzo(k)fluoranthene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Benzo(a)pyrene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Dibenz(a,h)anthracene | | ug/Kg | | - | - | - | - | - | - | - | - |
| Benzo(g,h,i)perylene | | ug/Kg | | - | - | - | - | - | - | - | - |
| **Inorganic Constituents** | CLP | | | | | | | | | | |
| Aluminum | (ICP) | mg/Kg | | 1730 | 1560 | 547 | 750 | 1320 | 964 | 1410 | 1090 |
| Arsenic | (GFAA) | mg/Kg | | 2.2 J | [1.2] J | - | [1.2] J | [1.1] J | [0.89] J | - UJ | - |
| Barium | (ICP) | mg/Kg | | [7] | [7.2] | [15.5] | [1] U | [1.4] U | [1] U | [1.8] U | [1.9] U |
| Cadmium | (ICP) | mg/Kg | | - | - | - | [0.39] | - | - | - | - |
| Calcium | (ICP) | mg/Kg | | 948 | [796] U | [138] U | [429] U | [78.4] U | [68.8] U | [39.6] U | 3140 |
| Chromium | (ICP) | mg/Kg | | 7.1 | 6.9 U | 17.8 U | 6.1 U | 8.7 U | 8.7 U | 13.5 | [5.6] |
| Copper | (ICP) | mg/Kg | | - | - | [2.4] | - | - | - | - | - |
| Iron | (ICP) | mg/Kg | | 1870 | 1790 | 648 | 606 | 1230 | 851 | 1290 | 821 |
| Lead | (GFAA) | mg/Kg | | 1.9 | 1.9 | 0.96 | 0.71 | 1.3 | 0.9 | 1.2 | 1 |
| Magnesium | (ICP) | mg/Kg | | [63.6] | [57.9] U | [40.2] U | [32.3] U | [35.5] U | [41.8] U | [30.6] U | [64.9] U |
| Manganese | (ICP) | mg/Kg | | 11 J | 10.4 | [1.1] UJ | 3.5 UJ | [1.4] U | 2.9 U | 4.7 | 5 |
| Mercury | (CV) | mg/Kg | | - | - | - | - | - | - | - | 0.11 |
| Nickel | (ICP) | mg/Kg | | [1.3] | - | [1.1] U | [1.4] U | [1.2] U | [1.4] U | [3] | [1.4] |
| Sodium | (ICP) | mg/Kg | | [8.9] U | [16.8] U | [42.2] U | [14.7] U | [25.9] U | [13.5] U | [16] U | [26.8] U |
| Vanadium | (ICP) | mg/Kg | | [3.2] | [2.9] | [1.4] | [1.2] | [1.7] | [1.5] | [1.7] | [1.4] |
| Zinc | (ICP) | mg/Kg | | [3.1] U | 9.8 U | [3.2] U | [1.8] U | [2.4] U | [3] U | [3.4] U | [3.3] U |
| Cyanide | CLP | mg/Kg | | - | - | 2.2 | - | - | - | - | - |

FOOTNOTES:

1/ Constituents not detected in any sample are not shown.

2/ "-" indicates the constituent was not detected.

UJ Analyte was not detected or has been qualified as undetected, with further classification as qualitative.

J Value has been classified as qualitative.

U Analyte was not detected or has been classified as undetected.

TABLE 1 Results of the Analysis of Subsurface Soil Samples for the Former BMI-Textron Site, Lake Park, Florida



| PARAMETER 1/ | TEST METHOD | UNITS | DATE<br>G&M ID<br>SAVANNAH ID | 2/24/93<br>93/8-11-13<br>57701 | 2/24/93<br>93/9-9-11<br>57703 | 2/24/93<br>93/10-8-10<br>57702 | 2/22/93<br>93-11-0/2<br>55106 | 2/22/93<br>93/11-10-12<br>55107 | 2/22/93<br>93/12-0-2<br>55101 | 2/22/93<br>Dup (93/12-0-2)<br>90R-1<br>55103 | 2/22/93<br>93/12-10-12<br>55102 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds** | CLP (GC/MS) | | | | | | | | | | |
| Acetone | | ug/Kg | | - | - | - | - | 28 | - | - | - |
| **Base Neutral and Acid Extractable Organic Compounds** | CLP (GC/MS) | | | | | | | | | | |
| Diethylphthalate | | ug/Kg | | - | - | - | [5] J | - | - | - | - |
| Phenanthrene | | ug/Kg | | - | - | - | [50] J | - | - | - | - |
| Anthracene | | ug/Kg | | - | - | - | [5] J | - | - | - | - |
| Carbazole | | ug/Kg | | - | - | - | [9] J | - | - | - | - |
| Di-n-butylphthalate | | ug/Kg | | [12] U | [11] U | [13] U | [19] UJ | [23] UJ | - | [19] UJ | [14] UJ |
| Fluoranthene | | ug/Kg | | - | - | - | [150] J | - | - | [5] | - |
| Pyrene | | ug/Kg | | - | - | - | [120] J | - | - | [7] UJ | [5] |
| Butylbenzylphthalate | | ug/Kg | | - | - | - | [7] UJ | - | - | [6] UJ | - |
| Benzo(a)anthracene | | ug/Kg | | - | - | - | [54] J | - | - | - | - |
| Chrysene | | ug/Kg | | - | - | - | [85] J | - | - | - | - |
| bis(2-Ethylhexyl)phthalate | | ug/Kg | | - | - | - | [14] U | - | - | [6] UJ | [80] UJ |
| Di-n-octylphthalate | | ug/Kg | | - | - | - | - | - | - | - | - |
| Benzo(b)fluoranthene | | ug/Kg | | - | - | - | [71] J | - | - | - | - |
| Benzo(k)fluoranthene | | ug/Kg | | - | - | - | [71] J | - | - | - | - |
| Benzo(a)pyrene | | ug/Kg | | - | - | - | [64] J | - | - | - | - |
| Indeno(1,2,3-cd)pyrene | | ug/Kg | | - | - | - | [46] J | - | - | - | - |
| Dibenz(a,h)anthracene | | ug/Kg | | - | - | - | [17] J | - | - | - | - |
| Benzo(g,h,i)perylene | | ug/Kg | | - | - | - | [50] J | - | - | - | - |
| **Inorganic Constituents** | CLP | | | | | | | | | | |
| Aluminum | (ICP) | mg/Kg | | 1010 | 1060 | 900 | 47.5 U | 962 | 67.1 U | 93.8 | 702 |
| Arsenic | (GFAA) | mg/Kg | | - | - | - | - | - | - | - | - |
| Barium | (ICP) | mg/Kg | | [1.2] U | [2.1] | [1.2] U | [0.46] U | [2.9] | [.74] U | [.92] U | [2] U |
| Cadmium | (ICP) | mg/Kg | | - | - | - | - | - | - | - | - |
| Calcium | (ICP) | mg/Kg | | [28.9] U | [34.9] U | [22.1] U | [177] U | [76.5] U | 1650 | 4870 | [215] U |
| Chromium | (ICP) | mg/Kg | | 5.9 U | 6 U | 4 U | [0.63] U | [4.8] U | [.55] U | - | 5.4 |
| Copper | (ICP) | mg/Kg | | - | - | | [0.56] | - | - | - | - |
| Iron | (ICP) | mg/Kg | | 683 | 822 | 907 | 76.3 U | 724 | 126 | 138 | 676 |
| Lead | (GFAA) | mg/Kg | | 0.88 | 1.3 | 1.5 | 4 | - UJ | 1.2 | 1.2 | 1.3 |
| Magnesium | (ICP) | mg/Kg | | [41.4] U | [45.9] U | [41.3] U | - | [47.8] U | [7.8] U | [11.6] U | [35.6] U |
| Manganese | (ICP) | mg/Kg | | [0.97] U | [1.7] U | [2.4] UJ | [1.8] J | [1.1] UJ | 4.2 J | 3.4 | 3.9 J |
| Mercury | (CV) | mg/Kg | | - | - | - | - | - | - | - | - |
| Nickel | (ICP) | mg/Kg | | [1.5] U | [1.1] U | [1.8] U | 2 | [1.2] | - | - | - |
| Sodium | (ICP) | mg/Kg | | [12.2] U | - | [10] U | [4.9] U | [8.9] U | [12.3] U | [44] U | [8.1] U |
| Vanadium | (ICP) | mg/Kg | | [1.5] | [1.6] | [1.5] | - | [1.3] | - | - | 1.1 |
| Zinc | (ICP) | mg/Kg | | 5.1 U | [1.9] U | [4] U | 30 U | 4.9 U | [2.5] U | [3.3] U | [3.3] U |
| Cyanide | CLP | mg/Kg | | - | - | - | - | - | - | - | - |

FOOTNOTES:

1/ Constituents not detected in any sample are not shown.

2/ "-" indicates the constituent was not detected.

UJ Analyte was not detected or has been qualified as undetected, with further classification as qualitative.

J Value has been classified as qualitative.

U Analyte was not detected or has been classified as undetected.

Although di-n-butylphthalate was detected in several samples at concentrations up to 18 µg/kg, this compound was also detected in the equipment/field and laboratory blanks. Therefore, the reported concentrations for this constituent have been classified as undetected. Likewise, the concentrations of pyrene (9 µg/kg), butylbenzylphthalate (13 µg/kg) and bis(2-ethylhexyl)phthalate (7 µg/kg) reported in the soil sample collected from SB-93-3 have also been classified as undetected, due to the presence of these compounds in the associated blank analyses.

Inorganic Constituents

As shown in Table 1, the concentrations of inorganic constituents present in the subsurface soil samples were relatively low. Of the constituents measured, aluminum, arsenic, barium, calcium, iron, lead, magnesium, manganese, and vanadium were detected at concentrations slightly above twice the average background concentration in soil sample 93/ 1-14-16. This sample was collected from soil boring SB-93-2. The depth interval sample is below the fill material used to fill the excavation associated with the removal action conducted a PP-2 in 1990.

Traces of one to three metals were detected at concentrations above twice the background concentration in soil samples collected from five of the remaining eight borings. The soil borings and the associated concentrations are presented below:

| | |
|---|---|
| SB-93-3 | arsenic (1.2 mg/kg), and cadmium (0.39 mg/kg) |
| SB-93-3 | arsenic (1.1 mg/kg) |
| SB-93-3 | arsenic (0.89 mg/kg) |
| SB-93-3 | chromium (13.5 mg/kg),manganese (4.7 mg/kg), and nickel (3 mg/kg) |
| SB-93-3 | calcium (3,140 mg/kg), manganese (5.0 mg/kg), and mercury (0.11 mg/kg) |

Samples collected from the three soil borings SB-93-8, SB-93-9 and SB-93-10 did not contain concentrations of metals or cyanide above twice the background levels.

As discussed above, cyanide, which is not normally found in soils, was also detected in the soil sample collected from Soil Boring SB-93-2 (2.2 mg/kg). This low concentration of cyanide in the soils at PP-2 as well as the lack of cyanide in the sample collected from SB-93-1, associated with PP-1, is consistent with the levels of cyanide detected during confirmation sampling conducted after the removal actions associated with the two sources.

Several metals were reported to be present in samples as well as in the associated equipment/field or laboratory blanks. This led to classification of several metals results as undetected. The metals affected and the maximum concentration of each metal that was qualified are barium (1.9 mg/kg), calcium (796 mg/kg), chromium (17.8 mg/kg), magnesium (64.9 mg/kg), manganese (3.5 mg/kg), nickel (1.8mg/kg), sodium (42.2 mg/kg), and zinc (9.8 mg/kg). Because concentrations reported in the samples that were qualified were at trace levels, the qualification of the data does not compromise the evaluation of the nature and extent of impacted soil nor is qualification of the data expected to impact the confidence level of the conclusion developed from the risk assessment.

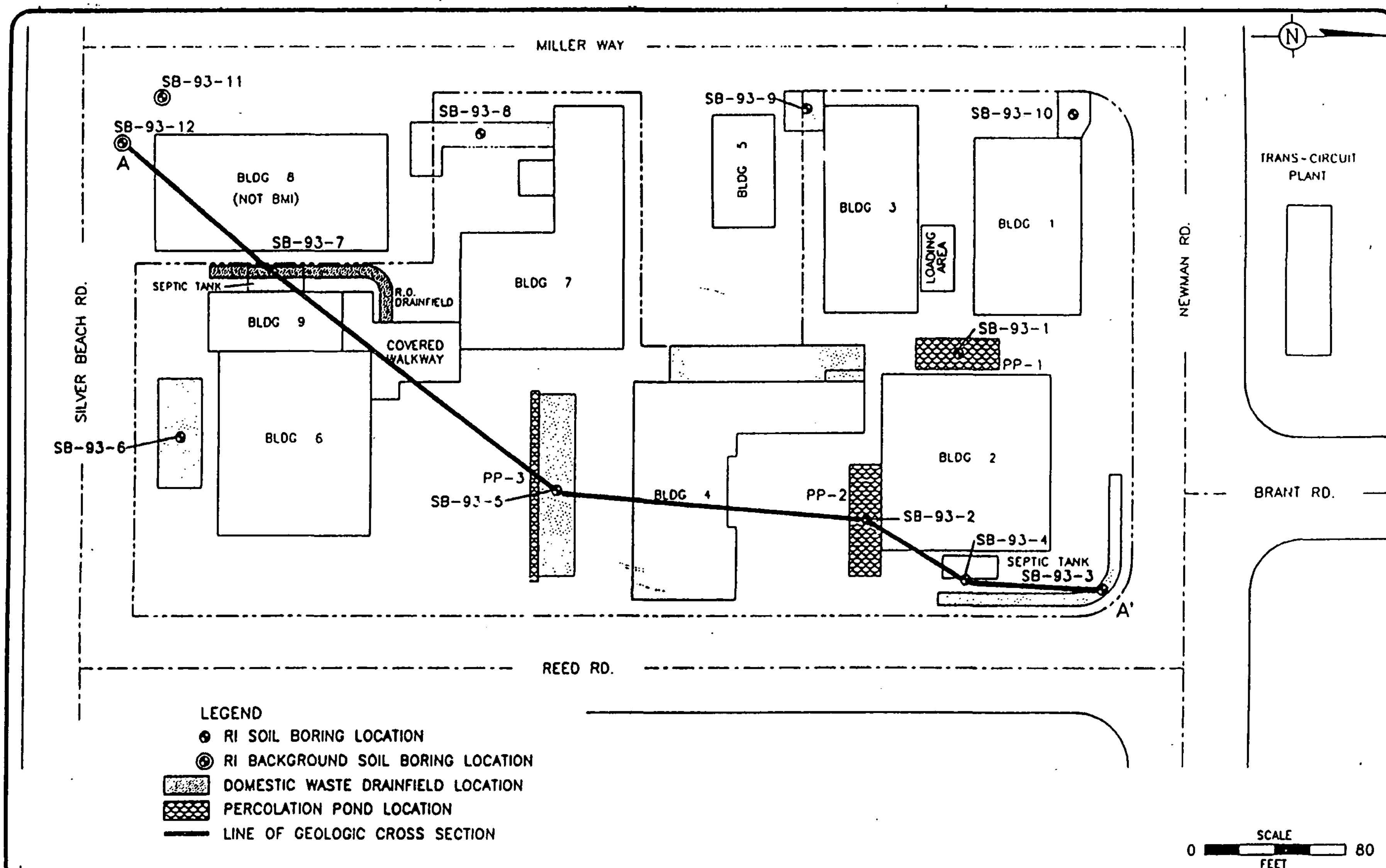
The analysis revealed: 1) low concentrations, <200 micrograms per kilogram (µg/Kg), of a very limited number of organic constituents in only a few soil samples; 2) several inorganic constituents (primarily metals) in concentration slightly above twice the average background level; and 3) cyanide and fluoride above background levels. The data collected during the RI indicates that previous soil removal efforts done by Textron Inc., has significantly reduced any risk due to soil contamination.

### 5.3.2 Ground Water

Ground water sampling was conducted in two events. Nineteen existing monitor wells and two new monitor wells were sampled in the first event in March 1993. The second event was conducted in June 1993 and consisted of installing and sampling four new monitoring. Thus making the total number of samples consist of five off-Site monitoring wells and 23 monitoring wells (including monitor wells previously sampled). Monitor Wells locations are shown in figure 5.

There were no organics found at concentrations greater than Federal or State standards. Concentrations of several inorganics were detected in the monitoring well samples, however, only two metals, arsenic and sodium, and two inorganics, cyanide and fluoride, were detected in concentrations that exceeded twice the average background concentration and/or the State of Florida primary drinking water Maximum Contaminate Level (MCL).

Sodium was found to exceed the State primary drinking water MCL of 160,00 micrograms per liter (µg/L) in only one monitor well MW-35. The concentration of sodium detected in that sample was 298,000 µg/L. Arsenic was found to exceed the primary drinking water MCLs of 50 µg/L in only monitor well, MW-38, during the March 1993 sampling event. Arsenic was detected in samples from only three monitor wells (MW-36A, MW-36B, and MW-35) during the June 1993 sampling event which utilized the modified ground water sampling procedure discussed in the Final RI Report. Arsenic was not detected in monitor well MW-38 during the June 1993 sampling event. this procedure reduced the turbidity of samples and minimized the influence of sediments in the sample.

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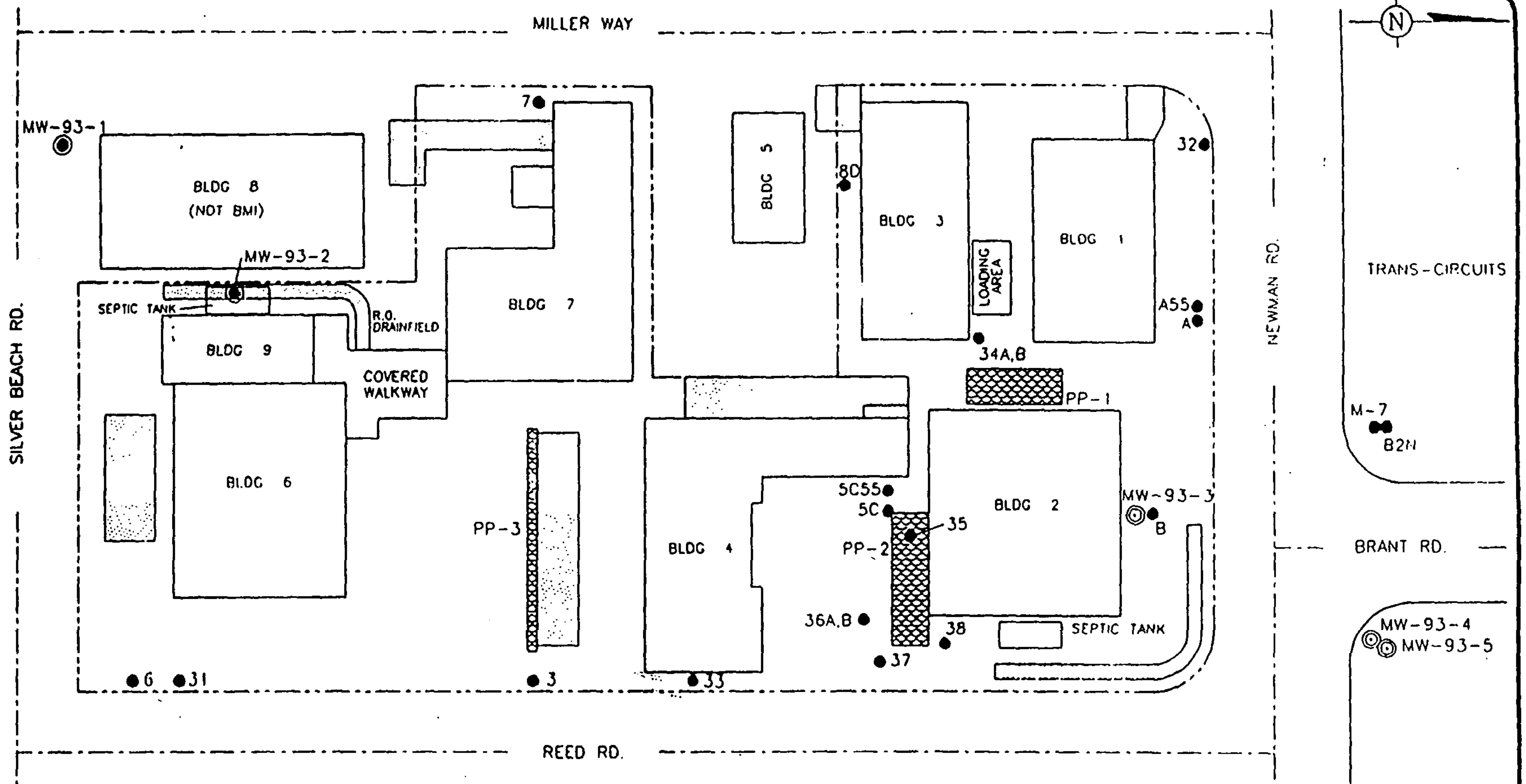
LOCATION OF SOIL BORINGS INSTALLED DURING THE RI

FORMER BMI-TEXTRON SITE

FIGURE 4




LEGEND

- EXISTING MONITOR WELL LOCATION
- MONITOR WELL LOCATION INSTALLED DURING THE RI (FEBRUARY 1993)
- MONITOR WELL LOCATION INSTALLED DURING THE RI (JUNE 1993)
- DOMESTIC WASTE DRAINFIELD LOCATION
- PERCOLATION POND LOCATION

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LOCATION OF MONITOR WELLS/OFFSITE MONITOR WELLS

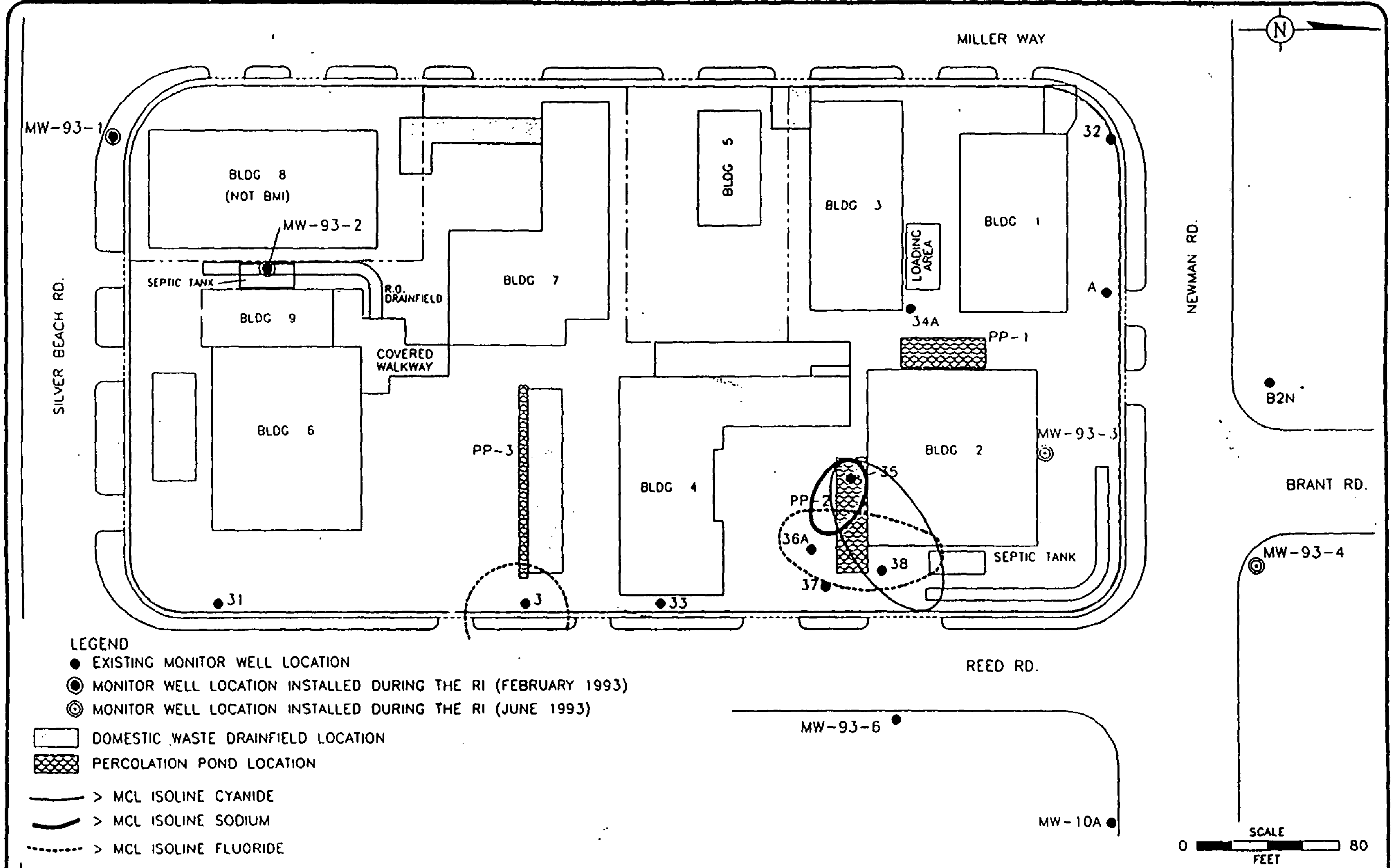
FORMER BMI-TEXTRON SITE
LAKE PARK, FLORIDA

FIGURE
**5**

The arsenic concentrations detected in the three monitor wells in June 1993 were below the primary drinking water MCL 50 µg/L.Arsenic was detected at a maximum concentration of 18.1 µg/L, which is below the State and Federal standards. Cyanide was found to exceed the primary drinking water MCL of 200 µg/L at two monitor well locations, MW-35 and MW-38, during the March and June 1993 sampling events. Both monitor well locations are in the vicinity of Percolation Pond PP-2. The data indicate the extent of ground water impacted with cyanide above the MCL is limited to the upper zone (upper 20 feet ) of the surficial aquifer in the immediate vicinity of Percolation Pond PP-2. Cyanide was detected at levels as high as 2170 to 3190. Fluoride was found to be slightly above the primary drinking water MCL of 4000 µg/L in samples from four monitor wells during both sampling events. Three of these monitor wells (MW-35, MW-36A, and MW-38) are located in the vicinity of Percolation Pond PP-2. The fourth monitor well (MW-3) is located immediately east of PP-3. The data indicate ground water impacted with fluoride above the MCL is localized in the upper zone of surficial aquifer in the immediate vicinity of PP-2 and PP-3. Area of contamination is shown is figure 6.

Manganese concentrations also exceeded twice the average background concentration at\on monitor well, MW-32; there is no primary drinking water MCL for manganese (the secondary MCL for manganese is 50 µg/L). Because the location of MW-32 is cross gradient to the identified locations of waste disposal, and other constituents such as cyanide known to be associated with the disposed waste were not detected, it appears that the elevated manganese concentration reported is an isolated occurrence and not attributable to previous waste management practices.

DWG DATE: 3/10/94 | PRJCT NO.: PF0451.03G | FILE NO.: BMI | DRAWING: ACYU0793.DGE | CHECKED: W.VOGELSONG | APPROVED: W.VOGELSONG | DRAFTER: BJH

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**ISOLINES FOR COPC's DETECTED IN GROUNDWATER SAMPLES ABOVE MCLs**
**UPPER ZONE OF THE SURFICIAL AQUIFER**

FORMER BMI-TEXTRON SITE
LAKE PARK, FLORIDA

FIGURE
6

The table below is a summary of the COPCs found at during the ground water investigation portion of the RI event.

| BMI TEXTRON Site GROUND WATER SUMMARY | | | |
|---|---|---|---|
| GROUND WATER | Phase I MCD (µg/L) | Phase II MCD (µg/L) | Federal/State MCL (µg/L) |
| Arsenic | 64.4 | 18 | 50 / 50 |
| Sodium | 298,000 | NA | -- / 160,000 |
| Cyanide | 2170 | 3,190 | 200 / 200 |
| Fluoride | 6200 | 4800 | 4000 / 4000 |

Note: MCD - Maximum Concentration Detected in Site Groundwater
MCL - Maximum Contaminant Level
NA - Not Analyzed

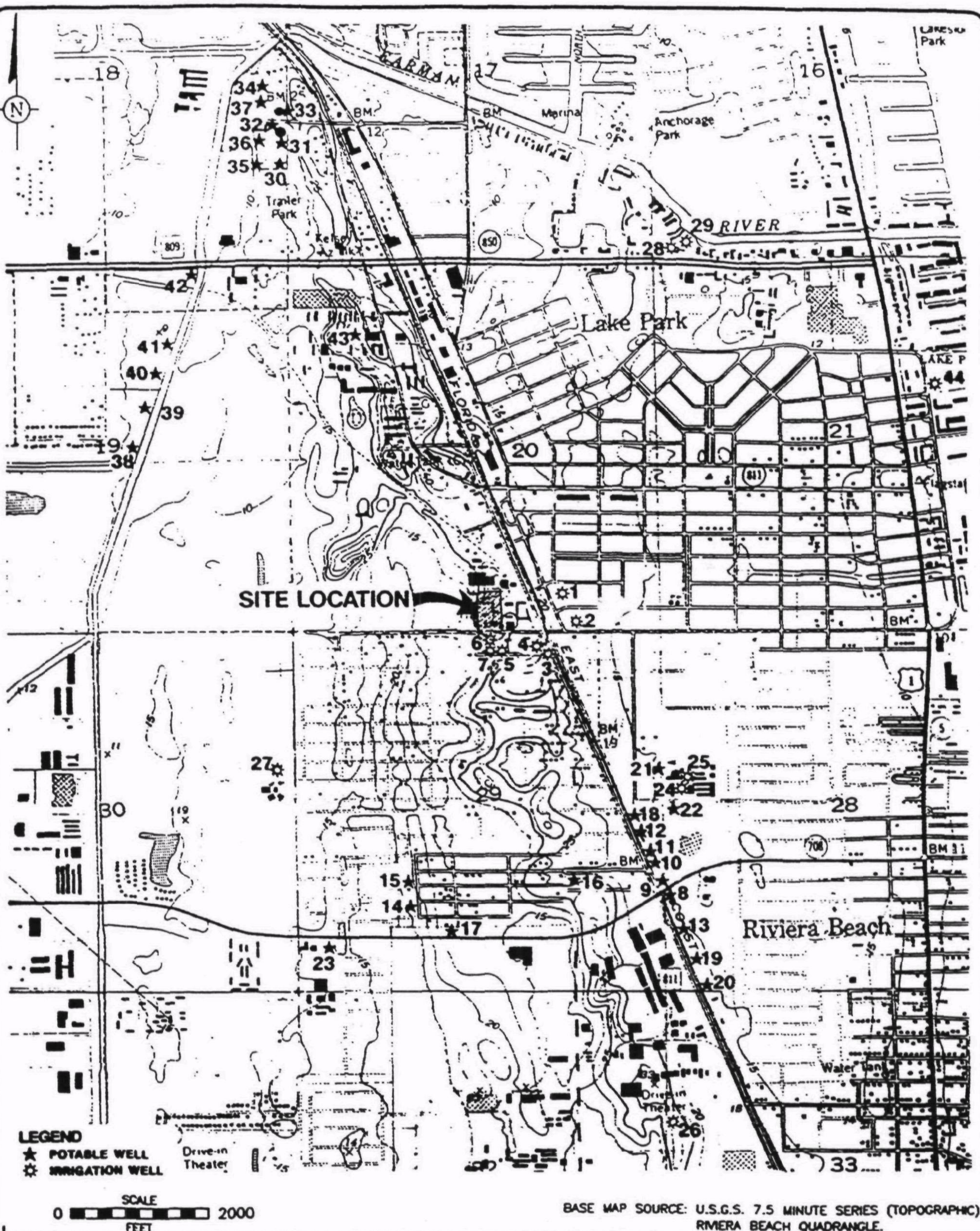
5.3.3 Well Inventory

BMI-Textron conducted a well inventory within a two mile radius of the Site. A review of South Florida Water Management District files and a door-to-door survey in areas lying within 1000 feet of the Site were performed. All permitted potable wells (a total of 30) within this area were identified and plotted on Figure 7.

No unpermitted or exempt potable wells were found to exist in the area surveyed. The nearest permitted potable well found in this survey is Public Supply Well #16 for the City of Riviera Beach (Well #21 on Figure 7). A total of 14 irrigation wells identified in the survey area are shown on Figure 7. Seven of the irrigation wells were found to exist in the residential neighborhoods south, southeast and east of the Site. Well construction information was not available for the other 5 wells in the vicinity of the former BMI-Textron Site. The closest irrigation well (Well #7) is approximately 100 feet south of the southern property boundary. The RI has revealed no Site related well contamination within the two mile survey.

5.4 Human Population Survey

A survey of specific demographic data within a two-mile radius of the BMI-Textron Site was performed. The nearest residential community lies south of Silver Beach Road as shown on Figure 8. The Site is surrounded by a locked, chain-link fence which inhibits access by the community.




**WELL INVENTORY MAP**

FORMER BMI-TEXTRON SITE
LAKE PARK, FLORIDA

FIGURE 7

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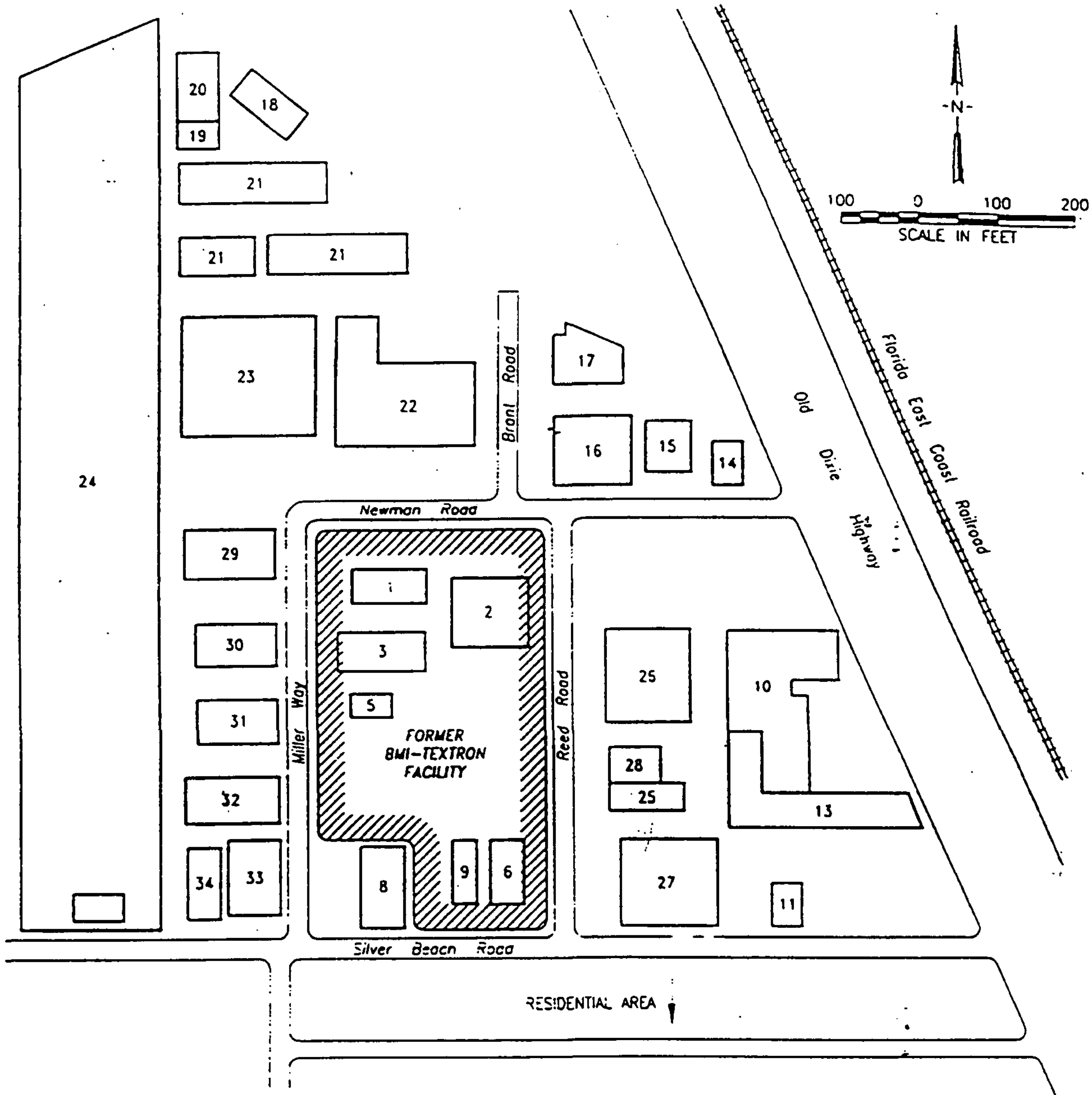


BUILDING INVENTORY

1. DR. JOHN'S AUTO CLINIC
2. FL. AERO PRECISION (FAA REPAIR STATION)
3. HOUSE OF CUSTOM CUSHIONS
4. VACANT BUILDING
5. HARDRIVES (PAVING COMPANY)
6. FIRESIDE DISTRIBUTORS
7. BEACH MIRROR & GLASS/ANDERSON MASONRY
8. SIGNING AMERICA CORP.
9. GLOBAL ELECTRIC
10. TRI-CITY LUMBER
11. A&H AUTO. INC.
13. DAIRS AUTOMOTIVE
14. PARK CARPET
15. PARK GLASS
16. BARON SIGN CO.
17. BEACH A/C
18. LAKE & BAY BOATS
19. DUN RIGHT MFG.
20. DETAILING & WINDOW T
21. MISC. REPAIR SHOPS (AUTO, ETC.)
22. VACANT BUILDING (FORMERLY TRANS CIRCUITS, INC.)
23. ACTION BOLT & TOOL
24. THOUSANDS OF PARTS AUTO JUNKYARD
25. PALM BEACH X-RAY
26. SPECIALTY WOODWORKS (KIT. CABINETS)
27. CARRIER A/C
28. J&R WELDING
29. NEVER WEAR ASPHALT SEALER
30. MILES OF SOUND (CAR STEREOS)
31. WELDING BY DAN
32. NEW IMAGE AUTO BODY
33. LUCIDO BROTHERS (CABINETS)

| AREA VICINITY MAP | FIGURE NO. 8 |
|---|---|
| BMI-TEXTRON SITE<br>LAKE PARK, FLORIDA | |

## 5.5 Ecological Assessment

The BMI-Textron Site is in an industrial park, with the area surrounding the Site consisting of a locked, chain-link fence. A grass-covered drainage swale, approximately 5 to 10 feet wide, located on the perimeter of the property. The majority of the Site is covered by building, asphalt pavement, and concrete which reduces exposure pathways (see Figure 2). Although the area is paved or covered with a building, the ecological assessment concluded that no visual evidence exists that indicate biota at the Site and surrounding areas have been adversely impacted by operations at this Site.

## 6.0 Summary of Site Risks

CERCLA directs EPA to conduct a Baseline Risk Assessment (BRA) to determine whether a Superfund Site poses a current or potential threat to human health and the environment in the absence of any remedial action. The BRA provides the basis for taking action and indicates contaminants and the exposure pathways that need to be addressed by the remedial action. This section of the ROD contains a summary of the results of the BRA conducted for this Site. The completed BRA is located in the BMI-Textron repository, located in the Palm Beach County Library.

## 6.1 Contaminants of Potential Concern

The objective of contaminant identification is to screen the information that is available on hazardous substances present at the Site and to identify COPC in order to focus subsequent efforts in the risk assessment process. COPC are selected based upon their toxicological properties, concentrations and frequency of occurrence at the Site. During the Risk Assessment for the BMI-Textron Site, the following chemicals were identified as contaminants of potential concern in the ground water: arsenic, sodium, cyanide and fluoride. Arsenic was listed as a COPC during the first round of sampling done in February and March 1993, however, in a second round of sampling the arsenic concentration level was below federal and state MCLs.

## 6.2 Exposure Assessment

Exposure assessment is conducted to identify pathways whereby human receptors may be exposed to Site contaminants and to estimate the frequency, duration and magnitude of such exposures. Exposure assessment is a multiphase process that involves (1) characterization of the exposure setting; (2) identification of exposure pathways; and (3) quantification of exposure.

### 6.2.1 Conceptual Site Model

The primary source of contamination at the BMI-Textron Site was wastewater/sludge in Percolation Ponds (PP-1, PP-2 and PP-3). These contaminant sources were removed through previous soil removals during Percolation Pond Closures, in December 1984 and April 1990. The primary release mechanism for previously existing contamination is to ground water. The medium available for human contact is ground water.

Ground water and subsurface soils beneath the BMI-Textron Site became contaminated through the disposal of the sludge/wastewater in the Percolation Ponds infiltration of rainwater also caused ground water contamination through the leaching of contaminants from subsurface soil to ground water. Analytical results collected during the RI from both on and off-Site monitoring wells confirm the presence of contamination in ground water both beneath the Site and downgradient (G&M, 1993). The potential exposure pathways are diagrammed in the conceptual Site model, Figure 9.

### 6.2.2 Exposure Point Concentrations

Reasonable maximum exposure (RME) point concentrations for ground water were calculated using the lesser of the 95 percent upper confidence limit (UCL) on the arithmetic average for a lognormal distribution or the maximum detected value. Where a COPC was not detected, one-half the quantitation limit was used as a concentration. RME concentrations for the surficial aquifer reveal that exposure point concentrations for future use at the Site are oral exposure to contaminants. Concentrations of exposure route are presented in Table 2.

### 6.2.3 Human Intakes

Currently, no drinking water wells are known to be contaminated. Additionally, surface soil contamination that did exist has been removed. Since there are no current complete exposure pathways, there is no risk to human health based on current use of the Site.

In the future use scenario, new wells might be installed within the contaminant plume and utilized by workers or by potential residents. The variables used in calculating oral intakes are presented below:

1. Residents

    - Ingestion rate 1 L/day-child (conservative estimate); 2 L/day-adult
    - Exposure frequency 350 days/year

# CONCEPTUAL SITE MODEL

## BMI-TEXTRON SITE

LAKE PARK, FLORIDA

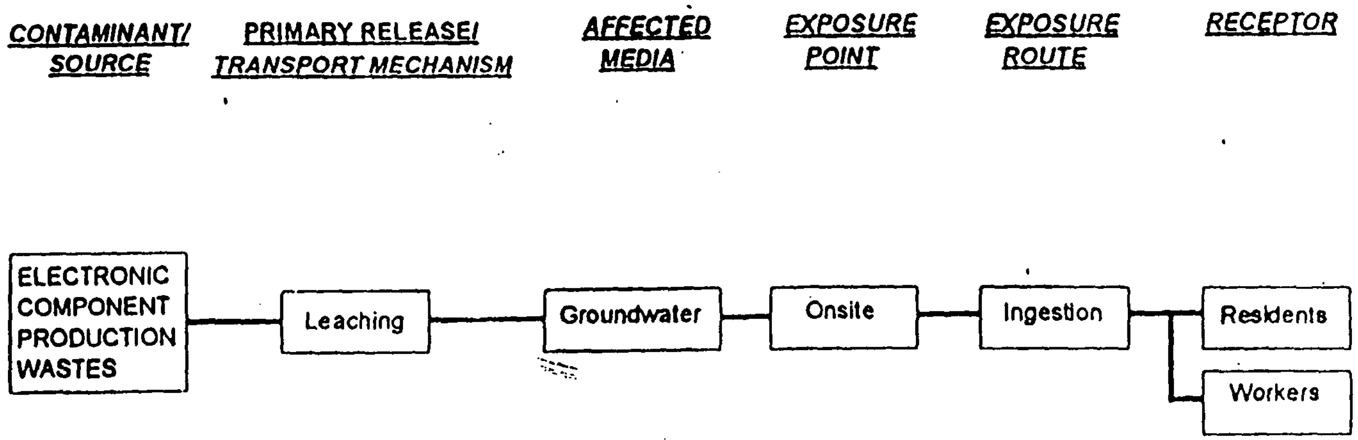


FIGURE NO. 9

- Exposure duration 6 years-child, 30 years-adult
- Body weight 15kg-child, 70 kg-adult
- Averaging time 70 years for cancer effects, 6 years-child and 30 years-adult non-cancer effects

2. Workers

- Ingestion rate 1 L/day
- Exposure frequency 250 days/year
- Exposure duration 25 years
- Body weight 70 kg
- Averaging time 70 years for cancer effects, 25 years non-cancer effects

Calculated intakes of ground water from the surficial aquifer for a child resident, an adult resident and a worker are presented in Table 2.

Table 2
Summary of Reasonable Maximum Exposure Concentrations for a Future Hypothetical Receptor Exposed to Ground Water

BMI-Textron Site
Lake Park, Florida

| Contaminant of Potential Concern | Future Exposure to Ground Water RME (µg/L) | Future Oral Exposure To Ground Water For Child Residents | | Future Oral Exposure To Ground Water For Adult Residents | | Future Oral Exposure To Ground Water For Adult Worker | |
|---|---|---|---|---|---|---|---|
| | | ADD (mg/kg/day) | LADD (mg/kg/day) | ADD (mg/kg/day) | LADD (mg/kg/day) | ADD (mg/kg/day) | LADD (mg/kg/day) |
| Arsenic | 17.4 | 1.1E-03 | 9.5E-05 | 4.8E-04 | 2.0E-04 | 1.7E-04 | 6.1E-05 |
| Sodium | 298000 | 1.9E+01 | 1.6E+00 | 8.2E+00 | 3.5E+00 | 2.9E+00 | 1.0E+00 |
| Cyanide | 1933 | 1.2E-01 | 1.1E-02 | 5.3E-02 | 2.3E-02 | 1.9E-02 | 6.8E-03 |
| Fluoride | 6200 | 4.0E-1 | 3.4E-02 | 1.7E-01 | 7.3E-02 | 6.1E-02 | 2.2E-02 |

**Notes:**

**RME Reasonable Maximum Exposure**
**ADD Average Daily Dose**
**LADD Lifetime Average Daily Dose**

## 6.3 Toxicity Assessment

The purpose of a toxicity assessment is to weigh available evidence regarding the potential of the contaminants of concern to cause adverse effects in exposed individuals and to provide an estimate likelihood of adverse effects. The toxicity assessment is based on toxicity values which have been derived from quantitative dose-response information. Toxicity values for cancer are known as slope factors (SFs) and those determined for non-carcinogenic effects are referred to as reference doses (RfDs).

Slope factors (SFs), which are also known as 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. SFs, 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 calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. SFs 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. SFs for the contaminants of concern at BMI-Textron are listed in Table 3.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects for exposure to chemicals exhibiting non-carcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for human, 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 non-carcinogenic effects to occur. RfDs for the contaminants of concern at BMI-Textron Site are found in Table 3.

## 6.4 Risk Characterization

Human health risks are characterized for potential carcinogenic and non-carcinogenic effects by combining exposure and toxicity information. Excess lifetime cancer risks are determined by multiplying the estimated daily intake level with cancer risks with cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a reasonable maximum estimate, an individual

Table 3
Cancer Slope Factor and Reference Doses for Contaminants of Concern
BMI-Textron Site
Lake Park, Florida

| Contaminant of Concern | CSF (mg/kg/day)-1 | | Rfd (mg/kg/day) | |
|---|---|---|---|---|
| | Oral | Inhalation | Oral | Inhalation |
| Arsenic | 1.75E+00 | NA | 3E-04 (1) | NA |
| Sodium | NA | NA | 3.4E+01 (2) | NA |
| Cyanide (free) | NA | NA | 2E-02 (1) | NA |
| Fluoride (child) | NA | NA | 6E-02 (1) | NA |
| Fluoride (adult) | NA | NA | 1E-01 (1) | |

(1) IRIS, 1993
(2) ECAO, 1992

CSF - Cancer Slope Factor
RfD - Reference Dose
NA - Not Applicable

has a one in one million additional (above their normal risk) chance of developing cancer as a result of Site-related exposure to a carcinogen over a 70-year lifetime under the assumed specific exposure conditions at a Site. EPA considers individual excess cancer risks in the range of $1x10^{-4}$ to $1x10^{-6}$ as protective; however, the $1x10^{-6}$ risk level is generally used as the point of departure for setting cleanup levels at superfund Sites. A summary of cancer and non cancer Risks is listed in Table 4.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose derived for a similar exposure period. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ<1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g., liver) within a medium or across all media to which a given population may reasonably be exposed. An HI<1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely.

The HQ is calculated as follows:

Non-cancer HQ=CDI/RfD

where:

CDI=Chronic daily intake

RfD=reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

To characterize the overall potential for non-carcinogenic effects associated with exposure to multiple chemicals, EPA has developed a HI approach. This approach assumes that simultaneous subthreshold chronic exposures to multiple chemicals that effect the same target organ are additive and could result in an adverse health effect. The HI is calculated as follows:

Table 4
Summary of Cancer and Noncancer Risks
BMI-Textron Site
Lake Park, Florida

| Drinking Water Source | Child Resident | | Adult Resident | | Adult Worker | |
|---|---|---|---|---|---|---|
| | Cancer Risk | HI | Cancer Risk | HI | Cancer Risk | HI |
| Surficial Aquifer | 2E-04 | 13.8 | 4E-04 | 5.9 | 1E-04 | 2.1 |

HI Hazard Index (non-cancer risk)

$$Hazard\ Index = ADD_i/RfD_1 + ADD_2/RfD_2 + \ldots ADD_i/RfD_i$$

where: $ADD_i$ = Average Daily Dose (ADD) for the toxicant
$RfD_i$ = Reference Dose for the toxicant

The term $ADD_i/RfD_i$ is referred to as the Hazard Quotient (HQ). Calculation of a HI in excess of unity indicates the potential for adverse health effects. Indices greater than one will be generated anytime intake for any of the chemicals of concern exceeds its RfD. However, given a sufficient number of chemicals under consideration, it is also possible to generate a HI greater than one even if none of the individual chemical intakes exceeds it respective RfD.

6.5 <u>Current and Future Use Site Risk</u>

EPA has discovered no current complete exposure pathways. Thus, there is no risk to human health based on current use of the Site. Future risks posed by the Site consider consumption of drinking water from a well screened within the contaminant plume of the surficial aquifer. Examination of the above hypothetical risk is consistent with the philosophy expressed in the NCP, which is to treat ground water as a valuable resource to be protected and restored. Cancer and non-cancer risks attributable to drinking water from the surficial aquifer for a child resident are presented in Table 4. The maximum cancer risk estimate for ingestion of drinking water for an adult resident is $4x10^{-4}$, with a hazardous index of 5.9. The maximum HI calculated was 13.8 for the child resident scenario. Estimate of cancer risk greater than $1 \times 10^{-4}$ and non cancer risk greater than one, are outside EPA's acceptable target range for risk at Superfund sites (explaination of risk values can be found in section 6.4 of the ROD). Actual or threatened releases of hazardous substance if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to human health.

6.6. <u>Uncertainties</u>

Reference dose factors and carcinogenic slope factors for the COPCs were derived from the IRIS, EPA's chemical toxicity database. All values in IRIS have been peer-reviewed and approved for use. For sodium which is not included in IRIS, toxicity data were obtained for EPA's Environmental Criteria and Assessment Office.

The calculated RfD is likely overly protective, and its use results in an overestimation of non-cancer risk. Similarly, the cancer slope factor developed by EPA are generally conservative and represent the upper-bound limit of the carcinogenic potency of each chemical. The use of the conservative assumptions and models and the conservatism built into the toxicity values are believed to result in an overestimate of risk. Therefore, actual risk may be much lower than the estimates presented in previous tables, but is not likely to be greater.

## 6.7 Remediation Goals

The risk assessment determined Site-specific remediation goals for the ground water to initially establish levels suitable for drinking. Because all the COPCs have MCLs, the MCL values were utilized as remedial goals for this Site. The remediation goals for the COPCs are included in the table listed on page 14, under Federal and State MCLs.

## 7.0 Description of Alternatives

The following Site specific alternatives represent a range of distinct actions addressing human health and environment. The analysis presented below reflects the fundamental components of the various alternatives considered feasible for this Site. The transport model used for establishing timeframe for each of the ground water alternative is called SEFTRAN. This model reflects a relative comparison of remedial alternatives and does not necessarily reflect the actual remedial periods. A more detailed discussion of this model can be found in the Contaminant Transport Modeling section of the FS report.

Four ground water alternatives have been identified for evaluation and are listed below:

- Alternative 1: No Action
- Alternative 2: Institutional Controls and Monitoring
- Alternative 3: Institutional Controls, Monitoring, Groundwater Recovery, On-Site Treatment, and Off-Site Discharge
- Alternative 4: Institutional Controls, Monitoring, Ground Water Recovery, On-Site Treatment, and Discharge

## 7.1 Alternative 1: No Action

Under the "No Action" alternative, no proactive steps (including monitoring) will be taken to clean up the affected media, which in this case is ground water. This means that the Site will be left as is without monitoring of any kind or deed notices or restrictions to restrict exposure to the affected ground water.

## 7.2 Alternative 2: Institutional Controls and Monitoring

Alternative 2 incorporates the use of institutional controls along with periodic Site monitoring to achieve Federal and State ground water standards without any remedial construction. This alternative would include the following:

- Natural Degradation/Attenuation of COPCs;
- Water Well Controls and Regulatory Restrictions;
- Site Security; and
- Monitoring.

This alternative is considered, based on ground water transport modeling, which indicates a reduction of COPCs to federal and state standards in approximately 3 years due to natural attenuation mechanisms. During the 3 years, ground water will be monitored quarterly for one year to verify modelled decrease of contaminant concentration. During the remaining two years an annual review of monitoring frequency. Selected wells within the existing monitoring well network would be used to provide confirmation of historical data and modeling transport data that indicates the COPCs will naturally degrade and/or attenuate with time. However, EPA reserves the right to increase or decrease monitoring frequency should sampling data indicate the necessity. If after the three years of monitoring, data shows that Performance Standards are achieved, then the Site will be considered for deletion from the National Priorities List (NPL). However, should monitoring indicate that the Site has contaminants above standards, EPA in consultation with the State of Florida, will reconsider the protectiveness of the "Institutional Controls and Monitoring" alternative.

Institutional controls associated with this Site include established regional well controls and use of existing well permitting regulations administered through the South Florida Water Management Department (SFWMD), the Palm Beach County Health Department (PBCHD), and FDEP. A Consumptive Use Permit and Water Well Construction Permit, each approved by the SFWMD, and a property inspection are required for installation of any public water supply well and for any private well if the casing diameter is six inches or larger. All other well installations require well permits approved by the SFWMD.

Ground water monitoring would be used in association with the institutional controls to document natural degradation/attenuation of affected ground water. These measures would be required until cleanup goals is achieved for a minimum of two consecutive sampling periods.

### 7.3 Alternative 3: Institutional Controls, Monitoring, Ground Water Recovery, On-Site Treatment, and Off-Site Discharge

This alternative includes actions outlined in Alternative 2, along with ground water recovery, on-Site treatment for cyanide, and off-Site discharge to the City of Palm Beach Wastewater Treatment Plant (POTW). Based on ground water modelling this alternative would reach Federal and State ground water standards within one year after installation. This alternative includes the following:

- Installation of Recovery Well near Monitor Well MW-38;
- Installation of a Recovery Well near Monitor Well MW-3;
- Performance of an Aquifer Pump Test to Establish Discharge Concentrations;
- On-Site Treatment of Cyanide;
- Off-Site Discharge of Recovered Ground water to a nearby Manhole for Transfer to the POTW;
- Pumping, Treatment, and Discharge Systems Operation;
- Water Well Controls and Regulatory Restrictions;
- Site Security (fencing); and
- Monitoring

The contaminant transport model indicates that installation of a recovery well near MW-38 pumping at an estimated rate of 3 gallons per minute (gpm), and installation of a second recovery well near MW-3 pumping also at an estimated rate of 3 gpm, would effectively capture the contaminated ground water. The low yield recovery system would be designed to pump until the concentrations of COPCs reach federal and state standards or asymptotic levels are achieved, at which time the pumping would cease until equilibrium is achieved, and then pumping would resume. The pumping system would be used in conjunction with institutional controls and periodic monitoring, low yield recovery would be an effective, implementable approach to lowering the concentrations of COPCs to acceptable levels.

To implement this alternative, an aquifer pump test would be performed during remedial design to establish discharge concentrations of COPCs. The pump test would involve pumping the two recovery wells at an estimated total flow rate of 6 gpm, with the recovered ground water discharged into an on-Site, portable storage tank. Based on current data, anticipates that the concentrations of COPCs in the extracted ground water will be acceptable for discharge to the POTW, with the exception of cyanide which may require treatment to reduce the total cyanide concentration to the POTW pretreatment standard of 0.7mg/L. Ground water collected by the recovery well near Monitor Well MW-38 would be treated by appropriate technology as determined by the screening criteria to meet the POTW pre-treatment standard for cyanide. Ground water collected by the second recovery well near Monitor Well MW-3 would by pass the treatment system since the anticipated concentration of cyanide from this well is non-detect and below the remediation goal. Ground water treatment would be preformed using a package alkali-chlorination treatment system, including controls and instrumentation.

The treated ground water would be collected on-Site in a portable storage tank for transfer to the local POTW. Two options for transfer of the ground water to the POTW are considered: 1) construction of a pipeline approximately 1600 feet long with connection to an existing sewer system (manhole), or 2) trucking of the ground water to the local POTW. The chosen option would be design during pre-design activities.

Ground water monitoring would also be used to document the reduction in concentrations of COPCs. The transport model indicates that with continuous pumping of the recovery wells the remediation goals would be achieve in approximately 1 year from installation. However, should remediation goals not be reached in prescribed time, pumping will continue until goals are reached.

### 7.4 Alternative 4: Institutional Controls, Monitoring, Ground Water Recovery, On-Site Treatment, and Discharge

This alternative also incorporates the actions outlined in Alternative 2, and on-Site disposal of the water to a recharge gallery. This alternative includes the following:

- Installation of a Recovery Well near Monitor Well MW-38;
- Installation of a Recovery Well near Monitor Well MW-3;
- Performance of an Aquifer Pump Test to Establish Discharge Concentrations;
- On-Site Treatment of Cyanide, Fluoride, and Sodium;
- Installation of a Recharge Gallery;
- Pumping, and Discharge Systems Operation;
- Water Well Controls and Regulatory Restrictions;
- Site Security (fencing); and
- Monitoring.

As with Alternative 3, this alternative includes the utilization of a recovery well which would be installed near monitor Well MW-38, a second recovery well which would be installed near monitor well MW-3, along with the pumping strategy of 3 gpm each well.

The treated ground water would be collected in an on-Site, portable storage tank and a gravity feed system would be used to discharge treated water from the tank to the recharge gallery. The recharge gallery would be located upgradient of PP-2. Remedial standards are expected to be achieve approximately 1 year after installation.

## 8.0 Comparative Analysis of Alternatives

The alternatives are evaluated against one another by using the following nine criteria:

- Overall protection of human health and the environment.
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
- Long term effectiveness and permanence.
- Reduction of toxicity, mobility, or volume through treatment.
- Short term effectiveness.
- Implementability.
- Costs.
- State acceptance.
- Community acceptance.

The NCP categorized the nine criteria into three groups:

(1) Threshold criteria: the first two criteria, overall protection of human health and the environment and compliance with ARARs (or invoking a waiver), are the minimum criteria that must be met in order for an alternative to be eligible for selection;

(2) Primary balancing criteria: the next five criteria are considered primary balancing criteria and are used to weigh major trade-offs among alternative cleanup methods; and,

(3) Modifying criteria: state and community acceptance are modifying criteria that are formally taken into account after public comment is received on the proposed plan. State and community acceptance is addressed in the responsiveness summary of the ROD.

8.1 <u>Comparative Analysis of Human Health and the Environment</u>

The comparative analysis of the alternatives proposed for this Site are presented in this section.

1. <u>Overall Protection of Human Health and the Environment</u>

With the exception of the Alternative 1, all of the alternatives would provide protection for human health and the environment. Alternative 1 and 2 rely on natural degradation/attenuation mechanisms to remediate the COPCs. Alternative 2 is more protective than Alternative 1, since it includes periodic monitoring of the natural processes. Alternative 2 also uses institutional controls to restrict use of ground water.

With regard to aquifer remediation, Alternative 1 and 2 use natural mechanisms while Alternative 3 and 4 include ground water recovery and treatment. Based on the current information available, there is evidence to suggest that natural degradation/attenuation is occurring. The basic contaminant transport model suggests that both Alternatives 3 and 4 would require approximately 1 year from installation to remediate the plume while Alternatives 1 and 2 would each require 3 year without construction. Alternative 3 would require on-Site O&M, including sludge handling, system operators and also provides for additional treatment at the POTW. Alternative 4 requires increased on-Site O&M and sludge handling which complicates the system management and creates a greater risk for on-Site operator exposure and accidental spillage.

2. Compliance with ARARS

Table 5 presents a comparison of the applicability of the potential chemical-specific, location-specific, and action-specific ARARs to each of the four remedial alternatives for the former BMI-Textron Site. All four alternatives have the potential to be in compliance with ARARs. Alternatives 1 and 2 rely on natural degradation/attenuation mechanisms to remediate the impacted ground water. Based on the current information available, including transport modeling, there is evidence to suggest that natural degradation/attenuation is occurring. However, Alternative 1, does not provide a mechanism such as ground water monitoring to demonstrate compliance with ARARs. The pumping options, Alternatives 3 and 4 will comply with ARARs through ground water treatment. If the natural remediation processes, Alternatives 1 and 2, are found to be ineffective in reducing constituent concentrations, then Alternatives 3 and 4 would, at a minimum, come closer to reaching remediation standards since these alternatives would remove at least some of the COPCs.

Part 141, Subparts B,F and G; Maximum Contaminat Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) promulgated under the authority of the SDWA are specifically identified in Section 121 of CERCLA as well as in the NCP as remedial action objectives for ground waters that are current or potential sources of drinking water supply. The ground waters underlying this Site are classified as Class IIA ground water (i.e., as potentila sources of drinking water) under the EPA Guidelines for Ground-Water Classification. MCLs and all non-zero MCLGs aree therefore relevant and appropriate for use as remedial action objectives for ground water cleanup at this Site and will have to be attained. In that FDEP is authorized to adiminister the SDWA, the MCLs and non-zero MCLs estabished under FDEP law are the relevant and appropriate standards for this Site.

3. Long-Term Effectiveness and Permanence

All of the alternatives, with the exception of the Alternative 1, would reduce potential risks and/or environmental impacts. The remaining alternatives would utilize ground water monitoring results to document actual effectiveness.

**Table 5 . Applicability of Potential ARARs to Each Remedial Alternative for the Former BMI-Textron Site; Lake Park, Florida.**

| POTENTIAL ARARs | ALTERNATIVE 1<br>NO ACTION | ALTERNATIVE 2<br>INSTITUTIONAL CONTROLS AND MONITORING | ALTERNATIVE 3<br>INSTITUTIONAL CONTROLS, MONITORING, GROUNDWATER RECOVERY, ON-SITE TREATMENT, AND OFF-SITE DISCHARGE | ALTERNATIVE 4<br>INSTITUTIONAL CONTROLS, MONITORING, GROUNDWATER RECOVERY, AND ON-SITE TREATMENT AND DISCHARGE |
|---|---|---|---|---|
| **CHEMICAL-SPECIFIC ARARs:**<br>1. 40 CFR 141.11 - 141.16 Safe Drinking Water Act Maximum Contaminant Levels.<br>2. 33 USC 1251 Clean Water Act; Section 303 - water quality standards including State water quality standards, and Section 304 - Federal water quality criteria.<br>3. Florida Administrative Code FAC Rules 17-3 and 17-550 Florida drinking water standards and monitoring frequencies for contaminants in groundwater. | According to groundwater modeling results, this alternative will achieve the chemical-specific ARARs, but it includes no monitoring to demonstrate achievement of the chemical-specific ARARs. | According to groundwater modeling results, this alternative will achieve the chemical-specific ARARs, and it includes monitoring to demonstrate achievement of the chemical-specific ARARs. | According to groundwater modeling results, this alternative will achieve the chemical-specific ARARs, and it includes monitoring to demonstrate achievement of the chemical-specific ARARs. | According to groundwater modeling results, this alternative will achieve the chemical-specific ARARs, and it includes monitoring to demonstrate achievement of the chemical-specific ARARs. |
| **LOCATION-SPECIFIC ARARs:**<br>1. 29 USC 651/29 CFR 1910.120 Occupational Safety and Health Act of 1970 worker and public health requirements.<br>2. Palm Beach County Environmental Control Rule 2 requirements for permitting and installing wells, mandated by the Palm Beach County Public Health Department.<br>3. Florida Administrative Code FAC 40(e)3 - South Florida Water Management District rules regarding well construction.<br>4. FAC Rules 17-4 and 17-531 Regarding permits and water wells. | None of these location-specific ARARs are applicable to this alternative. | All of these location-specific ARARs are applicable to this alternative since it includes institutional controls and monitoring. Location-specific ARAR No. 1. is applicable during monitoring events, location-specific ARAR No. 4 is applicable for construction of the monitoring wells, and the remaining location-specific ARARs are applicable as institutional controls in limiting the installation of wells at or near the former BMI-Textron site. | All of these location-specific ARARs are applicable to this alternative since it includes institutional controls, monitoring, and on-site workers. Location-specific ARAR No. 1. is applicable during monitoring events and operation of the treatment system; location-specific ARAR Nos. 1 and 4 are applicable during construction and operation of the groundwater recovery and treatment system; and the remaining location-specific ARARs are applicable as institutional controls in limiting the installation of wells at or near the former BMI-Textron site. | All of these location-specific ARARs are applicable to this alternative since it includes institutional controls, monitoring, and on-site workers. Location-specific ARAR No. 1. is applicable during monitoring events and operation of the treatment system; location-specific ARAR Nos. 1 and 4 are applicable during construction and operation of the groundwater recovery and treatment system; and the remaining location-specific ARARs are applicable as institutional controls in limiting the installation of wells at or near the former BMI-Textron site. |

Table 5-1. Applicability of Potential ARARs to Each Remedial Alternative for the Former BMI-Textron Site; Lake Park, Florida.



| POTENTIAL ARARs | ALTERNATIVE 1<br>NO ACTION | ALTERNATIVE 2<br>INSTITUTIONAL CONTROLS AND MONITORING | ALTERNATIVE 3<br>INSTITUTIONAL CONTROLS, MONITORING, GROUNDWATER RECOVERY, ON-SITE TREATMENT, AND OFF-SITE DISCHARGE | ALTERNATIVE 4<br>INSTITUTIONAL CONTROLS, MONITORING, GROUNDWATER RECOVERY, AND ON-SITE TREATMENT AND DISCHARGE |
|---|---|---|---|---|
| **ACTION-SPECIFIC ARARs:**<br>1. 40 CFR 122.44(a) Use of best available or best conventional pollution control technology to control pollutants.<br>2. 40 CFR 122.41(l) Discharge monitoring to assure compliance using test methods approved under 40 CFR 136.1 - 136.4.<br>3. 40 CFR 264.601 Design and operating standards for miscellaneous units in which hazardous waste is treated.<br>4. 40 CFR 122.41(l) Proper operation and maintenance of the recovery and treatment system.<br>5. Resource Conservation and Recovery Act (RCRA) requirements for sludge handling and disposal.<br>6. 40 CFR 403.5 Prohibition of discharge of pollutants that pass through a POTW without treatment, interfere with POTW operation, contaminate POTW sludge, or endanger the health and safety of POTW workers.<br>7. City of West Palm Beach Wastewater Treatment System (POTW) pre-treatment standards including monitoring and reporting requirements.<br>8. FAC Rule 17-520 Groundwater classes, standards, and exemptions regarding groundwater classification and criteria for discharge to groundwater.<br>9. Palm Beach County Building Department building permits. | Only action-specific ARAR No. 8 is applicable to this alternative, and the groundwater at the former BMI-Textron site is considered a Class II groundwater. | Only action-specific ARAR No. 8 is applicable to this alternative, and the groundwater at the former BMI-Textron site is considered a Class II groundwater. | Action-specific ARARs No. 1, 3, 4, 5, 6, 7, 8, and 9 are applicable to this alternative with respect to design, construction, operation, and maintenance of the recovery and treatment system; discharge to the POTW; and groundwater being considered Class II. | Action-specific ARARs No. 1, 2, 3, 4, 5, 8, and 9 are applicable to this alternative with respect to design, construction, operation, and maintenance of the recovery and treatment system; discharge to the recharge gallery; and groundwater being considered Class II. |

Alternatives 2, 3 and 4 would also incorporate institutional control to protect human health. Alternatives 1 and 2 uses natural degradation. Alternatives 3 and 4 would accelerate degradation, once treatment is initiated.

4. Reduction of Toxicity, Mobility or Volume

Alternatives 1 and 2 would reduce (to some degree) toxicity, mobility and volume of ground water impacted by COPCs, through the uses of natural degradation/attenuation of constituents with time, as predicted by the transport model. Through pumping, alternative 3 and 4 would contain the area of impacted ground water while reducing the volume of COPCs. Alternatives 3 and 4 would use ground water recovery to lessen the time frame for reduction of concentrations to occur, and would limit the migration of COPC.

5. Short-Term Effectiveness

Alternatives 1 and 2 depend on the natural degradation/attenuation mechanisms, which ground water modeling indicates will happen in approximately 3 years. Based on transport modeling Alternatives 3 and 4 may achieve remediation standards in approximately 1 year following construction of the treatment system. However, prior to completion of construction activities EPA will negotiate a Consent Decree with Textron, a design would be prepared, and the system must be built. These activities could take up to two years to complete. Consequently, based on the relative time for remediation, Alternatives 3 and 4 would be similar to that of Alternative 2. Alternative 3 and 4 have some inherent risks related to ground water handling and discharge which Alternatives 1 and 2 do not have. These risks which potentially include such things as accidental spillage of impacted water, pass-through of untreated water, and potential exposure to on-Site system operators, would be considered when developing a Health and Safety Plan for construction activities.

6. Implementability

Alternative 1 is the easiest to implement, yet it provides no protection of human health and environment. Alternatives 2 is also easily implemented. This alternative relies on institutional controls that are already in place and enforced by PBCHD, SFWMD, and FDEP. Furthermore, a network of monitoring wells already exists both on-Site and off-Site to periodically sample and analyze ground water for COPCs. Alternative 3 is similar to alternative 4, however, implementation is contingent upon: 1) approval from the cities of Lake Park and Riviera Beach for accessing the public right-of-ways adjacent to Reed Road and Silver Beach Road, for installation of the pipeline from the Site to the nearest manhole; 2) approval from Riviera Beach Utilities to tie-in and discharge to their manhole; 3) approval from the City of West Palm Beach POTW to discharge ground water to their facility, and 4) enforcement of institutional controls and obtaining deed restrictions. In addition, system operation maintenance would require trained personnel assigned to run the system. Implementation of alternative 3 is contingent upon enforcement of institutional controls, 1.5 years for system design, POTW approval, EPA approval, and construction. This system would also require trained personnel assigned to run the system.

7. Cost

A summary of the present worth costs, including O&M, for each of the alternatives is presented below:

| Alternatives | Total Cost |
|---|---|
| Alternative 1 | $0 |
| Alternative 2 | $253,800 |
| Alternative 3 | $755,000 |
| Alternative 4 | $654,200 |

8. State Acceptance

The State of Florida, as represented by the FDEP, has been the support agency during the Remedial Investigation and Feasibility Study process for the BMI-Textron Site. In accordance with 40 CFR 300.430, as the support agency, FDEP has provided EPA with input during the process. Based upon comments received from FDEP, it is expected that written concurrence will be forthcoming; however, a letter formally recommending concurrence with the preferred remedy has not yet been received.

9. Community Acceptance

There have been very few comments from the local community. Comments indicated that residents wish to remain informed of the progress of remedial efforts.

## 8.2 Synopsis of Comparative Analysis of Alternatives

All of the alternatives, with the exception of the "No Action", would provide acceptable degrees of overall protection of human health and environment and would comply with ARARs. Alternative 2 is considered the best alternative based on the criteria used to evaluate remedies. This alternative is believed to be protective of human health and the environment, would attain ARARs, and is cost effective.

## 9.0 Selected Remedy

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, and the results of the RI report, EPA has determined that no active remediation is necessary for the soil at the Site. With respect to ground water cfontamination, the previous data gathered from Textron along with the RI/FS and Risk Assessment results indicated that natural degradation/attenuation is occurring at the Site. However, because the future potential risk to human health and the environment from exposure to contaminated ground water at the Site is at a level which EPA may consider taking action, the ground water at and around the Site will be monitored quarterly for one year to confirm that the modelled decrease of contaminant concentrations to the drinking water standards are indicative of an actual decrease of contaminants on the Site. Quarterly monitoring for the first year. During the remaining two years EPA would conduct an annual review of monitoring frequency will be conducted. Selected wells within the existing monitoring well network would be used to provide confirmation of historical data and modeling transport data that indicates the COPCs will naturally degrade and/or attenuate with time. The monitoring program also would be used to provide confirmation that no off-Site migration of COPCs at concentration greater than the remediation goals is occurring.

The total present worth cost of the selected remedy, is estimated at $253,800. There is no capital cost associated with this remedy. However, total annual O & M is $79,200, present worth of annual O&M cost is $207,800 and present worth of verification of goals cost $46,000.

### A. Ground Water Remediation

Natural degradation/attenuation will be the method of ground water remediation. The progress of this natural attenuation will be monitored with periodic ground water sampling. Existing institutional controls will be relied upon to protect against possible exposure to contaminants and to confirm that the Federal and State standards are obtained. Monitoring will use existing wells and, if necessary, the construction of additional wells. Ground water usage will be restricted via institutional controls until such time as ground water reaches the goals specified in 9.A.2. for a minimum of two consecutive monitoring events.

A.1 Components of Ground Water Remediation for Implementation

a. Institutional controls for the former BMI-Textron Site consist of existing regional well control which includes restrictions and permitting requirements for installation of any water supply wells in the vicinity of the impacted areas.

b. Ground water monitoring of the COPCs would be implemented to track the movement and natural attenuation degradation of the COPCs.

A.2 Performance Standards

The cleanup standards for the BMI-Textron Site are presented in the following table.

| BMI TEXTRON Site GROUND WATER REMEDIATION STANDARDS | | |
|---|---|---|
| GROUND WATER | Federal µg/L | State µg/L |
| Arsenic | 50 | 50 |
| Sodium | — | 160,000 |
| Cyanide | 200 | 200 |
| Fluoride | 4000 | 4000 |
| Note: MCL – Maximum Contaminant Level<br>— No Federal Standard Exists | | |

It may become apparent during the implementation of this alternative that contaminant levels have ceased to decline and are remaining constant at levels higher than the above standard. In such a case, EPA in consultation with FDEP, may re-evaluate the protection afforded by this alternative.

B. Compliance Testing

During the 3 years, ground water will be monitored quarterly for one year to verify modelled decrease of contaminate concentration. During the remaining two years EPA would conduct an annual review of monitoring frequency. Selected wells within the existing monitoring well network would be used to provide confirmation of historical data and modeling transport data that indicates the COPCs will naturally degrade and/or attenuate with time. The monitoring program also would be used to provide confirmation that no off-Site migration of COPCs at concentrations greater than the above remediation goals is occurring. However, should monitoring indicate that the Site has contaminants at concentrations greater than standards, EPA in consultation with the State of Florida, will reconsider the protectiveness of the "Institutional Controls and Monitoring" alternative.

10.0 Statutory Determinations

EPA has determined that the selected remedy will satisfy the statutory determinations of Section 121 of CERCLA. The remedy will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will use permanent solutions to the maximum extent practicable.

10.1 Protection of Human Health and The Environment

A ground water monitoring remedy has been chosen to protect human health and the environment by confirming that contaminants are being reduced or by alerting EPA of potential further migration of the contaminated ground water and by monitoring the contaminant concentrations in ground water until the concentrations are less than or equal to the Performance Standards. Compliance with MCLs will be protective at this Site. The long-term cancer risk associated with possible ingestion of ground water will be reduced to within EPA's acceptable risk range of $1x10^{-4}$ and $1x10^{-6}$ and the non-carcinogenic risk would be reduced to the EPA goal of 1. Periodic ground water monitoring will be conducted to evaluate the performance of the natural degradation/attention process.

10.2 Compliance with ARARs

Implementation of this remedy will comply with all Federal and State ARARs and will not require a waiver. The natural degradation/attenuation mechanism will meet the ground water performance standards noted in Section 9.A.2, which are based on Federal and State MCLs. Federal and State MCLs are considered relevant and appropriate in the cleanup of contaminated ground water.

10.3 Cost-Effectiveness

The selected remedy, Alternative 2, is a cost effective remedy. The total estimated present worth cost of this alternative is $253,800, which includes implementation and annual operation and maintenance costs. EPA has determined that the cost of implementing the remedy is appropriate given the potential threat posed by the contaminated ground water.

10.4 Use of Permanent Solutions and Treatment Technologies

The selected remedy uses natural degradation/attenuation mechanisms to reduce the toxicity, mobility, and volume of contaminants in ground water.

10.5 Preference for Treatment as a Principal Element

The statutory preference for treatment will not be met, because the selected remedy does not contain an actual treatment. However, the selected remedy does include Site monitoring to ensure that the natural degradation/attenuation is occurring and migration of contaminants does not exist.

11.0 Documentation of Significant Changes

The remedy described in this Record of Decision is the preferred alternative described in the Proposed Plan for this Site. There have been no significant changes in the selected remedy.

# APPENDIX

## RESPONSIVENESS SUMMARY

The U.S. Environmental Protection Agency (EPA) held a public comment period from April 18 to May 17, 1994 for interested parties to comment on EPA's Proposed Plan for the BMI-Textron Site, which addressed contaminated ground water. During the comment period, EPA conducted a public meeting at the Riviera Beach Municipal Complex, in Riviera Beach, Florida on April 21, 1994. During this meeting, representatives of EPA presented the results of the studies undertaken at the Site and EPA's preferred alternative for addressing ground water contamination.

A summary of EPA's response to comments received during the public comment period, known as the responsiveness summary, is required under Section 117 of CERCLA. EPA has considered all of the comments summarized in this responsiveness summary in determining the final selected remedy presented in the Record of Decision.

This responsiveness summary consists of the following sections:

A. Background of Community Involvement and Concerns: This section provides a brief history of community interest and concerns regarding the BMI-Textron Site.

B. Summary of Major Questions and Comments Received During the Public Comment Period and EPA's Responses:

### A. Background of Community Involvement and Concerns

In accordance with Section 113 and 117 of CERCLA, EPA has conducted community relation activities at the BMI-Textron Site to ensure that the public remains informed on the Site remediation progress. During the numerous investigative activities, EPA held meetings and telephone conversations with city and state officials to advise them of the progress of activities at the Site.

A community relation plan (CRP) was developed in 1993 to establish EPA's plan for community participation during the remedial activities. Prior to the initiation of the Remedial Investigation/Feasibility Study (RI/FS), EPA held an Availability Session in West Palm Beach, Florida to present to the public the activities scheduled for the RI. Following completion of the RI/FS, a Proposed Plan fact sheet was mailed to local residents and public officials in April 1994. The fact sheet detailed EPA's preferred alternative for addressing the source of contamination at the BMI-Textron Site. Additionally, the Administrative Record for the Site, which contains Site related documents including the RI and FS reports and the Proposed Plan, was made available for public review at the information repository in the Lake Park Library. A notice of the availability of the Administrative Record for the BMI-Textron Site was published in the Palm Beach Post Newspaper, which serves Lake Park, Riviera Beach and other surrounding areas, on April 17, 1994, and again on April 24, 1994.

A 30-day public comment period was held for April 18, 1994, to May 17, 1994, to solicit public input on EPA's preferred ground water remediation alternative. Written comments were received from representatives for Textron Inc. only. Textron agreed with the selected remedy, but asked for clarification on EPA's interpretation of the preferred ground water alternative.

In addition to the comment period, EPA held a public meeting in Riviera Beach, Florida on April 21, 1994, at the Riviera Beach Municipal Complex to discuss the remedial alternatives under consideration and to answer any questions concerning the Proposed Plan for the BMI-Textron Superfund Site. The meeting was attended by several concerned citizens and representatives of Textron Inc. EPA's response to the comments received at the meeting and Textron's written comments are summarized in Section II below. Additionally, a transcript of this public meeting was prepared by a certified court reporter, and this document is a part of the Administrative Record upon which the remedy selected in the Record of Decision is based.

Following the issuance of the final Record of Decision, EPA will continue to keep the community informed about progress at the site through fact sheets and informational meetings as needed. Additional, design and construction documents pertaining to the implementation of the ground water remedy will be placed in the information repository at the Lake Park Library.

B. <u>Summary of Major Questions and Comments Received During the Public Comment Period and EPA's Responses</u>

1. **Comment:**

The Proposed Plan indicates that Site monitoring would occur over a three-year period, based on the ground water modeling performed for the Site. Will remediation standards be reached within that time period.

**Response:**

A numerical transport model called SEFTRAN was used to simulate the movement of contaminant of potential concern (COPC). The SEFTRAN model is a two-dimensional ground water flow and contaminant transport model developed to simulate the movement of contaminants in two dimensions through time in response to ground water flow. This model reflects a relative comparison of remedial alternatives and does not necessarily reflect the actual remedial periods. Site monitoring will be performed for an anticipated period of three years, however, that period may be modified based on certain decision criteria. For example, if after three years, the remedial standards have not been met and off-Site concentrations of contaminants of concern reflect an increase which is likely to exceed remedial standards, EPA would consider if additional clean-up should take place. The three-year monitoring period is the time-frame for evaluating changes in water quality and will not necessarily preclude implementation of further actions.

2. **Comment:**

How often will the monitoring occur?

**Response**

During the 3 years, ground water will be monitored quarterly for one year to verify modelled decrease of contaminant concentration. During the remaining two years EPA would conduct an annual review of monitoring frequency. Selected wells within the existing monitoring well network would be used to provide confirmation of historical data and modeling transport data that indicates the COPCs will naturally degrade and/or attenuate with time. Any modifications to frequency will be determined by sampling data.

3. **Comment:**

The Proposed Plan states that the monitoring should sample for cyanide, fluoride and sodium. The commentor did not feel sodium was related to operations at the Site. Although the concentrations of sodium are above the state standard, the concentrations are restricted to a small portion of the Site and do not pose a threat to public health or the environment. Why should this constituent being sampled for when the State of Florida has been known to waived the State maximum contaminant level for sodium.

**Response:**

Sodium was listed as a COPC by the baseline risk assessment during the RI because in high volumes sodium has been known to cause problems with human health (i.e. elevated blood pressure). The State of Florida has not waived the contaminant level for sodium on this Site.

4. **Comment:**

The Proposed Plan states that institutional controls applicable to the Site consist of "the use of existing regional well controls, and the continuance of FDEP deed restrictions." What deed restrictions have been imposed on the Site and who has the authority to do so?

**Response:**

The restrictions for the site apply to existing regional well controls to restrict site usage, administered through state and local agencies. The FDEP is responsible for notifying regulatory personnel in the SFWMD and the PBCHD of the existence of any CERCLA or RCRA sites within their respective jurisdiction, including the BMI-Textron site. Consequently, the permitting officials would be expected to deny permit applications for installation potable water wells in the impacted area of the surficial aquifer.

5. **Comment:**

How long will Alternative 4 take?

**Response:**

Following signature of the Record of Decision (ROD) EPA would negotiate with Textron to conduct the design and construction of the selected alternative. Remedial design for this alternative is expected to take up to 18 months. Ground water transport model indicate the remedial standards would to occur within 1 year of installation. Therefore, the cleanup goals could be reached as soon as 2 1/2 to 3 years from ROD.

6. **Comment:**

Are there any of potential harmful effects to people that formerly worked at BMI Facility?

**Response:**

The primary pathway of exposure or route of exposure in which a person could come in contact with the COPCs is oral contact. This means that for a person to be exposed to potentially harmful compounds the person would have to consume the contaminated ground water from the site. However, local potable water supplies obtain their water from uncontaminated sources that are safe from contamination by the BMI-Textron Site.

7. **Comment:**

Is there any danger to the residential area south of the Site?

**Response:**

According to data gathered during the RI, the area of the wells that showed contamination are east/northeast of the residential area. Our RI further showed that the area of contamination is limited to on site. To the north, west and east are industrial areas which are on city water supply and the nearest residential area is located to the south which also have city water supplied.

8. **Comment:**

Is the problem at BMI-Textron Site along the same lines as the problem found at Soletron?

**Response:**

No. The two sites are a great distance away from each other and contain different COPCs. The BMI-Textron Site risk is due to inorganics percolating into the ground water. Soletron was an accidental spilling of volatile organics into a sanitary water system and is being addressed by FDEP.

9. **Comment:**

Given the location of the Transcircuit Facility and the similarities of the chemicals associated with both the BMI and Transcircuit Facilities, could Trancircuit be the source or partial source of the ground water contamination?

**Response:**

The Transcircuit facility is located crossgradient to downgradient (depending on the pumping of the city wells) from the BMI-Textron Site. The RI has not shown evidence of any kind of contaminants in the areas that might join the BMI-Textron and Transcircuit Facilities together. BMI-Textron contains metals while the Transcircuit Facility contains metals and volatile organic compounds as contaminants. Our data has not shown metal and organic contaminants together. Also, the area of contamination indicated by the RI is located approximately 300 feet downgradient from the Transcircuit Facility.