PUBLIC HEALTH ASSESSMENT

BRIDGEPORT RENTAL AND OIL SERVICE

LOGAN TOWNSHIP, GLOUCESTER COUNTY, NEW JERSEY

CERCLIS NO. NJD053292652

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Prepared by:

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Environmental Health Service

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SUMMARY

The 30 acre Bridgeport Rental and Oil Services, Inc. (BROS) site is located in southwest New Jersey, Logan Township, approximately 1 mile east of the town of Bridgeport and about 2 miles south of the Delaware River.

Groundwater and surface soils at the BROS site have been contaminated as a result of the mismanagement of large quantities of waste oil and other fluids. A second superfund site, Chemical Leaman Tank Lines, Inc., is located near the BROS site and may be contributing to groundwater contamination within the BROS study area.

Groundwater in the top two aquifers has been impacted by significant levels of contaminants. The contaminants include, among others: volatile organic compounds (VOC's), such as methylene chloride, trichloroethene, benzene, and vinyl chloride; semi-volatile organic compounds, bis (2-chloroethyl) ether; metals, lead and chromium; and polychlorinated biphenyls (PCBs).

Past exposure of residents living near the BROS lagoon to VOC's in residential well water is likely to have occurred from before 1983 through 1987. In the past, VOC's had migrated from the BROS lagoon through the shallow groundwater system. Before connections to the public water supply were completed, all of the known residents in the area were supplied with bottled water for drinking and other domestic purposes. A permanent source of water to 33 of these residents was provided by extension of the public water supply pipeline in April 1987.

The full expanse of the contamination plume at the BROS site has not been totally characterized. Groundwater contamination has been documented in off site monitoring wells and has been estimated to have moved as much as a mile from the site towards the southeast. It is not known the extent to which residents may have used this water in the past, how it is presently used, or how it may be used in the future.

It is possible that there are residents who are downgradient from the BROS lagoon who drank water from contaminated private wells and were chronically exposed to contaminants in those wells.

Based upon information reviewed, the BROS Site is considered a public health hazard because of past exposures, and is currently considered an indeterminate public health hazard. Human exposure to site related contaminants has occurred in the past. The indeterminate nature of the current health hazard is based on the fact that site related contaminants are migrating off-site and may have contaminated groundwater in an area where residential wells are in current use. The contaminants detected in this groundwater are of sufficient concentrations as to constitute a public health hazard. ATSDR's Health Activities Recommendation Panel has evaluated the BROS site to determine appropriate follow-up health actions. The panel determined that community health education is needed; however, the level of educational activity will be determined by the NJDOH following an evaluation of, among other factors, comments received during the public comment period for this

public health assessment.

BACKGROUND

A. Site Description and History

Groundwater and surface soils at the Bridgeport Rental and Oil Services, Inc. (BROS) site have been contaminated as a result of the mismanagement of large quantities of waste oil and other fluids. Groundwater in the top two aquifers has been impacted by significant levels of contaminants. The contaminants include, among others: volatile organic compounds (VOC's), such as methylene chloride, trichloroethene, benzene, and vinyl chloride; semi-volatile organic compounds, bis (2-chloroethyl) ether; metals, lead and chromium; and polychlorinated biphenyls (PCBs). A groundwater contaminant plume is suspected to have moved as much as a mile southeast of the site.

Due to the contamination of drinking water wells near the BROS site, first identified in the early 1980's, the U.S. Environmental Protection Agency (USEPA) supplied an alternate water supply to 33 affected residents. A permanent source of water to these residents was provided by extension of the public water supply pipeline in April 1987.

In the early 1970's, the eastern dike of the BROS lagoon was breached and an adjacent 3 acre area was covered with a superficial layer of PCB contaminated oil.

In the spring of 1981, the level of the lagoon again threatened to overflow the dike. In response to the threat, the U.S. Coast Guard increased the height of the dike by 5 feet. When the dike again threatened to overflow in 1982 and 1983, the EPA took emergency action to lower the level of the lagoon by pumping and treating the aqueous phase layer and discharging the treated material into the Little Timber Creek.

The BROS site was included on the EPA's National Priorities List (NPL) in 1983. A Phase 1 Remedial Investigation/Feasibility Study (RI/FS) was conducted in 1983 and 1984 (1), and a Record of Decision (ROD) was signed in 1984 approving remedial activity at the site. EPA is currently performing a detailed Phase 2 RI/FS to determine the nature of the extent of the groundwater contamination and to evaluate remedial alternatives.

Remedial activities have included the demolition and removal of approximately 100 tanks and process vessels used to store hazardous wastes; off-site disposal of about 400,000 gallons of oils and sludges taken from the tanks; demolition and off-site disposal of buildings, drums, and other site debris; and the construction and operation of an aqueous wastewater treatment system (AWTS). In addition, an on-site transportable incinerator has been setup on the site. The incinerator is being used for the thermal destruction of the approximately 5000 cubic yards of PCB contaminated lagoon surface oil , and the 80,000 to 100,000 cubic yards of contaminated sludges, sediments, soils, and levee material.

The listed activities were implemented through an interagency agreement between USEPA and the U.S. Army Corps of Engineers (COE). The New Jersey Department of Environmental Protection and Energy (NJDEPE) provides support to the USEPA.

The Agency for Toxic Substances and Disease Registry (ATSDR) has been involved with this site in the past. A Health Assessment was preformed by the agency in March 1986 (2) and an Addendum to the Health Assessment was completed on August 9, 1991 (10). This addendum evaluated data collected in and adjacent to Swindell Pond. The New Jersey Department of Health (NJDOH), in cooperation with ATSDR, completed a Site Review and Update (SRU) on September 2, 1992 that recommended the site be revaluated through the public health assessment process.

The 30 acre BROS site is located in southwest New Jersey, Logan Township, approximately 1 mile east of the town of Bridgeport and about 2 miles south of the Delaware River (Figure # 1). The site borders an active peach orchard on its western edge. Located on Cedar Swamp Road, it's northern border, BROS is situated at the point where Route 130 and Interstate 295 diverge. The eastern edge of the site is a swampy area leading to the Little Timber Creek. Two "man-made" ponds are found adjacent to the lagoon, south and south west of the site (Figure # 2).

The site was originally a sand and gravel pit in the 1930's, and there is evidence of waste disposal activities beginning in the 1950's. When the current owners acquired the site in the late 1960's the site was already a waste oil storage and recovery operation. Today, waste handling activities are prohibited at the site by court order. Before remediation began, the site consisted of a tank Farm, drums, tank trucks and an approximately 13 acre waste oil lagoon. The lagoon was up to 25 feet deep in certain locations, with the bottom 13 feet of the lagoon in contact with the ground water. The liquid in the lagoon is divided into three phases including: an oily layer with drums, trash, and other debris floating in it; an aqueous layer; and sludge/sediment deposits on the bottom. At one time it was estimated that there were about 2.5 million gallons of oil in the lagoon. The depth of the sludge layer was estimated to be between 2 and 4 feet. Sampling of the oil and the sludge layers revealed average PCB concentrations in excess of 500 ppm. Beneath the sludge layer are contaminated groundwater and soils. Most of the oil has been removed from the lagoon and the water level has been lowered by pumping from 8.5 to 3.0 feet below mean sea level. The water level during remediation is held at or slightly below the natural water level in the superficial aquifer (Upper Potomac-Raritan-Magothy [PRM] Aquifer). The treated water is discharged to the Little Timber Creek and is monitored to ensure acceptable effluent standards. Contaminated soils excavated from the site are incinerated in the on-site thermal destruction facility.

Access to the BROS site is strictly limited. There is tall chain-link fence surrounding the entire site. The entrance to the on-site areas is controlled by a security guard.

B. Actions Implemented during the Health Assessment Process

Since the completion of the data review for this site, March 31, 1993, there have been no additional

actions implemented. The remedial work is continuing with a few minor incidents reported. These include: the discovery of additional contamination and short term release of organic vapor while workers were digging in the western levee of the lagoon; and the discovery of an apparent human hip bone in the same area.

C. Site Hydrogeology

The BROS lagoon is underlain by three aquifers and three confining units as follows: the Upper Potomac-Raritan-Magothy (PRM) Aquifer; an intermediate confining unit; the Middle PRM Aquifer; a continuous clay confining unit; the lower PRM Aquifer; and a basal confining unit defined by the Wissahikon Formation (Figure # 3). Only the Upper and Middle PRM aquifers have been investigated as part of the Phase II RI/FS (4). In order to accurately address the vertical and horizontal migration of contaminants from the lagoon, the middle PRM Aquifer has been separated into the Upper Middle PRM and the Lower Middle PRM Aquifers.

D. Site Visit

NJDOH (J. Pasqualo, N. P. Singh, and J. Winegar), ATSDR (A. Block and S. Jones; Region II), USEPA (Region II) and Gloucester County Health Department personnel visited the BROS site on December 1, 1992. The site was well secured with a chain-link fence, guarded, and posted with warning signs. The on-site area actually consists of two distinct areas: an administrative area consisting of numerous large office trailers; and an inner exclusion zone surrounding the lagoon itself where remediation is taking place. Both of these regions were examined during our visit. During our visit the following observations were made:

- The site is undergoing active remediation;

- The large storage lagoon was obviously heavily contaminated and stained with oil, with the level of the fluid approximately 10-15 feet below the lip of the levee;

- In the eastern portion of the lagoon numerous steel drums were observed in and protruding from the oil. Each drum appears to have been punctured. In addition, there is a tanker trailer, trash, and a partially submerged boat in this section;

- There is an aqueous wastewater treatment system (AWTS) and a large mobile thermal destruction facility located near the north east corner of the lagoon. The AWTS facility pumps and treats the aqueous layer of the lagoon to keep the level at or below the water table in the surface aquifer and to remove volatile organic and inorganic contaminants. The treated water is discharged into the Little Timber Creek. The incinerator is used to burn oil, contaminated

soil, and sediments from the lagoon. At the time of our site visit the incinerator was not operating due to a dispute between two of the subcontractors;

- On the north side of the lagoon were two large piles of incinerated soil and ash. This material is stockpiled and being used as part of the back fill material for the lagoon;

- Backfilling with a mixture of incinerated soil, clean fill, and cement mix, has begun in a small area in the south west corner of the lagoon;

- The area contaminated by a previous levee breach northeast of the lagoon has just been cleared of trees and brush as part of the initial remediation of this area. The perimeter fence has been extended around this region;

- There is an active peach orchard directly adjacent to the western border of the lagoon;

- South and south west of the BROS lagoon, within 100 feet, are two "man-made" ponds, known as Swindell Pond and Gaventa Pond, respectively. According to the local health officials, the ponds are used for swimming and fishing;

- Several residences were noticed about 800 feet north of the site. A single residence was observed about 150 feet to the west.

- At the north east corner of Gaventa Pond, the point closest to the BROS Lagoon, a oil boom was noticed in the corner. There was an obvious oil slick on the lagoon side of the boom. There were also several drums of unknown origin noticed in the pond; and

- The land area just south of the lagoon, and between the two ponds, showed evidence of human activity. Off-road bike tracks were visible throughout this area. Closer to Swindell Pond there was an area noticed where persons have been building campfires and drinking. This area was littered with beer cans.

E. Demographics, Land Use, and Natural Resources Use

Demographics

The population of Logan Township was listed as 5,147 in the 1990 U.S. census. The Township

consists of approximately 15,369 acres in northwest Gloucester County, New Jersey and consists of the following towns: Bridgeport; Gibbstown; Paulsboro; Swedesboro Repaupo; and Beckett. A large percentage of the residents are employed by the local industries.

There is at least one daycare center known to be near the BROS site. The facility is located approximately 1/4 mile south and west of the site (Figure # 4, Residential Well #44).

Land Use

The area surrounding the BROS site is predominately rural and agricultural. There is an active peach orchard adjacent to the western border of the site. A truck repair garage is located about 300 feet north east of the site and there are three homes about 800 feet north.

Approximately 1/2 of Logan Township is undeveloped, including marshes, vegetated areas, and woodlands. About 5,200 acres of the Township are covered by privately owned farms that cultivate vegetable crops and fruit. About 500 acres of land is devoted to residential use.

There is another EPA Superfund site located approximately 1200 feet west of the BROS Site (Figure # 5). This site is known as the Chemical Leaman Tank Lines Site (CLTL), and it occupies 31.4 acres in Logan Township. The site includes a 14.1 acre tanker washing terminal, which has been operating since 1960. Contamination of the soil and the groundwater as a result of CLTL's activities has been confirmed. Contaminants largely consist of volatile organic compounds (VOC's).

Natural Resources Use

Residents near the BROS site use groundwater from either private wells or public water supplies for drinking and other household uses. As noted previously, the U.S. Environmental Protection Agency (USEPA) supplied an alternate water supply to 33 residents who reside just north of the site after it was first identified that their water was being contaminated by BROS. A permanent source of water was provided by extension of the public water supply pipeline by April 1987. Most of the residents to the south of the site, including those to the southeast in the projected path of the contamination plume moving in the upper middle aquifer, are utilizing private wells. Both the Upper PRM and Upper Middle PRM aquifers are used for this water source (private water). It is believed that most of these wells draw from the upper PRM aquifer (5).

Seven municipal supply wells lie within 4 miles of the BROS site. Five of the wells are screened within the Middle PRM; however, none of the wells appear to lie within the path of the BROS contaminant plume. Penns Grove Water Company wells in Bridgeport are hydraulically upgradient of the site. The Purulent Water Company wells, which lie southwest of BROS along Raccoon Creek, are hydraulically cross-gradient and are more than 3 miles away.

Only four private wells proximal to the BROS site are screened within the Middle PRM and appear to lie hydraulically downgradient and in the path of the contaminant plume. Wells 40, 43, 44, and 61 (Figure # 4) are screened within the Middle PRM and lie within 1 mile of the southwest boundary of the site. The remaining domestic wells lying to the south-southeast and proximal to the site are screened in the Upper PRM aquifer and surficial Cape May Formation.

There is an active peach orchard directly adjacent to the western border of the lagoon, which according to the local health department, sells peaches for local consumption. It seems likely, although not documented, that water from Gaventa Pond is used as irrigation water for the peach orchard.

According to the Gloucester County Health Department (personal communication) local residents use the two "man-made" ponds, known as Swindell Pond and Gaventa Pond respectively, for swimming and fishing. No information exists, however, on the number of persons swimming or fishing in the area.

The Little Timber Creek flows north along the eastern edge of the BROS site and discharges into a small drainage ditch through a tidal gate north of Route 44. It eventually drains into an unnamed tidal channel that runs along the western edge of Cedar Swamp. Water in the tidal channel finally flows into the Delaware River.

F. Health Outcome Data

There are multiple sources of health outcome data in New Jersey. State and local data for heath outcome information include the New Jersey State Cancer Registry, Birth Defects Registry, Vital Statistics Records, Renal Dialysis Network, and Hospital Discharge Reports. Federal databases such as those maintained by the agencies within the US Department of Health and Human Services (i.e., National Cancer Institute, National Institute for Occupational Safety and Health, and ATSDR) are not site-specific, but may be used for comparison or evaluation purposes.

COMMUNITY HEALTH CONCERNS

Initially, the public was most concerned about drinking water contamination in the direct vicinity of the BROS lagoon, particularly north and west of the site. They were also upset with the amount of time the study of the site was taking before actual remediation of the site was to take place. They felt action should be taken immediately.

A recent well inventory (October 1992) of domestic/residential, commercial, and municipal supply wells that lie towards the south and southeast of the site has generated and renewed local community concern regarding contaminated drinking water. This survey was conducted by the USEPA.

In general, the public was opposed to the idea of on-site incineration. This was due, in part, to negative experience that they had with a nearby hazardous waste incinerator, and a perception that incineration is a poor and inefficient technology.

At least one local resident who lives about 800 feet north of the BROS lagoon had complained about odors emanating from the site.

The owner of Swindell Pond has, in the past, expressed concern about possible contamination of his pond by the adjacent BROS lagoon.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

The tables in this section list the contaminants of concern. NJDOH evaluates these contaminants in the subsequent sections of the Health Assessment to determine whether exposure to them has public health significance. NJDOH selects and discusses these contaminants based upon the following factors:

1. Concentrations of contaminants on and off the site.

2. Field data quality, laboratory data quality, and sample design.

3. Comparison of on-site and off-site concentrations with health assessment comparison values for (1) noncarcinogenic endpoints and (2) carcinogenic endpoints.

4. Community health concerns.

In the data tables that follow the On-site Contamination subsection and the Off-site Contamination subsection (appendices), the listed contaminant does not mean that it will cause adverse health effects from exposures. When selected as a contaminant of concern in one medium, that contaminant will be reported in all media.

The Data tables include the following acronyms:

- **CREG** = ATSDR Cancer Risk Evaluation Guide
- **EMEG** = ATSDR Environmental Media Evaluation Guide
- **RMEG** = Reference Dose Media Evaluation Guide, calculated from EPA's reference dose (RfD).

- **LTHA** = USEPA's Lifetime Health Advisory
- **NJ MCL** =NJ Maximum Contaminant Level
- **PPB** = Parts Per Billion
- **ND** = Not Detected

Comparison values for public health assessments are contaminant concentrations in specific media that are used to select contaminants for further evaluation. These values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk Evaluation Guides (CREGs), and other relevant guidelines. CREGs are estimated contaminant concentrations based on a one excess cancer in a million persons exposed over a lifetime. CREGs are calculated from EPA's cancer slope factors. Maximum contaminant levels (MCLs) represent contaminant concentrations that New Jersey or a Federal regulatory agency, e.g., EPA, deems protective of public health (considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of 2 liters of water per day. MCLs are regulatory concentrations. EPA's Reference Dose (RfD) is an estimate of the daily exposure to a contaminant that is unlikely to cause health effects.

The environmental contamination section includes sampling data from a variety of media sources including: groundwater (monitoring wells and residential wells); surface water; surface soil; subsurface soil; and sediments.

Local residential water supplies in the area of the BROS lagoon are derived primarily from the Upper PRM Aquifer and the Upper Middle PRM Aquifer. Due to this fact, the groundwater section of this public health assessment will focus primarily on these two aquifers.

The Upper PRM Aquifer is the water table aquifer. Originally the movement of groundwater in this aquifer was primarily to the north and west, however, due to the ongoing site remediation the local hydraulic gradient has reversed so that the groundwater currently moves back towards the lagoon (personal communication).

Groundwater flow in the Upper Middle PRM Aquifer is consistently toward the southeast, regardless of tidal
stage or season. Contaminant concentration in this aquifer is strongest (most contaminants, highest concentration) towards the southeast, along the direction of the groundwater flow.

As of the writing of this report the extent of the contaminant plume in the Upper Middle PRM Aquifer has not been delineated (6). The conservative estimate of the distance of contaminant transport from the lagoon in the Upper Middle PRM Aquifer was calculated to be 5,000 feet, based on 40 years of travel time and an average of the hydraulic conductivity of this aquifer. Swedesboro-Paulsboro Road is about 5,000 feet from the BROS lagoon.

The characterization of the groundwater at the BROS site will be made by using data collected from monitoring wells between September 17 and 25, 1990. This includes 12 on-site and 18 off-site wells (Figure # 6).

A. On-Site Contamination

Groundwater-Monitoring Wells

On-site groundwater samples were taken from 12 monitoring wells which were screened in the shallow, Upper PRM, and deep, Upper Middle PRM and Lower Middle PRM, aquifers. Samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls (PCBs), and inorganic compounds. Table # 3 shows the contaminants of concern detected in the on-site monitoring wells. Concentration ranges are given for both the shallow and the deep aquifers, because the direction of groundwater movement in these two aquifers differs.

1. Upper PRM Aquifer

Volatile organic compounds (VOC's) were detected in all of the on-site monitoring wells which were screened in the shallow , Upper PRM aquifer. VOC's common to several wells include the compounds benzene, xylenes, toluene, ethylbenzene, 1,2,4,-trimethylbenzene, carbon disulfide and chlorobenzene. Three of the wells (MW-1A, MW-13A, and S-11C) exhibited 2-3 feet of floating or light nonaqueous phase liquids (LNAPL).

Although monitoring wells near the southern and eastern edges of the BROS lagoon show some VOC contamination, the two most contaminated wells in the Upper PRM aquifer lie north of the lagoon. These wells partially define the contaminant plume that trends north-northwest.

Semivolatile organic compounds (SVOC's) detected in the monitoring wells exhibit a distribution similar to the VOC's. Contaminants common to several wells include the compounds Bis (2-chloroethyl) ether (BEE), naphthalene, and 2-methylnaphthalene.

Metals of concern in this aquifer are chromium, lead, and manganese.

2. Upper Middle PRM Aquifer

The three on-site monitoring wells screened in the Upper Middle PRM aquifer, (S-3C, S-2C, and S-11c), were heavily contaminated with volatile organic compounds such as, benzene, acetone, tetrachloroethane, trichloroethene (TCE), and methylene chloride.

Semivolatile organic compounds (SVOC's) detected in the Upper Middle PRM aquifer, well S-11C only,include: Bis (2-chloroethyl) ether (BEE), naphthalene, and isophorone. Well S-11C in located on the southeastern edge of the lagoon.

Metals of concern in this aquifer are chromium and manganese. As with many of the other contaminants the highest concentration of metals was found towards the southeast, wells S-1C, S-2C, and S-11C.

Groundwater-Residential wells

There are no residential groundwater wells on site.

Surface Soil

There were three areas near the BROS lagoon where surface soil samples were taken (AREA # 1, 2, and 3; Figure # 7). Area # 1 will be discussed under off-site contamination. This is due to the size of the spill, approximately 3 acres, and the obvious signs of visible oil contamination. Areas 2 and 3 will be considered on-site. These two areas were setup south and east of the lagoon to characterize and delineate the horizontal extent of contamination in documented and suspected overflow areas. Fourteen surface samples for chemical analysis were collected between June and September 1990 (7). Samples were taken of soil from zero to 1 foot below grade.

Results of the chemical analysis of these soil samples indicate that there was some contamination in each area sampled. Area # 2 was heavily contaminated with a wide variety of SVOC's and inorganic compounds including metals.

Area # 3, to the south of the lagoon, showed some contamination of SVOC's and inorganic compounds. The contamination, although similar to Area # 2, was contaminated to a much lesser degree.

These data indicate that there was lagoon overflow to the east of the site not only towards the known overflow, Area # 1, in the northeast. Some contamination occurred to the south, but it does not appear to be a major overflow.

B. Off-Site Contamination

Groundwater-Monitoring Wells

Off-site groundwater samples were taken from 18 monitoring wells which were screened in the shallow, Upper PRM, and deep, Upper Middle PRM and Lower Middle PRM, aquifers. Samples were analyzed for volatile and semi-volatile organic compounds, pesticides, polychlorinated biphenyls (PCBs), and inorganic compounds. Table # 4 shows the contaminants detected in the off-site monitoring wells. The concentration range is given for both the shallow and the deep aquifers, because the groundwater movement in these two areas is so different.

1. Upper PRM Aquifer

Site contaminants in the upper PRM Aquifer have been, until recent dewatering, moving parallel to the direction of the groundwater flow in that area. The most distant monitoring well in that direction, MW-7A, shows several contaminants of concern. Monitoring well MW-7A is less than 1,000 feet north-northwest of the lagoon. Specifically detected were 1,2,4-trimethylbenzene, acetone, and methylene chloride. The original extent of the contamination plume has never been delineated, however; USEPA estimated that it was approximately 1,100 feet wide and 2,700 feet long. As previously noted the groundwater flow in this aquifer has been reversed by the remedial activities at the site.

2. Upper Middle PRM Aquifer

All of the off-site monitoring wells screened in Upper Middle PRM aquifer showed some VOC contamination. In addition to VOC compounds common to the Upper PRM Aquifer (benzene, acetone, etc.), the Upper Middle PRM samples contained the heavier chlorinated solvent compounds such as cis-1,2 dichloroethene, trichloroethene, tetrachloroethene, and vinyl chloride. Wells S-2C and S-11C near lagoon and off-site wells MW-11B and MW-10B, more than 1000 feet downgradient, define a contaminant plume that tends southeast from the lagoon. Significant VOC contamination has been found in the furthest wells along this trend; the extent of the contaminant plume, therefore, has not been delineated. EPA estimates that the plume has extended approximately 5,000 feet downgradient.

Semivolatile organic compounds were detected in most of the off-site wells. The greatest total concentrations were found downgradient in well S-11C. Semivolatile contaminants detected in the Upper Middle PRM included: bis (2-chloroethyl) ether (BEE), naphthalene, bis (2-ethylhexyl) phthalate (BEHP), and isophorone.

The metals detected with concentrations exceeding their comparison values were similar to the samples collected in the Upper PRM and included manganese lead, and zinc. Lead was encountered only in off-site well S-6.

In their Phase II RI/FS Work Plan, the EPA will attempt to further delineate the extent of the contamination plume in the groundwater in the Upper Middle PRM aquifer. The plan is to install one well along Route 295 (near S-6), and three wells at locations along Paulsboro-Swedesboro Road. The locations are shown on Figure # 8.

Groundwater-Residential wells

Residential well data collected by USEPA during a 1985 survey of 11 residential wells in the area documented the presence of VOC's in the potable water supply of these residents. Numerous VOC's

were detected, but few were quantified. Quantified VOC concentrations form these wells included: trans 1,2-dichloroethylene (DCE) (20 ppb); 1,2-dichloroethane (DCA) (1.9 ppb); 1,2-dichloropropane (7.1 ppb); and 1,1-dichloroethane (DCA) (1.9 ppb).

Monthly data (March 1983 to November 1985) were consistent with the above concentrations; generally, VOC levels of less that 20 ppb were reported. However, one residential wells' data was a persistent exception and often revealed vinyl chloride concentrations that exceeded 50 ppb. The average detected vinyl chloride concentrations in this well was approximately 80 ppb (maximum reported was 170 ppb).

A limited amount of more recent data concerning residential wells was collected in September 1992 as part of the Phase II RI/FS, Table # 8. Specifically, 11 residential wells in the vicinity of the lagoon have been tested. Of these 11, wells two are known to be screened in the Upper Middle PRM Aquifer. These wells, (40 and 44) each revealed some contamination. Well 40 was found to have detectable levels of cis 1,2-dichloroethene (9 ppb) and trichloroethene (TCE) (120 ppb). The TCE is being found well above its ATSDR comparison value of 3 ppb (CREG). Well 44 was found to have detectable levels of PCB (Aroclor 1260) at the level of 0.8 ppb. The ATSDR comparison value for PCB's is .05 ppb, chronic EMEG. A resampling of well 44 did not detect PCB's.

Confirmatory resampling by the USEPA, January 1993, of the above contaminated wells has, so far, been inconclusive.

It is important to note that these wells, (40 and 44) are also located near a second superfund site known as the Chemical Leaman Tank Lines Site (CLTL), Figure # 5. At least two of the compounds, TCE and cis 1,2-dichloroethene, found in these residential wells are known contaminants of the CLTL site.

Soils/Sediments (Overflow Area # 1)

As noted in the background section of this report, in the early 1970's the eastern dike of the BROS lagoon was breached and an adjacent 3 acre area was covered with a superficial layer of PCB contaminated oil.

USEPA, as part of the Phase 2 Remedial Investigation at the site, collected additional samples of soils/sediments in the area east of the lagoon. A total of 25 soil/sediment samples were collected along three transects, Figure # 9.

The analytical results of the materials taken from these transects show that this entire area is heavily contaminated with numerous compounds including PCB contaminated oil, grease and petroleum hydrocarbons. As expected, the concentrations of contaminants , generally, decreases in samples taken further east of the lagoon dike.

Twenty-four of 25 samples analyzed contained organic contaminants at or above detection levels, although some compounds are only tentatively identified or listed as unknown. Some of the numerous VOC's detected include (maximum levels) : toluene (160,000 ppb); Benzene (13,000 ppb); xylene (240,000 ppb); TCE (610 ppb); Tetrachloroethene (6600 ppb); 1,2-dichloroethene (19,000 ppb); chlorobenzene (4,500 ppb); ethylbenzene (44,000 ppb); and others.

Analyzed samples also included very high concentrations of SVOC's. The highest concentrations were found at sample location S-4 along transect 3 (Figure # 9). At this location, fluoranthene, pyrene, chrysene, benzo(a)anthracene, benzo(k)flouranthene, and benzo(a)pyrene reached levels of 1,300 ppb, 3,000 ppb, 2,600 ppb, 1,200 ppb, 2,000 ppb, and 1,700 ppb, respectively. In the case of the SVOC's the concentrations along the 3 transects differs from the VOC's. The concentrations appear to be greatest along the central portion of the transect near the center of the wetland, rather than being greatest near the lagoon area as would be expected.

An analysis of inorganic compounds found in this area, indicated that 24 compounds were found at detectable levels. These include metals and other inorganics of potential concern including lead, cadmium, chromium, zinc, arsenic, cyanide, and barium.

Surface Water and Sediment Sampling

Ten surface water and sediment samples were collected from three surface water bodies near the BROS lagoon, on June 18 and 19, 1990 (8). These water bodies include Gaventa Pond, Swindell Pond, and the Little Timber Creek. Figure # 10 shows the location of these samples.

With the exception of location GVP-1, samples from the two ponds contained no significant levels of contamination. Sample GVP-1, collected on the pond side of the oil boom, exhibited 112 ppb of volatile organic including: acetone (78 ppb); 2-butanone (26 ppb); and 2-hexane (6 ppb). Semivolatile organics detected include: naphthalene (2 ppb); anthracene (18 ppb); pyrene (14 ppb); and BEHP (68 ppb). In addition, PCB (Aroclor 1260) at 110 ppb and 314 ppb of lead were detected. The detection of the above referenced compounds indicates that contaminants are migrating under the oil boom and spreading throughout the pond.

Each of the surface water samples collected along the Little Timber Creek, including the upgradient sample LTC-5, showed low concentrations of VOC's and SVOC's. These contaminants include: acetone (6 ppb); methylene chloride (1 ppb); 1,1,1-TCE (1 ppb); benzene (4 ppb); toluene (1 ppb); naphthalene (5 ppb); 1,2,3-TCE (.4 ppb). In addition, PCB (Aroclor 1260) at 2 ppb and 19.1 ppb of lead were detected. The number and concentration of contaminants generally increased nearest (LTC-2, LTC-4) and downgradient of the site (LTC-1).

Biota

To date, there has been no sampling of any biota likely to enter the human food chain in the vicinity of the BROS Site. A Rapid Stream Bioassessment was performed on the Little Timber Creek to assess the impacts of the AWTS discharge on the creek macroinvertebrate community (16). This work took place in the spring/summer of 1992, based upon a workplan dated April 8, 1992. NJDEPE believes results showed that BROS effluent discharge appeared to be impacting Little Timber Creek to the extent that a shift in the species composition of the benthic community, favoring pollution-tolerant species, had occurred.

C. Quality Assurance and Quality Control

In preparing this Public Health Assessment, ATSDR and NJDOH rely on the information provided in the referenced documents and assumes that adequate quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of analysis and conclusions drawn for this public health assessment is determined by the availability and reliability of the referenced information.

D. Physical and Other Hazards

The site contains no obvious or discernible physical hazards. On site buildings and the lagoon area are guarded by security personnel. The perimeter is fenced to prevent unauthorized access. There are no known or suspected radiological or biological hazards associated with the site.

E. Toxic Chemical Release Inventory Data

The NJDOH conducted a search of the Toxic Chemical Release Inventory (TRI) in an attempt to identify any possible facilities that could be contributing to the environmental contamination near the BROS Site. The TRI is compiled by USEPA and is based on estimated annual releases of toxic chemicals to the environment (air, water, soil, or underground injection) provided by certain industries.

The TRI search for the years from 1987 to 1990 did not identify any reported emissions of chemicals that were relevant to the contaminants of concern at the BROS Site.

PATHWAYS ANALYSIS

To determine whether nearby residents are exposed to contaminants migrating from the site, NJDOH evaluates the environmental and human components that lead to human exposure. This pathways analysis consists of five elements: (1) a **source** of contamination; (2) transport through an **environmental medium**; (3) a **point of human exposure**; (4) **route of human exposure**; and (5) an **exposed population**.

NJDOH classifies exposure pathways into two groups: (1) **"completed pathways"**, that is, those in which exposure has occurred, is occurring, or will occur and (2) **"potential pathways"**, that is, those in which exposure might have occurred, may be occurring, or may yet occur. A summary of all the completed pathways for the BROS site are summarized in Table # 1. The potential exposure pathways are summarized in Table # 2.

TABLE # 1. COMPLETED EXPOSURE PATHWAYS

PATHWAY NAME	EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Residential wells	**BROS**	**Groundwater**	**Residences (Taps)**	**Ingestion, Inhalation, Skin Contact**	**Residents N and NW BROS**	**Past**

TABLE # 2. POTENTIAL EXPOSURE PATHWAYS

PATHWAY NAME	EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Residential wells	BROS	Groundwater	Residences (Taps)	Ingestion, Inhalation, Skin Contact	Residents	Past Present Future
Soil	BROS	Soil	Dike Breach Area	Ingestion, Inhalation, Skin Contact	Residents, Tres-passers	Past Present Future
Sediment	BROS	Stream Sediment	Little Timber Creek	Ingestion Skin Contact	Residents, Tres-passers	Past Present Future
Ambient Air	BROS, Incinerator	Ambient Air	BROS Area	Inhalation	Residents	Past Present Future
Surface Water	BROS	Surface Water	Little Timber Creek, Ponds	Ingestion Skin Contact	Residents	Past Present Future
Biota	BROS	Surface Water	Ponds	Ingestion of Biota	Fish Eaters, Residents	Past Present Future

A. Completed Pathways

Residential Well Pathways

Past exposure of residents living near the BROS lagoon to VOC's in residential well water are likely to have occurred from before 1983 and through 1987. In the past, VOC's had migrated from the BROS lagoon through the shallow groundwater system, the Upper PRM Aquifer.

Before connections to the public water supply were completed (1982 to 1987), all of the known residents in the area were supplied with bottled water for drinking and cooking purposes. A permanent source of water to 33 of these residents was provided by extension of the public water supply pipeline in April 1987. During the period before the potable water line extension, residents may have been exposed by drinking tap water by breathing air in the home that was contaminated with VOC's released during the use of tap water for, purposes such as showers and dishwashing and, through direct contact with VOC's in activities such as hand-washing.

B. Potential Pathways

Residential Well Pathways

The full expanse of the contamination plume at the BROS site has not been totally characterized. Contamination has been documented in off site monitoring wells and has been estimated to have moved as much as a mile from the site towards the southeast. It is not known the extent to which residents may have used this water in the past , how it is presently used, or how it may be used in the future.

Most of the concern for residential exposure to contaminated groundwater would come from persons using wells screened in the Upper Middle PRM Aquifer. Again, it is not known exactly how many residential wells in the path of the contamination plume are using this aquifer.

It is possible that there are residents who are downgradient from the BROS lagoon who drank water from contaminated private wells and were chronically exposed to contaminants in those wells. The actual length of exposure to those contaminants depends on when the off-site groundwater became contaminated, which, in some cases, may have begun more than 30 years ago.

Soil/Sediment Pathways

In nonresidential areas near the Little Timber Creek and lagoon overflow area past and present exposures to elevated levels of contaminants in the surface soil and sediments via ingestion and skin contact, may have occurred. Future exposures in the overflow area are unlikely, but possible. This area is undergoing active remediation and is secured with a fence. Only workers and trespassers would have access to this area. Additionally, children and other residents could have future access to certain areas of the Little Timber Creek which could lead to exposure.

On site workers and nearby residents may potentially be exposed to airborne soil and dust released during site remediation activities. Routine dust suppression should be sufficient to minimize or eliminate this pathway.

Ambient Air

As previously noted, the BROS Site has a Thermal Destruction Facility (TDF) which is being used during the site remediation stage to incinerated contaminated materials on site. The TDF is a state-of-the-art transportable incinerator.

With the incineration of contaminated materials there is always the potential of some discharge into the air. Such emissions could constitute a potential exposure source to area residents.

When properly operated, the levels of contaminants emanating from the BROS TDF should not present a health concern. In addition, because the BROS TDF will only be operating for approximately 2 years, its potential impact on the community would be short-term (9). During the site inspection, off-site air monitoring equipment was noted, however, no air data was supplied for this public health assessment.

Surface Water

There is anecdotal evidence that the two ponds, Gaventa and Swindell are used for recreation, particularly swimming. Past exposure to low levels of organic compounds as well as elevated levels of PCBs and lead may have occurred at the ponds and the Little Timber Creek. The extent to which residents or children may have played in the creek is unknown.

In a August 1991 addendum to their 1986 Health Assessment, the ATSDR concluded that the contaminant levels measured in Swindell Pond should not pose a health concern. This conclusion was based on soil and water samples taken during the summer of 1990 at the Swindell pond property.

Continued current and future exposures at these locations, particularly at Gaventa Pond, are possible until remediation is complete.

Both of the ponds and the creek have only been sampled at 10 locations, so the full extent of any contamination has not been determined.

Biota

Since there are no data on the presence of any contaminants in biota, this pathway remains as a potential human exposure pathway. Residents may have been exposed to contaminants through the consumption the following biota: Consumption of peaches from the adjacent peach orchard is a potential source of exposure; as well as use of fish caught in the nearby ponds.

Peaches could become contaminated either from direct uptake of groundwater by the fruit trees, the presence of contaminated dust, or through the use of contaminated irrigation water from Gaventa Pond.

Fish caught from the nearby ponds may also be accumulating toxic substances. As noted, contaminants have been detected in surface water and sediments of the ponds. Of particular concern are the levels of contaminants in the part of Gaventa Pond nearest the BROS lagoon. PCBs, for example, were detected at up to 110 ppb. PCBs are known to partition significantly from water to aquatic organisms such as fish. There is evidence that PCBs will biomagnify within the food chain.

High levels of toxic compounds in fish could be a concern for any residents that eat fish captured from these ponds. More data on levels of contaminants, if any, in the fish are needed.

PUBLIC HEALTH IMPLICATIONS

A. Toxicologic Evaluation

In this section we will discuss the health effects in persons exposed to specific contaminants, evaluate state and local databases, and address specific community health concerns. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is than compared to established health

guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are more likely to have associated illnesses or disease.

Health guidelines are developed for contaminants commonly found at hazardous waste sites. Examples of health guidelines are the ATSDR's Minimum Risk Level (**MRL**) and the USEPA's Reference Dose (**RfD**). When exposure (or dose) is below the MRL or RfD then non-cancer, adverse health effects are unlikely to occur.

MRLs are developed for each route of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). ATSDR presents these MRLs in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

The toxicological effects of the contaminants detected in the groundwater and other environmental media have been considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

In the pathways section of this document, it was noted that exposure to contaminants has occurred (through a completed exposure pathway) for some of the residents in the BROS area. Before residents were switched to bottled water (1983) and before they were connected to the municipal water supply (1987), exposure to low levels of several contaminants occurred through the use of drinking water, most notably to chlorinated solvents.

As discussed in the residential wells portion of the pathways section, two wells sampled showed contamination with TCE and PCB, respectively. Emergency re-sampling by the USEPA was unable to confirm the presence of these contaminants. These compounds will not be evaluated further.

1,2-dichloroethane (DCA) (11)

Exposure to 1,2-dichloroethane (DCA) through inhalation, skin contact, and ingestion has occurred in BROS residents who used contaminated private well water before 1987. Exposure dose assessments assume that adults drink, on the average, two liters of well water per day, and children drink one liter of well water per day.

Presently there is no MRL or RfD for chronic oral exposure to 1,2-DCA. However, exposure doses calculated from the maximum reported concentration of 1,2-DCA (1.9 ppb) were well below the No Observed Adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is not likely that non-carcinogenic adverse health effects would occur.

1,2-dichloroethane is considered by the USEPA to be a probable human carcinogen. The calculated lifetime excess cancer risk associated with the oral exposure for 1,2-DCA is sufficiently low so that no apparent increased risk of cancer should be expected. Exposure dose assessments assume that adults (70 Kg) drink contaminated water for 33 years.

1,2-dichloropropane (12)

Exposure to 1,2-dichloropropane through inhalation, skin contact, and ingestion has occurred in BROS residents who used contaminated private well water before 1987. Exposure dose assessments assume that adults drink, on the average, two liters of well water per day, and children drink one liter of well water per day.

Based upon the maximum levels of 1,2-dichloropropane detected in potable wells at the site exposure doses calculated were well below the ATSDR's Minimum Risk Level (MRL) of 0.09 mg/kg/day for chronic oral exposure.

1,2-dichloropropane is considered by the USEPA to be a probable human carcinogen. There is no current oral carcinogenic slope factor from which to calculate a lifetime excess cancer risk (LECR) associated with the oral exposure for 1,2-dichloropropane. Data regarding any carcinogenic effects in humans following oral exposure to 1,2-dichloropropane was limited. Oral exposure to 1,2-dichloropropane at the calculated exposure dose would present no apparent increased risk of cancer. Exposure dose assessments assume that adults (70 Kg) drink contaminated water for 33 years.

1,1-dichloroethane (DCA) (13)

Exposure to 1,1-dichloroethane (DCA) through inhalation, skin contact, and ingestion has occurred in BROS residents who used contaminated private well water before 1987. Exposure dose assessments assume that adults drink, on the average, two liters of well water per day, and children drink one liter of well water per day.

Presently there is no MRL or RfD for chronic oral exposure to 1,1-DCA. However, exposure doses calculated from the maximum reported concentration of 1,1-DCA were well below the No Observed Adverse Effects Level (NOAEL) for animal studies presented in the ATSDR Toxicological Profile for this chemical. At such concentrations, it is not likely that non-carcinogenic adverse health effects would occur.

1,1-dichloroethane is considered by the USEPA to be a possible human carcinogen based on limited animal studies. There is no current oral carcinogenic slope factor from which to calculate a lifetime excess cancer risk (LECR) associated with the oral exposure for 1,1-dichloroethane. Data regarding any carcinogenic effects in humans following oral exposure to 1,1-dichloroethane was limited. Oral

exposure for 1,1-dichloroethane at the calculated exposure dose would present no apparent increased risk of cancer.

Vinyl Chloride (14)

Exposure to vinyl chloride through inhalation, skin contact, and ingestion has occurred in BROS residents who used contaminated private well water before 1987. For a period of up to 33 years for drinking and 37 years for other domestic uses. Exposure dose assessments assume that adults drink, on the average, two liters of well water per day, and children drink one liter of well water per day.

Based upon the maximum levels of Vinyl Chloride detected in potable wells at the site exposure doses calculated exceed the ATSDR's Minimum Risk Level (MRL) of 0.00002 mg/kg/day for chronic oral exposure. Studies with animals have shown that chronic exposure to low levels of Vinyl Chloride has caused liver damage. Health affects in humans is not well known.

There are data that show that animals fed low levels of Vinyl Chloride increased their risk of developing cancer. Vinyl Chloride is considered by the USEPA to be a human carcinogen based on these limited animal studies. There is no current oral carcinogenic slope factor from which to calculate a lifetime excess cancer risk associated with the oral exposure for Vinyl Chloride.

There is very little data regarding carcinogenic effects in humans following oral exposure to Vinyl Chloride, however, the most compelling evidence of its carcinogenic potential in humans comes from occupational studies. Reports of greater than expected cancers of the liver were reported in workers who were occupationally exposed to Vinyl Chloride. Oral exposure for Vinyl Chloride at the calculated exposure dose would present a moderate to low increased risk of cancer.

B. Health Outcome Data Evaluation

Health outcome data for the BROS site were not evaluated. Although completed exposure pathways for on-site contaminants have existed in the past, primarily through contact with contaminated groundwater, only about 33 residences were potentially exposed. Available databases would not yield observable results for a study population of this size.

Should the ATSDR and the NJDOH decide to do so, the health status of those residents whose wells were effected by site related contamination may best be determined by individual case investigation.

C. Community Health Concerns Evaluation

The primary community concern regarding the BROS Site, specifically the impact of the site on groundwater north and west of the lagoon, has been addressed through the introduction of a potable water supply to the area. Since the introduction of the public water supply community health concerns regarding water quality in the area have been minimal.

More recent community concern regarding the possible impacts on the groundwater southeast of the BROS Site are justified and will persist until the full extent of the contaminant plume has been delineated.

The issues concerning the public health implications of the on-site incinerator were addressed in a 1988 ATSDR Health Consultation. ATSDR concluded that a state-of-the-art incinerator, such as the BROS incinerator, are, when operated properly, capable of combustible destruction of organic chemicals without discharging concentrations of chemicals into the surrounding environment. Inorganic compounds can also be controlled with the proper technology.

No site related odors were noted during our site visit, however, residents have reported periodic odor problems. It seems likely that these types of episodes will continue until the site is completely remediated. There was insufficient air sampling data to evaluate the possible health effects of these odors, if any, however, adverse health effects seem unlikely. This is due to their infrequency and short duration.

At USEPA's request, the ATSDR (August 1991) performed an Addendum to the Health Assessment on Swindell Pond to evaluate data collected during the Phase 2 RI/FS for possible health effects. ATSDR concluded that the levels of VOC's, SVOC's, pesticides, inorganics, and PCBs detected, in the pond and adjoining property, were below levels of health concern. This conclusion, however, was based on a very small number of samples. For example, only two surface water and two sediment samples were taken for the entire pond (Figure # 10).

Public Comment Period

The New Jersey Department of Health (NJDOH) conducted a comment period for the Public Health Assessment for the Bridgeport Rental and Oil Service (BROS) site from September 23, 1994 to October 28, 1994. The Public Health Assessment was placed in local repositories to facilitate commentary and reaction from the public at large. Additionally, the Public Health Assessment was circulated to the Gloucester County Department of Health for the purpose of soliciting commentary by local health officials.

A summary of commentary received by the NJDOH and associated responses are contained in Appendix C.

CONCLUSIONS

Based upon information reviewed, the BROS Site is considered a public health hazard because of past exposures, and is currently considered an indeterminate public health hazard. As noted in the Pathways Analysis section of this document, human exposure to site related contaminants has occurred in the past. The indeterminate nature of the current health hazard is based on the fact that site related contaminants are migrating off-site and may have contaminated groundwater in an area where residential wells are in current use.
The contaminants detected in this groundwater are of sufficient concentrations as to constitute a public health hazard.

Currently, the past exposure of those residents north and west of BROS, originally exposed to site related contaminants has been eliminated or reduced. This was accomplished by providing affected residents with an approved public water supply. However, it is not known for certain how many of these residents continue to use the groundwater for other purposes.

The new groundwater data collected during Phase 2 of the RI/FS indicates that the groundwater is much more contaminated than first suspected, particularly towards the southeast of the site. The contamination is suspected to have moved well past the most distant monitoring wells and therefore its extent is not known. Exposure to levels of contaminants above their health comparison values may be taking place.

The presence of TCE and PCB in residential wells, noted in the September 1992 USEPA sampling, could not be confirmed. Should future sampling substantiate the presence of these contaminants, their toxicological significance will be evaluated.

Environmental data for surface soil do not adequately characterize the extent and nature of on-site and off-site contamination that may exist. Insufficient data exist to determine whether residents are being potentially exposed to contaminated soil, particularly in the Little Timber Creek area.

At least one of the ponds, Gaventa Pond, appear to have some site related contamination. There is very little data available on surface water contamination to adequately characterize the public health implications of this situation.

There was no data available on the potential contamination of biota. Residents who fish in these ponds, particularly in Gaventa Pond, may potentially expose themselves to contaminants. In addition, peaches from the nearby orchard have not been sampled.

Although air monitoring equipment was observed on the site perimeter, during our site visit, no air data was available for review and analysis. Therefore, the public health implications of potential air contamination could not be evaluated.

Remedial activities specified in the Record of Decision for the BROS site, when implemented, are sufficient to address the current concerns of the ATSDR, the NJDOH, and the community regarding the site and are consistent with protection of the public health.

RECOMMENDATIONS

Cease/Reduce Exposure Recommendations

1. The impact of the site on Gaventa Pond should be investigated to ensure that there are no human exposures. This investigation should include fish and peach sampling as well as additional sediment and surface water sampling.

2. A private well census in the area potentially impacted by the site, at least 5,000 feet downgradient, should be conducted and updated. In addition, current well usage needs to be characterized. Care should be taken to make sure formerly contaminated wells, whose owners connected to the public water supply, are now sealed and not used for irrigation purposes.

Site Characterization Recommendations

1. Additional characterization of the extent of the groundwater plume is indicated to ascertain its potential public health implications.

2. Additional data regarding site perimeter air contamination is indicated to characterize the potential public health implications.

3. Additional data is indicated regarding off-site surface soils (less than or equal to 3 inches deep) to adequately characterize the potential public health implications.

4. The presence of observable drums in Gaventa Pond indicates further characterization of this part of the site is warranted.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP) RECOMMENDATION

The data and information developed in the Public Health Assessment for the Bridgeport Rental and Oil Service, Logan Township, New Jersey, has been evaluated by ATSDR's Health Activities Recommendation Panel (HARP) for appropriate follow-up with respect to health activities. The panel determined that community health education is needed; however, the level of educational activity will be determined by the NJDOH following an evaluation of, among other factors, comments received during the public comment period for this assessment.

PUBLIC HEALTH ACTIONS

The Public Health Action Plan (PHAP) for the BROS site contains a description of the actions that have been or will be taken by ATSDR and/or NJDOH at or in the vicinity of the site subsequent to the completion of this Public Health Assessment. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of ATSDR/NJDOH to follow up on this plan to ensure that it is implemented.

Actions Taken

1. The EPA has initiated an environmental survey of the groundwater near the BROS site, particularly towards the southeast. The survey included the installation of new monitoring wells. Release of new site data regarding groundwater contamination is anticipated before September 30, 1994. The ATSDR/NJDOH will consider a health consultation when these data are available.

Actions Planned

1. ATSDR and NJDOH will evaluate public comments and other factors to determine the need for community health education.

2. ATSDR and the NJDOH will coordinate with the appropriate environmental agencies to develop plans to implement the cease/reduce exposure and site characterization recommendations contained in this health assessment.

3. ATSDR will provide an annual follow up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this health assessment, and will be provided to persons who request it.

ATSDR will reevaluate and expand the Public Health Action Plan (PHAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.

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APPENDICES

APPENDIX A

TABLE # 3. CONTAMINANTS OF CONCERN; ON-SITE GROUNDWATER MONITORING WELLS; BROS SITE, LOGAN TWP., NJ., CONTAMINANTS *WITH* COMPARISON VALUES.

CONTAMINANT	CONCENTRATION RANGE-PPB *		DATE	REF	COMPARISON VALUE	
	SHALLOW	DEEP			PPB	SOURCE
1,2-Dibromo-3-chloro-propane	ND-10	ND	9/90	5	20	EMEG
Benzene	ND-810	ND-95	9/90	5	1.2	CREG
Acetone	ND-77	17-33,000	9/90	5	1000	RMEG
1,1 Dichloroethene	ND	ND	9/90	5	.06	CREG
Cis-1,2 Dichloro-ethene	ND-3	ND-100	9/90	5	70	LTHA
1,2 Dichloroethane	ND	ND	9/90	5	0.4	CREG
Methylene Chloride	ND-70	ND-579	9/90	5	5	CREG
Trichloroethene	ND	ND-1000	9/90	5	3	CREG
Tetrachloroethene	ND-2	ND-25	9/90	5	0.7	CREG
1,1,2,2-Tetrachloroethane	ND	ND	9/90	5	0.2	CREG
Vinyl Chloride	ND	ND	9/90	5	0.2	EMEG
Benzo (A) Pyrene	ND-15	ND	9/90	5	.005	CREG
BEHP	ND-120	ND	9/90	5	3	CREG
BCEE	ND-11	ND-780	9/90	5	.03	CREG
Isophorone	ND-35	ND-1300	9/90	5	9	CREG
Naphthalene	ND-180	ND-25	9/90	5	20	LTHA
Manganese	292-6040	79.1-6240	9/90	5	50	RMEG
Barium	ND-1200	ND	9/90	5	700	RMEG
Zinc	ND	ND-567,000	9/90	5	3000	RMEG
Chromium	120-1730	ND	9/90	5	10	NJ MCL

* = Concentration range given for both the shallow and the deep aquifers

ND = Not Detected

Source: Phase II RI/FS

TABLE # 4. CONTAMINANTS OF CONCERN; OFF-SITE GROUNDWATER; BROS SITE, LOGAN TWP.,NJ. CONTAMINANTS *WITH* COMPARISON VALUES.

CONTAMINANT	CONCENTRATION RANGE-PPB *		DATE	REF	COMPARISON VALUE	
	SHALLOW	DEEP			PPB	SOURCE
1,2-Dibromo-3- chloro-propane	ND	ND	9/90	5	20	EMEG
Benzene	ND	ND-30	9/90	5	1.2	CREG
Acetone	ND-630	ND-3500	9/90	5	1000	RMEG
1,1 Dichloroethene	ND	ND-.9	9/90	5	.06	CREG
Cis-1,2 Dichloro-ethene	ND	ND-28	9/90	5	70	LTHA
1,2 Dichloroethane	ND	ND-17	9/90	5	0.4	CREG
Methylene Chloride	ND-16	ND	9/90	5	5	CREG
Trichloroethene	ND	ND-35	9/90	5	3	CREG
Tetrachloroethene	ND	ND-3	9/90	5	0.7	CREG
1,1,2,2-Tetrachloroethane	ND	ND-2	9/90	5	0.2	CREG
Vinyl Chloride	ND	ND-37	9/90	5	0.2	EMEG
Benzo (A) Pyrene	ND	ND	9/90	5	.005	CREG
BEHP	1-5	ND-2	9/90	5	3	CREG
BCEE	ND	ND-380	9/90	5	.03	CREG
Isophorone	ND	ND-1	9/90	5	9	CREG
Naphthalene	ND	ND-5	9/90	5	20	LTHA
Manganese	249-2040	ND-293	9/90	5	50	RMEG
Barium	ND	ND	9/90	5	700	RMEG
Zinc	ND	ND-16,800	9/90	5	3000	RMEG
Chromium	ND-234	ND	9/90	5	10	NJ MCL

* = Concentration range given for both the shallow and the deep aquifers

ND = Not Detected

Source: Phase II RI/FS

TABLE # 5. RANGE OF CONTAMINANTS IN ON-SITE GROUNDWATER, CONTAMINANTS *WITHOUT* ATSDR COMPARISON VALUES.

CONTAMINANT	CONCENTRATION RANGE-(PPB)*		REFERENCE
	SHALLOW	DEEP	
1,2,4 Trimethylbenzene	ND-360	ND	5
1,3,5 Trimethylbenzene	ND-250	ND	5
1,2 Dibromoethane	ND-36	ND	5
2-Butanone	ND-27	ND-2	5
2-Hexanone	ND-93	ND	5
N-Propylbenzene	ND-59	ND	5
N-Butylbenzene	ND-28	ND	5
P-Isopropyltoluene	ND-15	ND	5
Sec-Butylbenzene	ND-5	ND	5
2-Methylnapthalene	ND-74	ND	5
4-Methylphenol	ND-130	ND-160	5
Benzo (B) Fluoranthrene	ND-13	ND	5
Chrysene	ND-32	ND	5
Di-N-Octylphthalate	ND-12	ND	5
Dibenzofuran	ND-16	ND	5
Phenanthrene	ND-130	ND	5
Benzylalcohol	ND-2,800	ND	5
4-methyl-2-Pentanone	ND	ND-2,000	5
Lead	ND-1380	ND-2920	5

* = Concentration range given for both the shallow and the deep aquifers

ND = Not Detected

Source: Phase II RI/FS

TABLE # 6. RANGE OF CONTAMINANTS IN OFF-SITE GROUNDWATER, CONTAMINANTS *WITHOUT* ATSDR COMPARISON VALUES.

CONTAMINANT	CONCENTRATION RANGE-(PPB)*		REFERENCE
	SHALLOW	DEEP	
1,2,4 Trimethylbenzene	ND-11	ND-3	5
1,3,5 Trimethylbenzene	ND	ND-.7	5
1,2 Dibromoethane	ND	ND	5
2-Butanone	ND	ND-.5	5
2-Hexanone	ND	ND	5
N-Propylbenzene	ND	ND	5
N-Butylbenzene	ND	ND	5
P-Isopropyltoluene	ND	ND	5
Sec-Butylbenzene	ND	ND	5
2-Methylnapthalene	ND	ND	5
4-Methylphenol	ND	ND	5
Benzo (B) Fluoranthrene	ND	ND	5
Chrysene	ND	ND	5
Di-N-Octylphthalate	ND	ND	5
Dibenzofuran	ND	ND	5
Phenanthrene	ND	ND	5
Benzylalcohol	ND	ND	5
4-methyl-2-Pentanone	ND	ND	5
Lead	ND-140	ND-55.6	5

* = Concentration range given for both the shallow and the deep aquifers

ND = Not Detected

Source: Phase II RI/FS

TABLE # 7. CONTAMINANTS IN 11 OFF-SITE RESIDENTIAL GROUNDWATER (1983 TO 1985).

CONTAMINANT	CONCENTRATION PPB	COMPARISON VALUE (CV)		
		PPB	SOURCE	CV EXCEEDED ?
trans 1,2-DCE	20	200	RMEG	NO
1,2-DCA	1.9	0.4	CREG	YES
1,2-dichloro-propane	7.1	.005	MCL	YES
1,1-DCA	1.9			NA
vinyl chloride	170	0.2	EMEG	YES
NA = NOT AVAILABLE				

Table # 8. RANGE OF CONTAMINATION IN Off-SITE GROUNDWATER, RESIDENTIAL WELLS, SEPTEMBER 1992.*

WELL#	CONTAMINANT	LEVEL PPB	DATE	REF	COMPARISON VALUE	
					PPB	SOURCE
RW-40	Cis-1,2-dichloro-ethane	9	10/92	15	70	LTHA
RW-40	Trichloroethene	120	10/92	15	3	CREG
RW-65	Dieldrin	.025	10/92	15	.002	CREG
RW-44	Aroclor 1260	0.8	10/92	15	.002	MCL

* Resampling of contaminated wells by the USEPA in 1993 was not able to confirm the presence of the contaminants shown in table.

APPENDIX B

APPENDIX C

Response Summary

This response summary represents those comments and reactions to the Public Health Assessment received during the Public Comment Period described in the Community Concerns Evaluation section. A single comment was received from the Gloucester County Planning Department which listed additional sources of information about the site and the surrounding area. These sources have been acknowledged and added to the official file for this Public Health Assessment.