HEALTH CONSULTATION

FLORIDA PETROLEUM REPROCESSORS - AREA GROUNDWATER CONTAMINATION

FT. LAUDERDALE, BROWARD, FLORIDA

CERCLIS NO. FLD984184127

December 2, 1996

Prepared by

Florida Department of Health and Rehabilitative Services
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Background and Statement of Issues

The Florida Department of Health and Rehabilitative Services (Florida HRS), through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) in Atlanta, Georgia, evaluates the public health significance of Superfund hazardous waste sites in Florida. The U.S. Environmental Protection Agency (EPA) has requested that Florida HRS evaluate the health effects of exposure to contaminants in groundwater near the Florida Petroleum Reprocessors (FPR) site in Broward County, Florida (1). EPA collected samples from monitoring wells on and off of the site, and from public supply wells in a wellfield north of the FPR property. EPA analyzed samples for pesticides, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), metals, and chlorinated hydrocarbons (2, 3, 4, 5, 6). We have determined that a health consultation is an appropriate response to evaluate the groundwater sampling data. The interpretation, advice, and recommendations presented in this report are site-specific and should not be considered applicable to any other sites.

Florida Petroleum Reprocessors (FPR) began in 1978 as Oil Conservationists, Inc. The 1.25-acre property is at 3211 S.W. 50th Avenue, Davie, Florida (Figs. 1, 2, 3). The company functioned as a waste oil transfer station and reprocessed waste oil by filtering and grading until it closed in 1992 (2, 3, 4). Beginning in the mid-1980's FPR completed several cleanup actions ordered by the Florida Department of Environmental Protection (FDEP). FPR moved storage tanks inside containment areas, installed groundwater monitoring wells, excavated and disposed of contaminated soil, and removed and disposed of waste oil (3). EPA is currently assessing soil and groundwater contamination on and near the FPR property to determine what additional remedial actions may be needed.

In the mid-1980's, the City of Fort Lauderdale discovered volatile organic compounds (VOCs) in production wells in the south Peele-Dixie wellfield (Fig. 3), resulting in the closure of this wellfield. The wellfield is about one mile north-northeast of the FPR property. Natural groundwater flow in this area is strongly influenced by pumping activities in the wellfield. Although groundwater flow is generally from northwest to southeast (4), drawdown around wells in the south wellfield can reverse this flow and cause flow northward from the New River Canal (7). Many of the chemicals in the groundwater on the FPR property are also found in the south Peele-Dixie wellfield production wells. The City is evaluating the treatment methods needed to allow reopening this wellfield for use as a public water supply (4).

In December, 1992, Florida HRS conducted a preliminary public health assessment of the Broward County - 21st Manor Dump site

which is on the southern side of the south Peele-Dixie wellfield (8). The report concluded that VOCs in private wells near the site could be of health concern and recommended that households with private wells be provided with an alternate drinking water source. There was, and still is, public concern about groundwater contamination in the area. The neighborhood where private wells are located has a transient, predominantly Spanish-speaking, population that may not be aware of the potential health hazards from using this water (5).

Because groundwater contamination having public health implications extends beyond the FPR property and includes most of the south Peele-Dixie wellfield, we have defined the site as the area bounded by Peters Road on the north, US Highway 441 on the east, the Florida Turnpike on the west, and Oakes Road on the south (Fig. 3). For analysis purposes, we have subdivided the site into northern and southern areas using the New River Canal as the dividing line (Figs. 4 and 5).

According to 1990 census data (9), about 17,000 people live within the area of the site. The neighborhoods in this area are middle income. The population is about 81% white, 6% African-American, and 13% Hispanic. There are three public schools within the site area.

The northern part of the site is mostly residential. The eleven public supply wells of the South Peele-Dixie wellfield are in this part of the site. There is also a recreational lake and other recreational facilities, such as baseball fields. There are a number of homes here that have private wells. All of these homes have public water available (8).

The southern part of the site contains a trailer park and light industrial facilities. There are no public or private wells in the southern part of the site.

Fifteen potential contaminants of concern are present in the groundwater on the FPR property and in the South Peele-Dixie wellfield. These contaminants are:

arsenic	manganese
benzene	methylene chloride
bromodichloromethane	tetrachloroethene
chloroform	toluene
1,2-dichloroethane	1,1,1-trichloroethane
1,1-dichloroethene	trichloroethene
1,2-dichloroethene	vinyl chloride
lead	

Most of these contaminants were found only in shallow groundwater in the southern part of the site. Since this groundwater is not used for any purpose, there is currently no completed exposure

pathway. Many of these contaminants are also present in the soil on the FPR property; however, none of them are at a high enough level to represent a public health threat.

Two contaminants, 1,1-dichloroethene and vinyl chloride, are present in the groundwater on both parts of the site at levels high enough to be of potential health concern. Because both have also been found in the groundwater of the South Peele-Dixie wellfield, a potential completed exposure pathway, we selected them for further evaluation. Neither 1,1-dichloroethene nor vinyl chloride have been found at a level of concern in groundwater outside of the site area. Table 1, below, presents the highest level of these contaminants found in the groundwater on the site.

Table 1. Maximum Level of Contaminants in On-site Groundwater

	MAX. CONTAMINANT CONCENTRATION (µg/L)	
LOCATION	1,1-DICHLOROETHENE	VINYL CHLORIDE
SHALLOW (<60 FT.) GROUNDWATER - SOUTHERN AREA	12000	120000
DEEP (>60 FT.) GROUNDWATER - SOUTHERN AREA	520	260
SHALLOW (<60 FT.) GROUNDWATER - NORTHERN AREA	19.14	12
DEEP (>60 FT.) GROUNDWATER - NORTHERN AREA	71.94	240

µg/L - micrograms per liter
Sources: 2, 3, 4, 5, 6

Discussion

To evaluate health effects, ATSDR has developed Minimal Risk Levels (MRLs) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer, adverse health effects are unlikely to occur. ATSDR developed MRLs for each route of exposure, such as ingestion, inhalation, and dermal contact, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 365 days), and chronic (greater than 365 days). ATSDR presents these MRLs in Toxicological Profiles.

These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

ATSDR has developed MRLs for 1,1-dichloroethene (10)and vinyl chloride (11). To evaluate possible adverse health effects from ingestion of these chemicals in water, we used a standard ingestion rate for water of 1 liter per day (L/day) for children and 2 L/day for adults, and a standard body weight of 15 kilograms (kg) for children and 70 kg for adults.

1,1-Dichloroethene

The maximum estimated daily dose of 1,1-dichloroethene in shallow and deep groundwater on the southern part of the site exceeds the MRL for adults and children. No public or private supply wells are in this area. Therefore, no exposure is currently likely. However, future exposure is possible if this contaminated groundwater migrates to areas containing active supply wells.

The maximum estimated daily dose of 1,1-dichloroethene in shallow and deep groundwater on the northern part of the site is less than the MRL for adults and children. Therefore, no adverse non-carcinogenic health effects are likely.

1,1-Dichloroethene is a possible human carcinogen based on studies in animals (10). The evidence for the carcinogenicity of 1,1-dichloroethene in animals is not very good. Slight increases in some types of liver cancer have been observed in rats. Other types of cancers have also been observed. However, their relevance to human cancer is questionable (10). Therefore, although an increased risk of liver cancer is possible from lifetime exposure to 1,1-dichloroethene in the groundwater on the site, there is no clear evidence that an exposed person would actually increase their risk of liver or other cancers.

Vinyl chloride

The maximum estimated daily dose of vinyl chloride in shallow and deep groundwater on both parts of the site exceeds the MRL for adults and children. No public or private supply wells are in the southern part of the site. Therefore, no exposure is currently likely. Public and private wells are present in the northern part of the site. Although the public supply wells are not currently in use, there are some private wells that may be in use. Exposure to vinyl chloride in groundwater on the site may affect the liver by changing its cell structure (11).

Vinyl chloride is a known human carcinogen by inhalation. Vinyl chloride is expected to be carcinogenic by other exposure routes as well (11). Rats exposed to vinyl chloride in their water had an increased rate of liver cancer. Human exposure to vinyl

chloride by inhalation also increases the risk of liver cancer. Therefore, it is prudent to expect that lifetime exposure to vinyl chloride in the groundwater on the site may result in a low to moderate increase in the risk of liver cancer.

Conclusions

Based upon the information reviewed, Florida HRS concludes that adverse, non-carcinogenic and carcinogenic health effects may occur from exposure to vinyl chloride in groundwater on this site. Contamination in wells on the northern part of the site may increase if contaminated groundwater migrates from the southern part of the site. If additional information becomes available indicating other exposures at levels of concern, Florida HRS will evaluate that information to determine what actions, if any, are necessary.

Recommendations

We recommend that EPA limit human exposure to vinyl chloride-contaminated groundwater at this site. We also recommend that EPA monitor groundwater in the northern part of the site annually to ensure that any increases in contaminant levels are found in a timely manner. Finally, we recommend that Florida HRS, in cooperation with ATSDR, conduct community health education to assist residents with private wells in understanding their potential for exposure and the possible health risks, and to inform them of measures they may take to reduce their exposure.

References

1. U.S. Environmental Protection Agency. Letter to Bruce Tuovila, Florida HRS from Bradley Jackson, EPA, requesting a health consultation for the Florida Petroleum Reprocessors Site July 10, 1996.

2. Southeast Environmental Consultants, Inc. Contamination Assessment Plan for Oil Conservationists, Incorporated. September 7, 1987.

3. Southeast Enviromental Consultants, Inc. Contamination Assessment Report for Oil Conservationists, Inc. March 21, 1991

4. James M. Montgomery Consulting Engineers, Inc. Final Report: Contamination Assessment for the Continued Use of the Dixie Wellfield. December 8, 1992.

5. Bechtel Environmental, Inc. Draft Remedial Investigation/ Feasibility Study, Phase I Site Characterization Report for the Peele-Dixie Groundwater Plume Site, Ft. Lauderdale, Florida. December 1994.

6. Bechtel Environmental, Inc. Site Characterization Report for Phase II of the Remedial Investigation for the Peele-Dixie Groundwater Plume Site, Ft. Lauderdale, Florida. December 1995

7. Florida Department of Environmental Regulation. Peele-Dixie Wellfield Contamination - Broward County. December 1988.

8. Florida HRS. Preliminary Public Health Assessment, Broward County - 21st Manor Dump, Ft. Lauderdale, Broward County, Florida. December 15, 1992.

9. Bureau of the Census. 1990 Census Data Files. U.S. Department of Commerce, Washington, DC.

10. Agency for Toxic Substances and Disease Registry. Toxicological Profile for 1,1-Dichloroethene (Update). ATSDR: Atlanta. May 1994.

11. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Vinyl Chloride (Update). ATSDR Atlanta. August 1995.

Health Consultation Author

Bruce J. Tuovila
Biological Scientist
HSET
(904) 488-3385

CERTIFICATION

This Florida Petroleum Reprocessors - Area Groundwater Contamination Health Consultation was prepared by the Florida Department of Health and Rehabilitative Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

David Hutchins
Technical Project Officer
Remedial Programs Branch (RPB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation, and concurs with its findings.

Sharon Williams-Fleetwood, Ph.D.
Chief, RPB, DHAC, ATSDR

Figure 1. State Map Showing Location of Broward County

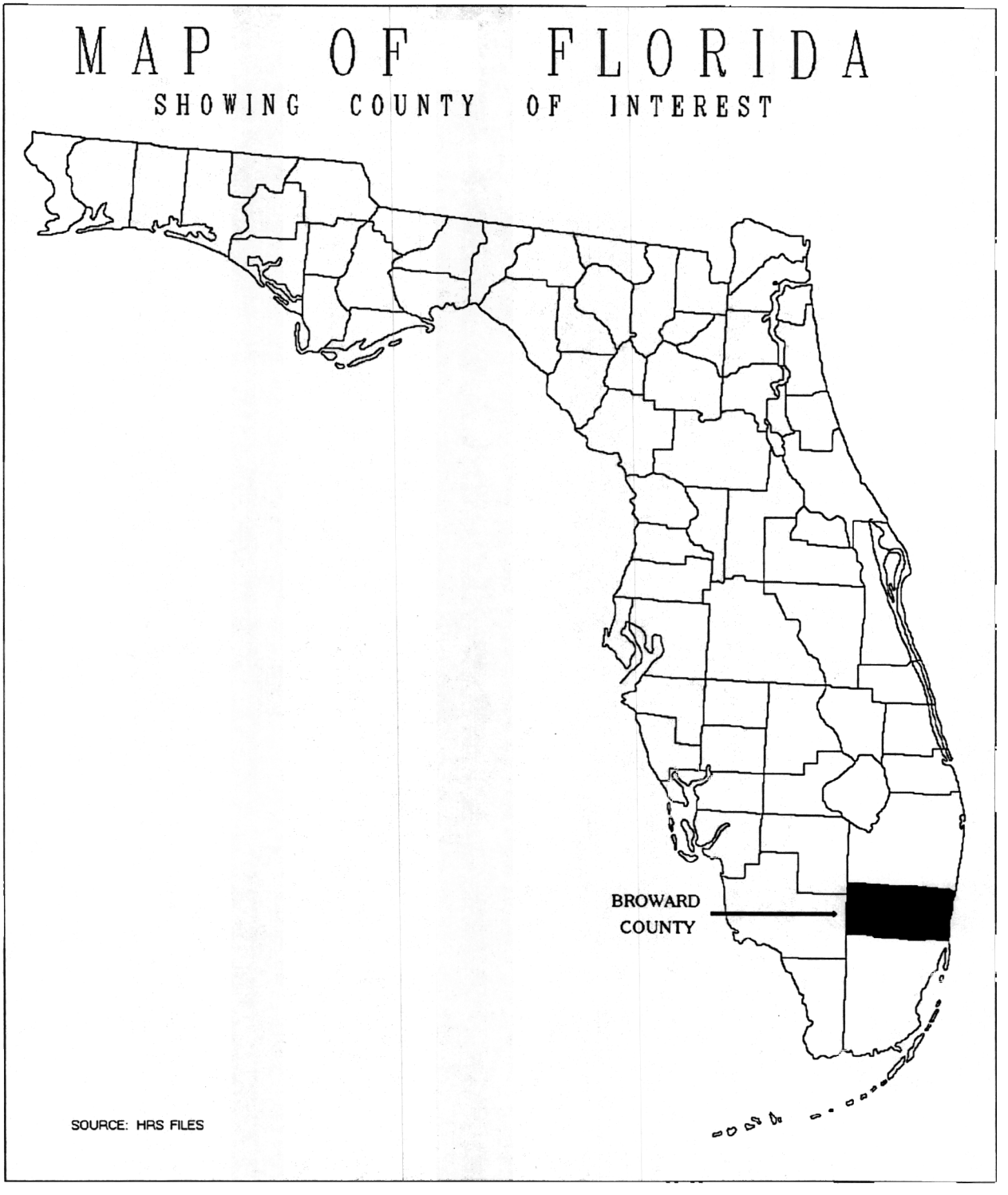
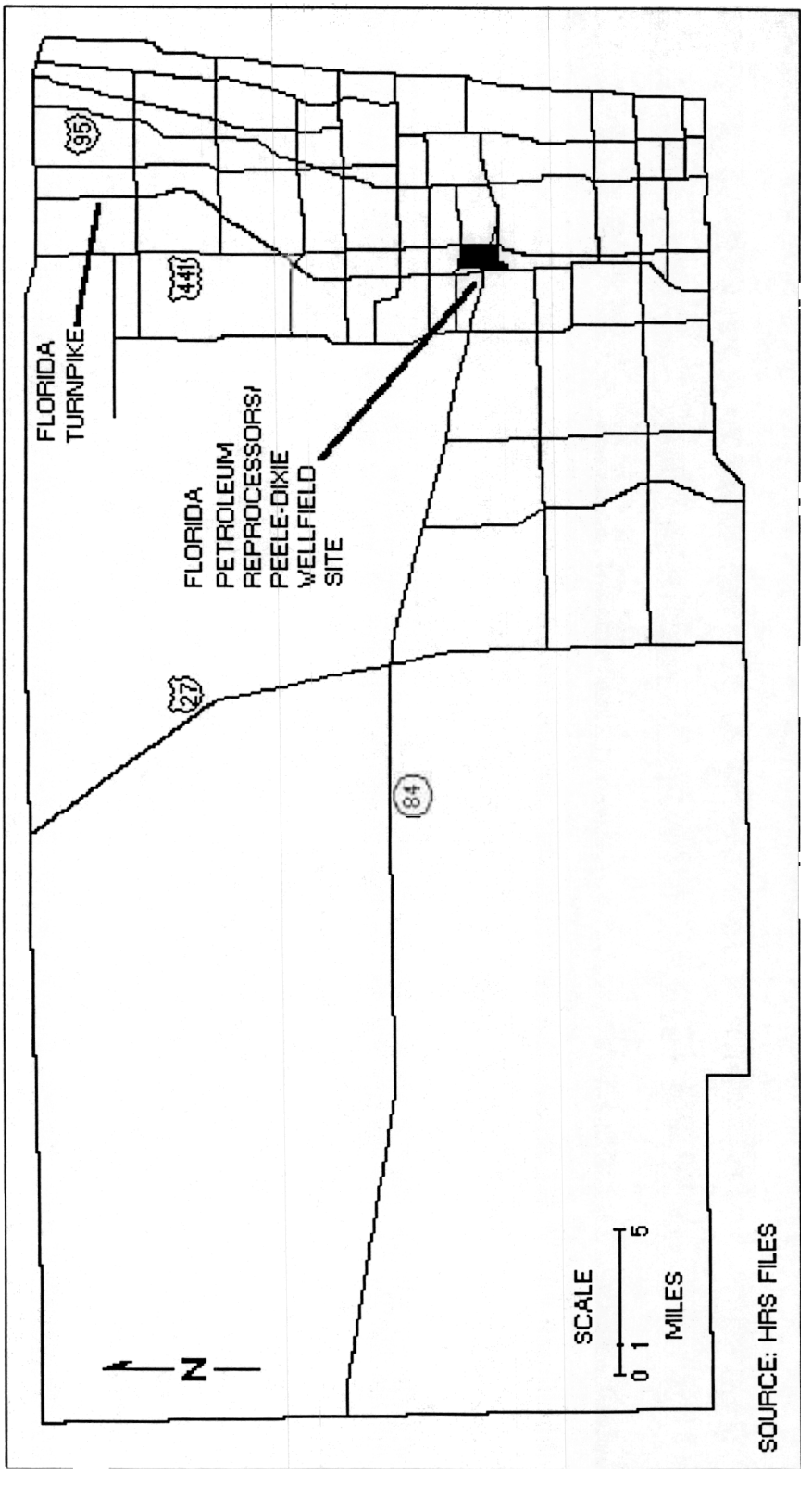


Figure 2. Location of Florida Petroleum Reprocessors Area Groundwater Contamination Site in Broward County




PETERS
ROAD
738
738
441
441
SOUTH
PEELE-
DIXIE
WELLFIELD
595
595
NEW
RIVER
CANAL
N
SCALE
0 500 1000 1500
FEET
■ - PRODUCTION WELL
SOURCE: HRS FILES
FLORIDA
PETROLEUM
REPROCESSORS
SITE
OAKES ROAD

Figure 4. Detail - Southern Part of Florida Petroleum Reprocessors Area Groundwater Contamination Site