Health Consultation

FLORIDA PETROLEUM REPROCESSORS

DAVIE, BROWARD COUNTY, FLORIDA

CERCLIS NO. FLD984184127

AUGUST 24, 1999

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA

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HEALTH CONSULTATION

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Prepared by:

Florida Department of Health
Bureau of Environmental Toxicology
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

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Summary

The Environmental Protection Agency (EPA) requested the Florida Department of Health review modeled air concentrations at the Florida Petroleum Reprocessors Superfund Site. Specifically, the EPA requested input on 1) estimates of potential exposure doses, 2) maximum exposure concentrations protective of public health, and 3) the EPA's assessment of the need for capturing/treatment of emission or temporary relocation of receptors.

The Environmental Protection Agency (EPA) modeled off-site air concentrations based on anticipated on-site air concentrations during remediation activities. The Potentially Responsible Parties (PRPs) proposed excavating contaminated soil for a duration of at least three weeks and covering the stockpiled soil on-site daily.

We concur with EPA's methodology (model) used to estimate potential exposure doses. We find that EPA's maximum exposure concentrations and alternate methods for controlling exposures (if screening levels are exceeded) are protective of public health. If remediation activities result in exposure doses much higher than the benchmark levels, a more in depth review of the data and possible capturing/treatment of emissions or temporary relocation of receptors may be needed.

Background

The Florida Petroleum Reprocessors (FPR) Site in Davie, Florida was listed on National Priorities List on March 27, 1998 (See Figure 1, 2, & 3). Between 1978-1992, it was a waste oil transfer station. The groundwater, soil and sediments are contaminated with volatile organic chemicals, metals and polycyclic aromatic hydrocarbons (EPA 1997).

In October 1998, FDOH prepared a public health assessment for public comment evaluating the potential for health effects from exposure to contaminated groundwater, soil, sediment, and surface water. FDOH concluded the site poses a potential public health hazard because of multiple potentially completed pathways. Furthermore, in the past, the site posed a public health hazard because private wells in the northern part of the site were contaminated. FDOH determined, residents using private well water may be at an increased risk of illness or cancer from household use contaminated groundwater. Since the plume of contaminated groundwater is moving south, residences with private wells may potentially be exposed in the future (FDOH 1998).

The FPR Potentially Responsible Party (PRPs) Group prepared a "Work plan for Shallow Source Removal for the FPR Site." The PRPs plan to clear debris, install sheeting around the edges of the excavation area and construct drain pads. Then they plan to excavate about 285 tons of contaminated soil above the watertable and about 2,250 tons of chemicals below the water table. They plan to control odors using a vapor suppressing foam and monitor the air. They plan to remove chemicals from the water to federal cleanup standards (Golder Associates 1999).

The EPA responded to the proposed remedial alternative in a March 31, 1999 memorandum entitled "Health Benchmarks for the Florida Petroleum Reprocessors Superfund Site" from Kenneth L. Mitchell Ph.D. Environmental Scientist to Lee Page, Environmental Engineer. The EPA noted that during excavation, substantial amounts of volatile organic chemicals may spread into the air and float offsite to nearby residences. The EPA modeled the levels of VOC's that residents might breathe during excavation. They determined which screening health benchmark values for non-cancer and carcinogenic chemicals they would use to compare with the modeled values. Finally, they discuss further examination if exposures exceed screening values.

EPA requested input on 1) the estimates of potential exposure doses, 2) the maximum exposure concentrations protective of public health, and 3) the EPA's assessment of the need for capturing/treatment of emission or temporary relocation of receptors.

Discussion

1) Estimate of potential exposure doses of carcinogens

The EPA estimated the potential exposure doses of carcinogens using the "Carcinogen Fenceline Health Benchmarks" calculation. Variables they used include: the unitless target risk, body weight in kilograms, the averaging time in years, the exposure frequency in days per year, the inhalation rate in cubic meters per day, exposure duration in years, and the inhalation slope factor in (1/milligrams per kilograms - day).

This equation, "Carcinogen Fenceline Health Benchmarks," combines the standard dose equation, risk calculations and target risk that we use in our public health assessments. This approach is reasonable given the exposure scenarios that are likely to exist at the site and that the approach is comparable to the approach we used in our public health assessments. We believe breathing contaminated air at this site is a completed exposure pathway.

In order to accurately define site-specific exposure, we convert levels of contamination in a media (air, soil, etc.) to an exposure dose. An exposure dose is the amount of contact with a chemical over time divided by a time period to obtain an average exposure rate per unit of time. The average exposure rate is also expressed as a function of body weight. For carcinogens, we assume exposure occurs over a 70 year lifetime. We use the same or similar exposure values to derive the dose estimates as used in the March 31, 1999 memo (EPA 1990).

For carcinogens, we calculate the probability of excess cancer cases that could develop per unit of population if the exposure assumptions are met for a specific contaminant. This probability is called the cancer risk. To calculate the cancer risk, we multiply the exposure dose times toxicity values (e.g., slope factors) to determine if the exposures pose a potential health risk (EPA 1989). Usually, an excess cancer risk of 1 in 1,000,000 ($1x10^{-6}$) is considered a negligible increase in cancer risk (the target risk; Williams 1985). The EPA uses the same the target risk that we use in our health assessments.

In conclusion, the equation, "Carcinogen Fenceline Health Benchmarks" uses the same standard dose risk calculations and target risk that we use in our health assessments. If a dose is greater than the negligible cancer risk range, we evaluate the chemical further. A negligible cancer risk ensures the safety of public health.

2) Maximum exposure concentrations protective of public health

Non-carcinogens

The EPA reviewed various methods for developing air screening levels for non-carcinogenic chemicals at the FPR fenceline. Since the EPA expects the remediation to last at a minimum three weeks and since the potentially exposed population is nearby residents, they choose to use the EPA's subchronic reference concentrations (RfCs) and the Agency for Toxic Substances and Disease Registry (ATSDR's) minimum risk levels (MRLs). First they used RfD's, then if they were not available for a chemical, they used intermediate exposure duration MRLs; if an intermediate MRL did not exist, they used an acute exposure MRL. We concur with the use of this benchmark because the approach is conservative.

To assess the health threat at a site, we use MRL screening levels for a first tier screening. We then may use EPA's RfD if an MRL does not exit. We compare modeled doses (or estimated exposures) to contaminant-specific MRLs, for the anticipated length of exposure, in this case an intermediate length - 15 to 364 days of exposure. An MRL is an estimate of the daily dose of a contaminant below which non-cancer illnesses are unlikely to occur. ATSDR develops MRLs from scientific studies found in the toxicological literature. They are usually based on a single study using the most sensitive endpoint and the most sensitive species of animal and are derived from no adverse effect levels with added uncertainty factors applied. MRLs are intended to serve as screening levels and used by the ATSDR health assessors to identify contaminants and potential health effects that may be of concern at hazardous waste sites (ATSDR 1992). If a modeled air concentration (exposure dose) is higher than the MRL, we evaluate the modeled air concentration further. The higher the exposure dose is above the MRL, the greater the likelihood of adverse health effects.

The EPA Recommended Fenceline Screening Benchmark for Ambient Air Concentrations Based On Non-Carcinogenic Effects for the Florida Petroleum Reprocessors Superfund Site proposes to use the same the screening levels that we use in our health assessments. If a dose is less than these benchmarks, it would ensure the safety of public health.

Carcinogens

The EPA proposes to use EPA's inhalation slope factors for developing air screening levels for carcinogenic chemicals at the fenceline at FPR. The EPA's "Recommended Fenceline Screening Benchmark Ambient Air Concentrations Based on Carcinogenic Effects" uses the same toxicity values we use for our health assessments to qualitatively assess the risk of cancer.

To evaluate possible cancerous health effects, we qualitatively interpret the weight of evidence. We identify if the National Toxicology Program, the International Agency for Research on Cancer or the Environmental Protection Agency classifies the compound as a carcinogen. We identify cancer studies, whether or not the associated cancers have been looked for and found to occur in humans or animals, mechanism of action, and duration of exposure (ATSDR 1992).

If toxicity values such as slope factors (or unit risks for inhalation exposures) are available, we quantitatively assess the risk of cancer by using standard equations to calculate an individual's additional risk of developing cancer over a lifetime after exposure to a potentially cancer-causing contaminant. To calculate the cancer risk, we multiply the exposure dose to toxicity values (e.g., slope factors), if they exist, to determine if the exposures pose a potential health risk. Usually, an excess cancer risk of 1 in 10,000 to 1 in 1,000,000 is considered a negligible increase in cancer risk (Williams 1985).

The EPA's March 31, 1999 memo uses the same the toxicity values that we use in our health assessments. These toxicity values used in conjunction with the modeled exposure dose would ensure that we would not have to evaluate the contaminant further and would ensure the safety of public health.

3) EPA's assessment of the need for capturing/treatment of emission or temporary relocation of receptors

Exposure doses at or below the levels suggested in the EPA March 31, 1999 memo would ensure the safety of public health. Exposure doses above the levels suggested in this memo would not necessarily cause illnesses but would warrant a more in-depth study. The higher the exposure doses are above these benchmarks, the greater likelihood of adverse health effects for community members. If remediation activities result in exposure doses much higher than the benchmark levels discussed in this memo, public health may be threatened.

Conclusions

1. We concur with the EPA's estimates of potential exposure doses. The methodology used in the equation, "Carcinogen Fenceline Health Benchmarks" combines the standard dose equation and risk calculations that we use in our health assessments and it also incorporates the same target risk we use for our health assessments.

2. We concur with the EPA's maximum exposure concentrations protective of public health. The EPA's use of Recommended Fenceline Screening Benchmark for Ambient Air Concentrations based on non-Carcinogenic Effects for the Florida Petroleum Reprocessors Superfund site are the same the screening levels that we use in our

health assessments to eliminate chemicals from further evaluation. In addition, we concur with the use of the EPA's cancer toxicity values. These toxicity values would ensure that we would not have to evaluate the contaminant further and would ensure the safety of public health.

3. We concur with the EPA's assessment of the need for capturing/treatment of emission or temporary relocation of receptors. The higher the exposure doses are above these benchmarks, the greater likelihood of adverse health effects for community members.

Recommendations

1. We recommend the use of the EPA's method of determining potential exposure in the equation, "Carcinogen Fenceline Health Benchmarks."

2. We recommend the use of the EPA's maximum exposure concentrations protective of public health, Recommended Fenceline Screening Benchmark for Ambient Air Concentrations based on non-Carcinogenic Effects for the Florida Petroleum Reprocessors Superfund site. We recommend the use of the EPA's cancer toxicity values.

3. If remediation activities result in exposure doses much higher than the benchmark levels discussed in this memo, public health may be threatened and alternative methods to limit exposure may be necessary. Alternative methods include a more in depth review of the data and possible capturing/treatment of emissions or temporary relocation of receptors.

The conclusions and recommendations in this report are based on the information reviewed. If additional information becomes available, we will evaluate it to determine what, if any, additional actions are necessary. The conclusions and recommendations in this report are site specific and are not necessarily applicable to other sites.

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CERTIFICATION

This Florida Petroleum Reprocessors Health Consultation was prepared by the Florida Department of Health 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.

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ATSDR

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

for RG

Richard Gillig
Chief, SSAB, DHAC, ATSDR

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Appendix

Figure 1

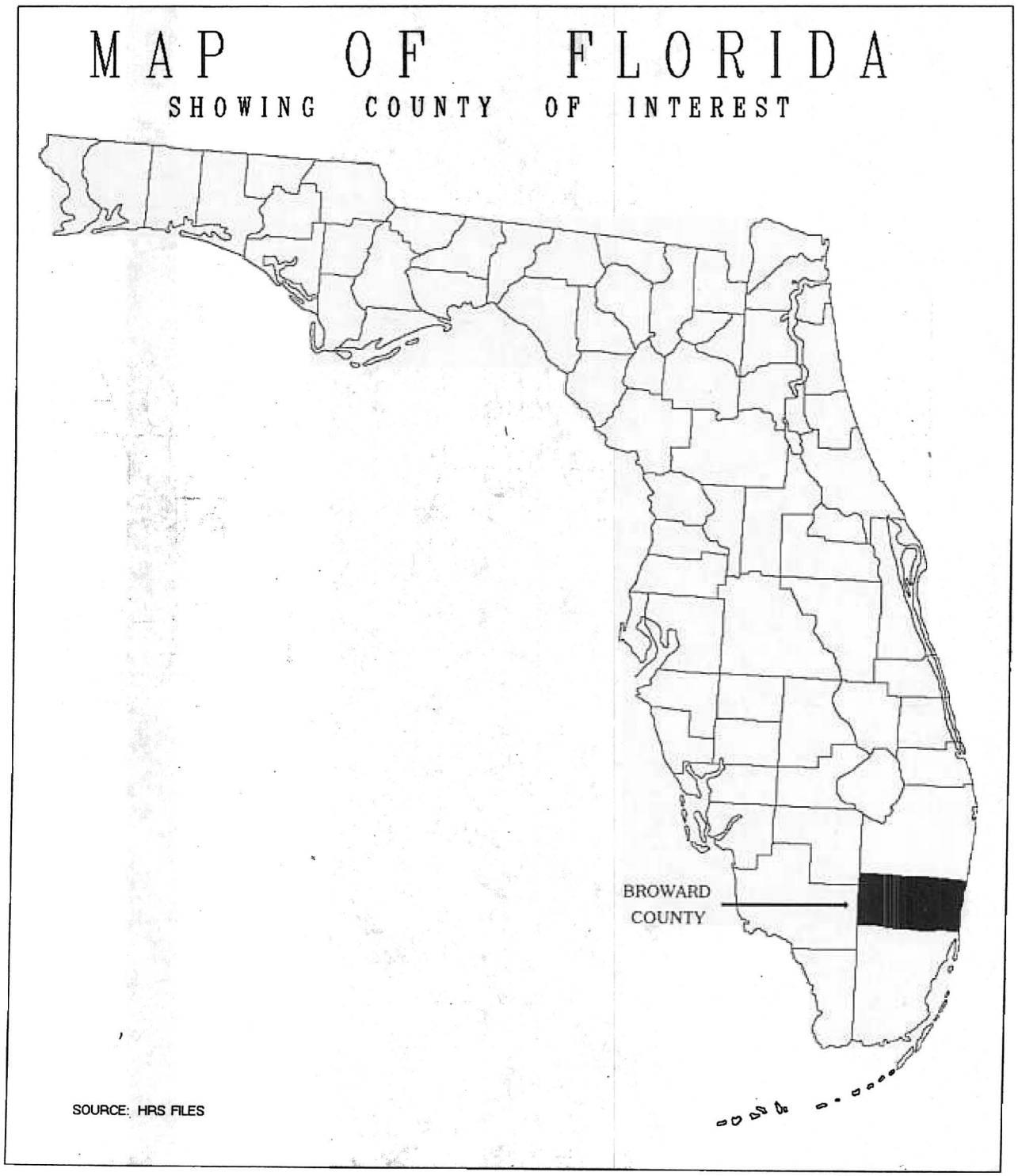
MAP OF FLORIDA
SHOWING COUNTY OF INTEREST
BROWARD
COUNTY
SOURCE: HRS FILES

Figure 2

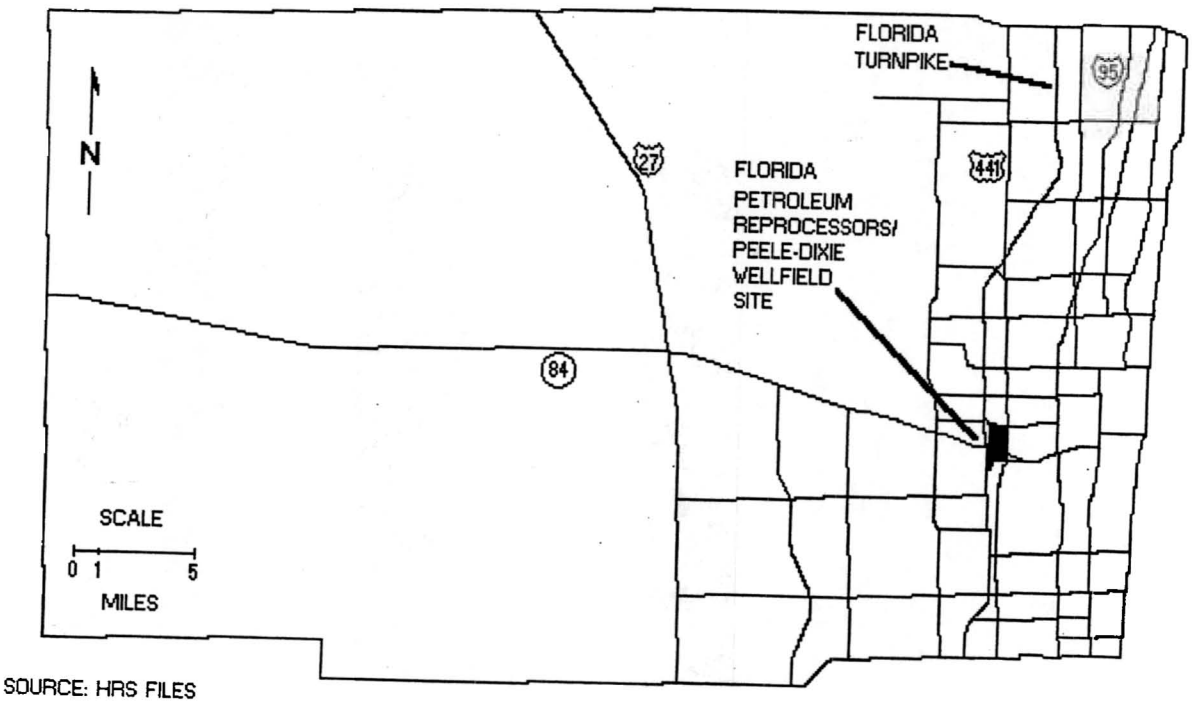

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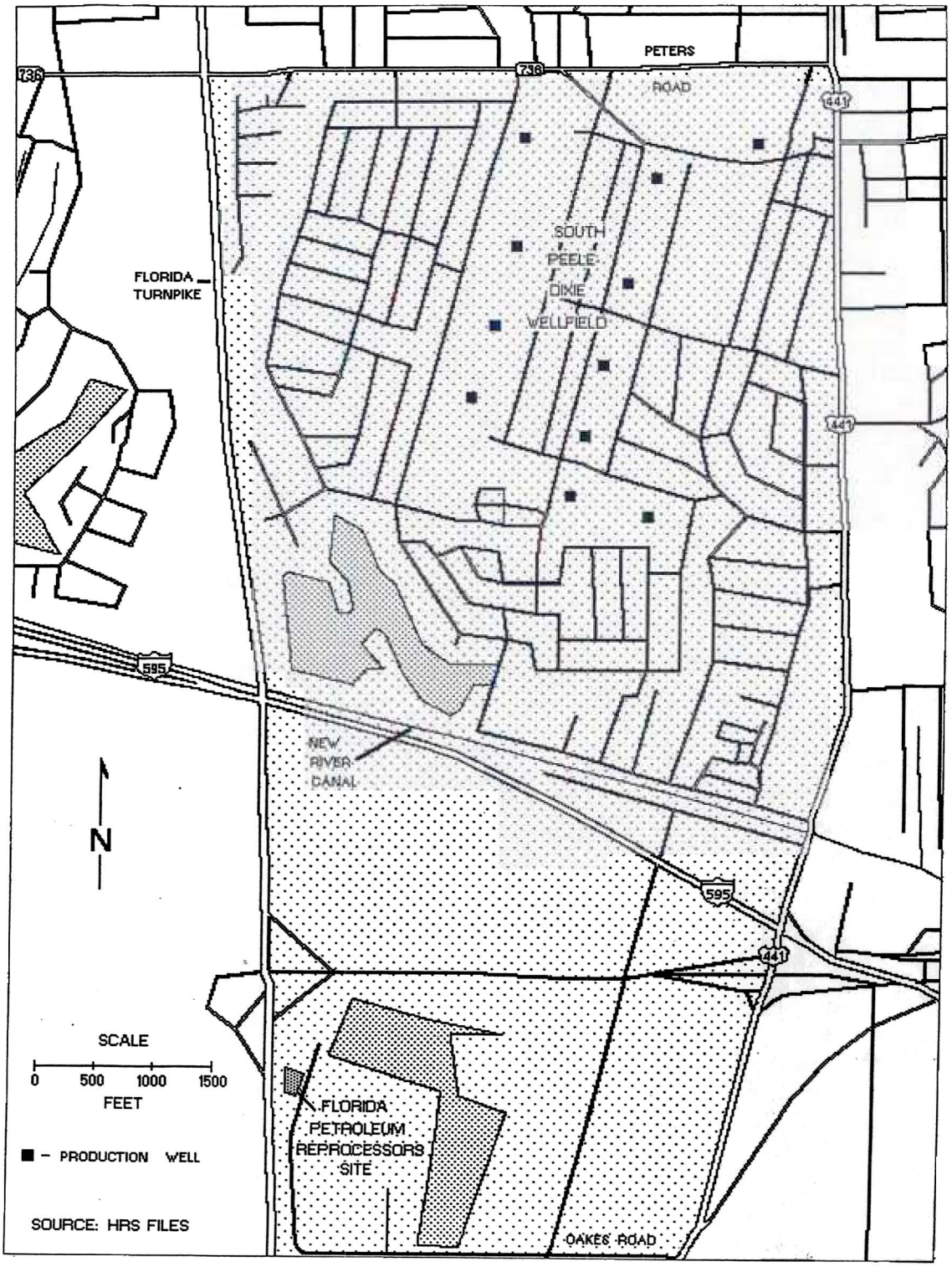
Figure 3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