

Health Consultation

SPRAGUE ELECTRIC COMPANY

SEMINOLE COUNTY, FLORIDA

EPA FACILITY ID: FLD004072658

**Prepared by
Florida Department of Health**

MAY 10, 2011

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LIST OF ABBREVIATIONS

ATSDR	Agency for Toxic Substances and Disease Registry
bls	below land surface
CHD	County Health Department
CV	comparison value
DCA	dichloroethane
DCE	dichloroethylene
EPA	U.S. Environmental Protection Agency
DEP	Florida Department of Environmental Protection
DOH	Florida Department of Health
kg	kilogram
MCL	maximum contaminant level (EPA)
µg/L	micrograms per liter
mg/L	milligrams per liter
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
NPL	National Priorities List
PCE	tetrachloroethylene
PHAP	Public Health Action Plan
ppb	parts per billion
ppm	parts per million
RfD	reference dose
TCA	trichloroethane
TCE	trichloroethylene
VOC	volatile organic compound

FOREWORD

The Florida Department of Health (DOH) evaluates the public health threat of hazardous waste sites through a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry in Atlanta, Georgia. This health consultation is part of an ongoing effort to evaluate health effects associated with groundwater from the Sprague Electric Company Superfund Site. The Florida DOH evaluates site-related public health issues through the following processes:

- ❖ Evaluating exposure: Florida DOH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is on the site, and how human exposures might occur. The US Environmental Protection Agency (EPA) provided the information for this assessment.
- ❖ Evaluating health effects: If we find evidence that exposures to hazardous substances are occurring or might occur, Florida DOH scientists will determine whether that exposure could be harmful to human health. We focus this report on public health; that is, the health impact on the community as a whole, and base it on existing scientific information.
- ❖ Developing recommendations: In this report, the Florida DOH outlines, in plain language, its conclusions regarding any potential health threat posed by groundwater contamination, and offers recommendations for reducing or eliminating human exposure to contaminants. The role of the Florida DOH in dealing with hazardous waste sites is primarily advisory. For that reason, the evaluation report will typically recommend actions for other agencies, including the US Environmental Protection Agency and the Florida Department of Environmental Protection. If, however, an immediate health threat exists or is imminent, Florida DOH will issue a public health advisory warning people of the danger, and will work to resolve the problem.
- ❖ Soliciting community input: The evaluation process is interactive. The Florida DOH starts by soliciting and evaluating information from various government agencies, individuals or organizations responsible for cleaning up the site, and those living in communities near the site. We share any conclusions about the site with the groups and organizations providing the information. Once we prepare an evaluation report, the Florida DOH seeks feedback from the public.

If you have questions or comments about this report, we encourage you to contact us.

Please write to: Bureau of Environmental Public Health Medicine
Florida Department Health
4052 Bald Cypress Way, Bin # A-08
Tallahassee, FL 32399-1712

Or call us at: 850 245-4299 or toll-free in Florida: 1-877-798-2772

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SUMMARY

INTRODUCTION

At the Sprague Electric Superfund Site (Sprague), the Florida Department of Health (DOH) and the US Agency for Toxic Substances and Disease Registry's (ATSDR) top priority is to ensure nearby residents have the best information to safeguard their health.

Sprague and an adjacent facility, General Dynamics-Longwood, both improperly disposed of volatile organic compounds (VOCs) from their vapor degreasers. VOCs from both facilities mixed and caused elevated contaminant levels in both on-site and off-site groundwater.

CONCLUSIONS

Florida DOH concludes that groundwater contamination has moved off-site from the Sprague and General Dynamics sites and may have affected two private drinking water wells, City of Winter Springs well #3, and a private residential irrigation well. Currently, the contaminant levels in these wells are not likely to harm people's health.

Until EPA determines the full extent of groundwater contamination, Florida DOH cannot determine the public health threat from future drinking water exposures.

Florida DOH does not have enough data to determine the public health threat to nearby residents and current workers from soil vapor intrusion.

Florida DOH concludes that exposure to the contaminants in the on-site drainage ditch and storm water retention pond, are not likely to harm people's health.

BASIS FOR

DECISION

The Seminole County Health Department found contaminants associated with Sprague and General Dynamics in nearby private drinking water wells. Currently, the contaminant levels found in the private wells are below health-based comparison values and not likely to cause non-cancer illness and the theoretical risk is very low for cancer effects. The City of Winter Springs also found contaminants associated with Sprague and General Dynamics in one production well and in one irrigation well south of the site. To date, the contaminant levels found in these wells are below health-based comparison values for both non-cancer and cancer effects and are not likely to harm people's health.

Groundwater contamination extends off-site several hundred yards to the north-northwest. The extent of groundwater contamination has not been fully delineated and may still be expanding.

EPA and the potential responsible parties have not evaluated indoor air quality in the on-site worker-occupied manufacturing building or in residences and other buildings off-site.

Contaminant levels found in surface water and sediment samples collected from the on-site ditch and the storm water retention pond were below health-based comparison values and are, therefore, not likely to harm health.

NEXT STEPS

The U.S. Environmental Protection Agency (EPA) should continue efforts to determine the full extent of groundwater contamination from both the Sprague and General Dynamics sites. Groundwater flow direction is generally to the north. Because large capacity municipal wells can change flow direction, EPA and the potential responsible parties should investigate groundwater contamination in all directions from the site.

EPA should notify municipal and private well water owners within 1-mile of the site about the groundwater contamination at Sprague and General Dynamics.

EPA and the potential responsible parties should determine the extent of groundwater contamination and municipal water supply and private well water owners within 1-mile of the site should consider quarterly testing for VOCs.

EPA should consider testing nearby private irrigation wells for site-related contaminants.

If EPA finds VOCs in groundwater under nearby occupied structures, they should investigate the possibility of vapor intrusion.

Florida DOH will evaluate additional data as they become available.

FOR MORE INFORMATION

If you have concerns about your health, you should call your doctor. You may also contact the Florida DOH toll free at 877 798-2772. Ask for more details about the Sprague Electric Superfund Site.

BACKGROUND AND STATEMENT OF ISSUES

The purpose of this health consultation report is to assess the public health threat from groundwater contamination from the Sprague Electric Superfund hazardous waste site (Sprague). In a previous health consultation report, Florida DOH evaluated the adjacent General Dynamics-Longwood National Priorities List (NPL) hazardous waste site.

Health scientists look at what chemicals are present and in what amounts. They compare those amounts to national guidelines. These guidelines are set far below levels known or suspected to be associated with health effects. Florida DOH uses guidelines developed to protect children. If chemicals are not present at levels high enough to harm children, they would not likely harm adults.

This assessment considers health concerns of nearby residents and explores possible associations with site-related contaminants. This assessment requires the use of assumptions, judgments, and incomplete data. These factors contribute to uncertainty in evaluating the health threat. Assumptions and judgments in this assessment err on the side of protecting public health and may overestimate the risk.

This assessment estimates the health risk for individuals exposed to the highest measured level of contamination. This assessment, however, does not apply equally to all nearby residents. Not all nearby residents are exposed to the highest measured level of contamination. The health risk for most nearby residents is less than the health risk estimated in this report. For those residents whose wells are not contaminated and who were not exposed, the health risk attributable to this site is essentially zero.

Site Description

The Sprague Electric Company facility is located at 1221 North US Highway 17/92 in Longwood, Seminole County, Florida (Figure 1). The site is approximately 32 acres with three (3) main buildings. Most of the site is paved with asphalt. An on-site storm water retention pond is in the northeast corner and a ditch runs along the northern border of the Sprague site (Figure 2). Access to the site, including both the ditch and the pond, is unrestricted.

The General Dynamics-Longwood NPL site and a portion of the Spring Hammock State Park are immediately north of Sprague. Kidquest Daycare and the Highlands Elementary School are east of Sprague along Shepard Road. Dittmer Aluminum Company and the Highlands neighborhood are south of the site. To the west of Sprague is the main portion of Spring Hammock State Park (Figure 3).

Site History

The Sprague Electric Company manufactured film capacitors from 1959 to 1992. The company used chlorinated solvents (volatile organic compounds or VOCs) to degrease electronic parts following the manufacturing process. Dearborn purchased the manufacturing equipment and operations from Sprague in 1992. Currently, Dearborn manufactures film capacitors in the main building. Dearborn does not use chlorinated solvents. Dearborn leases the property from the current owners, Great American Financial Resources, Inc. (GAFRI).

In 1986, Florida Department of Environmental Protection (DEP) began environmental investigations at the site following allegations by a former employee that Sprague improperly discharged VOCs. Florida DEP discovered VOCs, specifically chlorinated solvents, in the surficial (shallow) groundwater aquifer. Florida DEP required Sprague to determine the extent and source of the contamination.

Sprague discovered two (2) contamination sources-- a leaking 550-gallon underground storage tank (UST) along the southern part of the property, and several former septic tank systems on the northwestern edge. The UST was originally installed in 1959 for heating oil storage and contained the following VOCs: trichloroethylene (TCE), 1,1,1- trichloroethane (1,1,1-TCA), 1, 1-dichloroethene (1,1-DCE) and 1, 1-dichloroethane (1,1-DCA). The FDEP required Sprague to remove the UST along with two (2) tons of contaminated soil. After removal of the UST and the affected soil, Sprague documented shallow groundwater contamination above state and federal drinking water standards. The source of contamination was found to be in subsurface soil (former UST and septic systems). Florida DEP determined that the contaminants of concern in the groundwater were; TCE, 1,1,1-TCA, 1,1-DCE, 1,1-DCA along with associated breakdown products *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), vinyl chloride, 1,2-dichloroethane (1,2-DCA) and chloroethane [URS 2004].

In 1987, Sprague agreed to clean up the subsurface soil and groundwater contamination. In 1997, Sprague installed a groundwater treatment system (along the northern boundary of the site) in an attempt to contain and clean up the contamination. Sprague operated the treatment system but was unable to meet Florida DEP cleanup requirements. Florida DEP referred the Sprague site to the U.S. Environmental Protection Agency (EPA) in 2003.

In 2004, GAFRI entered into an agreement with EPA to conduct a Remedial Investigation (RI) to determine the extent of contamination and a Feasibility Study (FS) to determine how to clean up the contamination at the site. Because GAFRI was willing to undertake the RI/FS voluntarily, the Site is being treated as a Superfund Alternative Site rather than being listed on EPA's National Priority List (NPL) [EPA 2009b].

URS Corporation (URS), on behalf of GAFRI, began the environmental sampling for this investigation in 2005 and continued into 2006. URS completed a Draft RI to delineate the original site boundaries. EPA subsequently deleted the east part of the General Dynamics-Longwood facility from the site boundary and divided the Sprague property into two distinct sections or operable units (OU). URS finalized the RI for OU-1 in 2009. This RI/ includes some data for the other section of Sprague and the General Dynamics- Longwood facility. EPA proposed the adjacent General Dynamics-Longwood site to the National Priorities List (NPL) April 9, 2009. The FS for OU-1 was completed in July 2009. The recommended remedial alternative consists of In-Situ Chemical Oxidation with Soil Vapor Extraction [EPA 2009b].

EPA is working to delineate the area of contaminated groundwater at and around both the Sprague and General Dynamics-Longwood properties, to determine the source(s), and determine liability for cleanup. According to EPA, General Dynamics' and Sprague's groundwater contamination has co-mingled. Groundwater mixing has further complicated the investigation of these sites because of their close proximity and very similar operational histories (Figure 4).

Demographics and Land Use

Florida DOH examines demographic and land use data to identify sensitive populations, such as young children, the elderly, and women of childbearing age, to determine whether these sensitive populations are exposed to any potential health risks. Demographics also provide details on population mobility and residential history in a particular area. This information helps Florida DOH evaluate how long residents might have been exposed to contaminants.

Land use surrounding Sprague is a mixture of commercial and residential properties. Just east of Sprague is a large grassy field used for youth soccer practice. Just south of Sprague is a residential community with approximately 4,500 homes, all of which are connected to municipal water. Highlands Elementary School and Kidquest Daycare are just to the southeast of the property (Figure 3). Both the elementary school and the daycare receive municipal water as the source of drinking water. As of 2000, nearly 6,800 people live within 1-mile of this site: approximately 85% were White, 4.6% were African-American, and 13% were Hispanic or Latino [US Census 2000].

COMMUNITY HEALTH CONCERNS

The Sprague and General Dynamics facilities are adjacent properties; therefore, the affected community is identical for both sites. Florida DOH initially assessed General Dynamics-Longwood site in 2010, because of its proposed listing on the EPA National Priorities List (NPL).

In January, 2010, Florida DOH mailed 230 fact sheets to inform nearby residents living within ¼ mile of the site about the Sprague and General Dynamics-Longwood sites and to announce an open house. The January 28, 2010, open house provided an opportunity for community members to meet Florida DOH, EPA, Florida DEP and DOH Seminole County Health Department (CHD) staff, and to learn more about the sites and the health assessment process. The event also allowed residents to express their concerns and ask questions. Five residents attended the meeting and were concerned about health risks from shallow irrigation wells, health risks to former workers, and safety of area municipal drinking water supplies. In addition, three nearby residents mailed their concerns about potentially contaminated water to Florida DOH.

Florida DOH solicited public comment for the General Dynamics-Longwood health consultation report from March 31, 2010 through May 31, 2010. The “mail-out” included 600 addresses with in a ½ mile radius of the site. A press release was also issued. We received 15 comment forms and two e-mails from residents near the sites. Expressed concerns and comments included rheumatoid arthritis; health effects from drinking and/or showering; cancer in pets; potential adverse effects on children at the nearby school or playing on the vacant lot next to the site; a request for more environmental testing, especially of wells, (both drinking and irrigation); a dissatisfaction with the lengthy public notification and cleanup process; a perceived threat to the aquifer; and that local utility companies should be kept apprised of the contamination.

Florida DOH offered this Sprague Health Assessment document for public comment from October 22, 2010 to December 6, 2010. Florida DOH received three health concerns and many general comments about the site from nearby residents. Residents expressed concerns about possible health effects resulting from drinking contaminated groundwater, including; cancer in

general and the possibility of prostate and bladder cancer affecting an infant. Residents were also very concerned about the lack of information about these sites; the proximity to a neighborhood; and the fact that the contamination is contaminating the aquifer. Florida DOH also received comments from Great American Financial Resources Inc. (GAFRI).

(For a complete list of concerns and comments with corresponding responses, see Appendix D.)

DISCUSSION

In this area, the Floridan Aquifer is the main source of drinking water. Recharge in the upper Floridan Aquifer is by downward leakage from the surficial aquifer system. This occurs by lateral inflow, through drainage wells, or through breaches in the confining unit caused by sinkholes or where the confining unit is thin or missing [EPA 2009a].

In Seminole County, a confining bed (Hawthorn Group) separates the surficial (shallow) aquifer from the Floridan (deep) aquifer. This bed partially restricts vertical movement of water between the surficial and Floridan aquifers. However, the Hawthorn Group is absent in the western portion of the Sprague site and the northern portion of the General Dynamics site. This absence creates additional potential for downward migration of contamination from the surficial aquifer into the upper Floridan aquifer [EPA 2010].

EPA concludes that the predominant groundwater flow direction at the site in the surficial aquifer is to the north and in the Floridan Aquifer to the north-northeast. However, large capacity municipal wells can influence flow direction.

A model prepared for the City of Winter Springs indicates that the Sprague and General Dynamics sites are within the zone of influence of its production wells #3 west and #6 west (PW-3 West and PW-6 West) [Stillwater 2008]. In pretreated water, the City of Winter Springs detected low levels of *cis*-1,2-DCE, a contaminant at Sprague, in PW-3 West and in an irrigation well south of Sprague. The City of Winter Springs initially tested for VOCs when contamination was first discovered at Sprague and General Dynamics. Currently, the City of Winter Springs tests for VOCs quarterly and the treatment plant is equipped with an aeration system to ensure the safety of residents. The City of Winter Springs has never had a violation of the drinking water standards for VOCs (City of Winter Springs, personal communication, 2011).

Pathway Analysis

Chemical contamination in the environment can harm your health but only if you have contact with those contaminants (exposure). Without contact or exposure, there is no harm to health. If there is contact or exposure, how much of the contaminants you contact (concentration), how often you contact them (frequency), for how long you contact them (duration), and the danger of the contaminant (toxicity) all determine the risk of harm.

Knowing or estimating the frequency with which people could have contact with hazardous substances is essential to assessing the public health importance of these contaminants. To decide if people can contact contaminants at or near a site, Florida DOH looks at human exposure pathways.

Exposure pathways have five parts. They are:

- 1. a source of contamination like a hazardous waste site,**
- 2. an environmental medium like air, water, or soil that can hold or move the contamination,**
- 3. a point where people come into contact with a contaminated medium like water at the tap or soil in the yard,**
- 4. an exposure route like ingesting (contaminated soil or water) or breathing (contaminated air),**
- 5. a population who could be exposed to contamination like nearby residents.**

Florida DOH eliminates an exposure pathway if at least one of the five parts referenced above is missing and will not occur in the future. Exposure pathways not eliminated are either completed or potential. For completed pathways, all five pathway parts exist and exposure to a contaminant has occurred, is occurring, or will occur. For potential pathways, at least one of the five parts is missing, but could exist. Also for potential pathways, exposure to a contaminant could have occurred, could be occurring, or could occur in the future.

The risk from dermal exposure (skin absorption) is commonly less than the risk involved in ingestion (eating/drinking) and inhalation (breathing).

Completed Exposure Pathways:

For this assessment, we evaluate the long-term health threat from ingestion of contaminated drinking water. For this completed pathway, the Sprague and General Dynamics sites are the sources. Groundwater is the environmental medium. Nearby private drinking water wells are the exposure points. Ingestion is the exposure route (Table 1).

In addition, we evaluate the long-term health threat from inhalation from showering in contaminated drinking water. For this completed exposure pathway, the Sprague and General Dynamics sites are the sources. Groundwater is the environmental medium. Nearby drinking water wells are the exposure points. Inhalation is the exposure route (Table 1).

Potential Exposure Pathway:

Vapor intrusion is a potential on-site exposure pathway for current Dearborn employees working at the Sprague facility. Vapor intrusion is a potential off-site exposure pathway for residents living in buildings above contaminated groundwater. Groundwater contamination can lead to soil gas contamination. Soil gas contamination may lead to potential soil gas vapor intrusion in buildings overlying the impacted groundwater. For this potential exposure pathway, the Sprague and General Dynamics sites are the sources (Table 2).

Sprague found VOCs in the on-site storm-water retention pond water and in the surface sediment from the ditch running between the two sites. The retention pond and ditch are dry most of the year. Because of the unrestricted access to the site, the proximity of Highlands Elementary and the residential community, trespassers could be exposed to contaminants in surface water and sediments (Table 2).

Eliminated Exposure Pathway:

DOH concludes that ingestion of on-site soil (surface and subsurface) is an eliminated exposure pathway (Table 3). No one is being exposed to the subsurface soil. The site is covered with asphalt and large commercial buildings with very few grassy areas.

Environmental Sampling

Since 1986, EPA and consultants for the property owners have collected thousands of groundwater, soil and surface water samples on the Sprague property. Analytical data indicate that contamination in the surficial aquifer underneath both Sprague and General Dynamics have migrated hundreds of yards off-site; the vertical and lateral extent of contamination is still unknown.

In 2004, EPA requested a comprehensive Remedial Investigation and Feasibility Study (RI/FS). URS, on behalf of GAFRI, began the environmental sampling for this investigation in 2005 and continued into 2006. URS completed a Draft RI to address the original site boundaries. EPA subsequently deleted the east part of the General Dynamics-Longwood facility from the site boundary and divided Sprague into two distinct sections.

Florida DOH bases this health consultation on this most recent study of the groundwater contamination at Sprague and EPA's Record of Decision.

On-site / Off-site Groundwater

On-site/Off-site Monitor Wells:

In 2005, URS collected groundwater samples on the Sprague site and the surrounding properties. URS collected 51 groundwater samples using direct push technology (DPT) at 12, 22, 32 and 42 feet below land surface (Figure 6). They analyzed all samples for VOCs using EPA Method 8206B at either an off-site contract laboratory or an on-site mobile laboratory. In addition, URS sampled 55 existing monitor wells (47 surficial aquifer and 8 Floridan aquifer).

In 2006, URS sampled 72 existing monitoring wells (64 surficial aquifer and 8 Floridan aquifer) (Figure 7). They analyzed all monitoring well samples for VOCs using EPA Method 8206B at an off-site contract laboratory.

The highest levels of VOCs were found in the surficial aquifer at levels well above EPA drinking water maximum contaminant levels (MCLs) (Table 4). URS found the highest level of TCE (25,100 µg/L) underneath the manufacturing building currently occupied by Dearborn employees [URS 2009].

It is important to note that in all of the groundwater samples collected from the Floridan aquifer monitoring wells, contaminants were below EPA MCLs.

The highest levels of TCE were found in on-site groundwater during the most recent groundwater sampling at the Sprague site. These levels range from 100 to 5,000 times the drinking water standard of 5µg/L.

Off-site Drinking Water Wells:

Florida DOH considers shallow groundwater contamination at the Sprague site a future threat to the deeper public water supply in the area surrounding the site. Groundwater flow is moving to the north at this site; however, large capacity production wells can change the flow direction.

The City of Winter Springs PW-3 West well, south of Sprague, has been impacted with *cis*-1,2-DCE but levels remain well below the EPA MCL (Figure 5). Florida DOH has evaluated the latest available municipal well data for wells within a mile of the site. To date, the City of Winter Springs water supply has never had any violations of drinking water standards. The City of Winter Springs tests for VOCs quarterly and the treatment plant is equipped with an aeration system to ensure the safety of residents. While production well #3 has been impacted with *cis*-1,2-DCE, a contaminant of concern associated with both Sprague and General Dynamics, the levels found in the pre-treated water supply are well below any health-based guidelines.

Since 2001, the City of Winter Springs' production well (PW-3 West) has *cis*-1,2-DCE levels detected from <0.5 µg/L to 2.61 µg/L. The City of Winter Springs has also found *cis*-1,2-DCE from <0.5 µg/L to 5.41µg/L in a private irrigation well between PW-3 West and the Sprague site. The levels of *cis*-1,2-DCE in these wells are below federal and state drinking water standards and have not yet been found at levels known to cause harm from ingestion or inhalation.

Seminole County Health Department (CHD) sampled three private drinking water wells near the Sprague site (Figure 5). In one well, sampled on March 17, 2010, and again on March 29, 2010, vinyl chloride was detected at 1.2 micrograms per liter (µg/L). Two (2) additional wells were sampled on March 17, 2010. One well had no detectable levels of VOCs and the second well had detectable levels of *cis*-1,2-DCE (9.6 µg/L), *trans*-1,2-DCE (0.32 µg/L) and 1,1-DCE (0.48 µg/L) (Table 4). These two wells are fitted with well head treatment systems (Rainsoft Well System ICS/TC75 with Disinfection) supplied and maintained by Sprague. A confirmatory sample was taken at the well impacted with vinyl chloride and results were below detection limits for VOCs. This well has no filter and is continuing to be monitored by the Seminole CHD and FDEP.

The levels of vinyl chloride, *cis*-1,2-DCE, *trans*-1,2-DCE, and 1,1-DCE in these wells are below federal and state drinking water standards and have not yet been found at levels known to harm human health.

On-site Subsurface Soil

URS collected 73 subsurface soil samples (2 to 8 feet below land surface) from 38 soil borings at the site. They analyzed all samples for VOCs using EPA Method 8260. Of the 73 samples none exceeded Florida DEP direct exposure residential soil criteria [URS 2009].

Florida DOH does not consider the on-site soil at the Sprague site to be a current public health concern. No one is being exposed to the subsurface soil. The site is covered with asphalt and large commercial buildings with very few grassy areas. The levels found are below health-based guidelines. There is no indication that soil is migrating off-site. Off-site soil sampling is not necessary at this time. Exposure to on-site subsurface soil at the Sprague facility is unlikely.

On-site / Off-site Surface Water and Sediment

URS collected five (5) surface water and five (5) sediment samples from the on-site ditch, on-site storm-water retention pond and Soldier Creek (the closest natural surface water feature, Figure 8). They analyzed all samples for VOCs using EPA Method 8260B. The surface water sample collected from the retention pond had low levels of VOCs including; TCE (2.8 µg/L), *cis*1,2-DCE (2.8 µg/L), and vinyl chloride (1.2 µg/L). A sediment sample from the ditch contained 1,1-DCE (0.02 mg/kg)(Tables 8 & 9).

The levels of TCE, *cis*1,2-DCE, and vinyl chloride in these samples are well below federal health-based comparison values and therefore not expected to harm health.

All other samples collected from these locations including the down stream samples from Soldier Creek and off-site locations were below detection limits [URS 2009].

On-site Soil Vapor Sampling

URS tested soil gas underneath the concrete slab in the main manufacturing building currently being used by Dearborn employees on both September 1, 2005, and September 28, 2005. Previously, URS found the highest level of TCE (25,100 µg/L) in on-site groundwater underneath this building. They sampled four (4) locations for both sampling events with four (4) weeks in between each event. They connected Summa canisters to vapor monitoring wells through the concrete slab. The laboratory analyzed the soil vapor samples for VOCs using gas chromatography/mass spectrometry analyses, Method To-15 [URS 2009].

The highest soil gas level found during both sampling events was TCE at 25,000 micrograms per cubic meter (ug/m³). If this level were present in indoor air, it could pose a hazard. To date, indoor air samples have not been collected and should be collected in the future.

Quality Assurance Quality Control

Florida DOH confirmed that URS collected samples as per EPA guidelines. URS used certified laboratories to analyze soil, soil vapor, and groundwater samples.

Identifying Contaminants of Concern

Florida DOH compares the maximum concentrations of contaminants found at a site to ATSDR and other comparison values. Comparison values are specific for the medium contaminated (soil, water, air, etc.). We screen the environmental data using these comparison values:

- ❖ *ATSDR Environmental Media Evaluation Guides (EMEGs)*
- ❖ *ATSDR Reference Media Evaluation Guides (RMEGs)*
- ❖ *Florida DEP Soil Cleanup Target Levels (SCTLs)*
- ❖ *EPA Maximum Contaminant Levels (MCLs)*

When determining which comparison value to use, Florida DOH follows ATSDR's general hierarchy and uses professional judgment.

We select for further evaluation contaminants with maximum concentrations above a comparison value. Comparison values, however, are not thresholds of toxicity. They are not used to predict

health effects of establish clean-up levels. A concentration above a comparison value does not necessarily mean harm will occur. It does indicate, however, the need for further evaluation.

Maximum contaminant concentrations below comparison values are safe and are not evaluated further.

Comparing the highest measured concentrations in soil and groundwater to ATSDR and EPA screening guidelines, Florida DOH did not select any contaminants of concern for an evaluation of non-cancer health effects. Florida DOH selected vinyl chloride, 1,1-DCE, *cis*-1,2-DCE, and *trans*-1,2-DCE as a contaminants of concern for an evaluation of cancer health effects because they were found in drinking water wells. PCE and TCE were not selected for further scrutiny because they were not detected in drinking water wells. Selection of these contaminants does not necessarily mean there is a public health risk. Rather, Florida DOH selected these contaminants for closer scrutiny. Concentrations of other contaminants are below screening guidelines, are not likely to cause illness, and are not evaluated further.

PUBLIC HEALTH IMPLICATIONS

Florida DOH provides site-specific public health recommendations based on toxicological literature, levels of environmental contaminants, evaluation of potential exposure pathways, duration of exposure, and characteristics of the exposed population. Whether a person will be harmed depends on the type/amount of contaminant, how they are exposed, how long they are exposed, how much contaminant is absorbed, health status, genetics, and individual lifestyles.

After identifying contaminants of concern, Florida DOH evaluates exposures by estimating daily doses for children and adults. Kamrin [1988] explains the concept of dose as follows:

“...all chemicals, no matter what their characteristics, are toxic in large enough quantities. Thus, the amount of a chemical a person is exposed to is crucial in deciding the extent of toxicity that will occur. In attempting to place an exact number on the amount of a particular compound that is harmful, scientists recognize they must consider the size of an organism. It is unlikely, for example, that the same amount of a particular chemical that will cause toxic effects in a 1-pound rat will also cause toxicity in a 1-ton elephant.

Thus instead of using the amount that is administered or to which an organism is exposed, it is more realistic to use the amount per weight of the organism. Thus, 1 ounce administered to a 1-pound rat is equivalent to 2,000 ounces to a 2,000-pound (1-ton) elephant. In each case, the amount per weight is the same; 1 ounce for each pound of animal.”

This amount per weight is the *dose*. Toxicology uses dose to compare toxicity of different chemicals in different animals. We use the units of milligrams (mg) of contaminant per kilogram (kg) of body weight per day (mg/kg/day) to express doses in this assessment. A milligram is 1/1,000 of a gram; a kilogram is approximately 2 pounds.

To calculate the daily doses of each contaminant, Florida DOH uses standard and other factors needed for dose calculation [ATSDR 2005; EPA 1995]. We assume that people are exposed daily to the maximum concentration measured. We also make the health protective assumption that 100% of the ingested chemical is absorbed into the body. The percent actually absorbed into the body is likely less. The general formula for estimating a dose is:

$$\text{Dose} = (\text{concentration} \times \text{ingestion rate}) / \text{body weight}$$

ATSDR groups health effects by duration (length) of exposure. Acute exposures are those with duration of 14 days or less; intermediate exposures are those with duration of 15 – 364 days; and chronic exposures are those that occur for 365 days or more (or an equivalent period for animal exposures). ATSDR Toxicological Profiles also provide information on the environmental transport and regulatory status of contaminants.

To estimate exposure from drinking water and incidental ingestion (swallowing) of contaminated soil, Florida DOH uses the following standard assumptions:

- 1) children drink about 1 liter of water per day and adults drink about 2 liters of water per day,
- 2) children incidentally ingest (swallow) an average of 200 milligrams (mg) of soil per day (about the weight of a postage stamp),
- 3) adults incidentally ingest (swallow) an average of 100 mg of soil per day,
- 4) children weigh an average of 16 kilograms (kg) or about 35 pounds, adults weigh an average of 70 kg, or about 155 pounds,
- 5) children and adults ingest (swallow) contaminated surface soil at the maximum concentration measured for each contaminant.

We compare estimated exposure doses to ATSDR chemical specific minimal risk levels (MRLs). MRLs are comparison values that establish exposure levels many times lower than levels where no effects were observed in animals or human studies. The MRL is designed to protect the most sensitive, vulnerable individuals in a population. The MRL is an exposure level below which non-cancerous harmful effects are unlikely, even after daily exposure over a lifetime. Although we consider concentrations at or below the relevant comparison value reasonably safe, exceeding a comparison value does not imply that we expect adverse health effects. If contaminant concentrations are above comparison values, we further analyze exposure variables (for example, duration and frequency), toxicology of the contaminants, past epidemiology studies, and the weight of evidence for health effects. We use chronic MRLs where possible because exposures are usually longer than a year. If chronic MRLs are not available, we use intermediate length MRLs [ATSDR 2005].

For non-cancer illnesses, we first estimate the health risk for children. Because children are smaller and swallow more soil than adults swallow, their exposure is higher. Therefore, if children are not at risk, then adults are not either.

For cancer, we quantify the increased theoretical risk by multiplying the estimated dose by the EPA cancer potency slope factor. This is the highest estimated increased cancer risk. The actual increased cancer risk is likely lower. Because of large uncertainties in the way scientists estimate cancer risks, the actual risk of cancer may be as low as zero. If there is no cancer slope (potency) factor, we cannot quantify the risk.

We usually estimate the cancer risk from lifetime (70 year) exposure. Or we may estimate the cancer risk from exposure over a significant portion of the lifetime (at least 35 years). Studies of animal exposed over their entire lifetime are the basis for calculating most cancer slope factors.

Usually, little is known about the cancer risk in animals from less than lifetime exposures. Therefore, we also use lifetime exposure to estimate the cancer risk in people. Estimating the cancer risk for children, or from less than 35 years exposure, may introduce significant uncertainty.

Because people are often exposed to several chemicals at the same time, health scientists are often asked to evaluate exposure to a mixture of chemicals. There is evidence of additive toxicity from exposure to certain chemical mixtures when the individual chemicals are administered at doses that are near the individual toxic thresholds. Due to the low contaminant dose levels, it is highly unlikely that significant additive or toxic interactions would occur at this site. Therefore, this report assesses the health threat based on exposure to individual contaminants.

Vinyl Chloride

Non-cancer illness:

The level of vinyl chloride detected in nearby private water wells was below ATSDR health-based screening values for non-cancer health effects and, therefore, is not likely to cause non-cancerous illness.

Cancer:

Vinyl chloride is a known human carcinogen and EPA has calculated both an oral slope factor and an inhalation unit risk factor. The non-cancer exposure dose ((concentration X ingestion rate) / body weight) is multiplied by the EPA oral slope factor in order to calculate the theoretical risk of cancer from **ingesting** (drinking) water with vinyl chloride at 1.2 µg/L((0.00003 (milligram/kilogram/day) x 0.72 (mg/kg/d)⁻¹) = 0.0000216 = 2 x 10⁻⁵). This would be interpreted as an increased risk of two people in every 100,000 people or a “very low” increased risk.

To calculate the theoretical cancer risk from **inhalation** of vinyl chloride vapors released during showering Florida DOH first had to determine the appropriate air concentration. To do this we used the EPA approved assessment tool Risk Assistant to estimate the air concentration from showering in water contaminated with vinyl chloride. This air concentration was then multiplied by the EPA Inhalation Unit Risk for vinyl chloride ((0.000004 (microgram/cubic meters) x 0.0444 (µg/m³)⁻¹) = 0.000000177 = 2 x 10⁻⁷). This would be interpreted as an increased risk of two people in every 10,000,000 or an “extremely low” increased risk.

1,1-Dichloroethylene (1,1-DCE)

Non-cancer illness:

The level of 1,1-DCE detected in the private well sample was below ATSDR health-based screening values for non-cancer health effects and, therefore, is not likely to harm human health.

Cancer:

There is suggestive evidence of carcinogenicity for 1,1-DCE but not enough information is available to calculate a theoretical increased cancer risk [ATSDR 1994].

***cis*-1,2-Dichloroethene (*cis*-1,2-DCE)**

Non-cancer illness:

The level of *cis*-1,2-DCE detected in the private well sample was below ATSDR health-based screening values for non-cancer health effects and, therefore, is not likely to harm human health.

Cancer:

EPA has not classified *cis*-1,2-DCE as to human carcinogenicity. Therefore, there it is not possible to calculate a theoretical increased cancer [ATSDR 1996].

***trans*-1,2-Dichloroethene (*trans*-1,2-DCE)**

Non-cancer illness:

The level of *trans*-1,2-DCE detected in the private well sample was below ATSDR health-based screening values for non-cancer health effects and, therefore, is not likely to harm human health.

Cancer:

EPA has not classified *trans*-1,2-DCE as to human carcinogenicity. Therefore, there it is not possible to calculate a theoretical increased cancer risk [ATSDR 1996].

CHILD HEALTH CONSIDERATIONS

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometime engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than adults are; this means they breathe dust, soil and vapors close to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body system of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus, adults need as much information as possible to make informed decisions regarding their children's health.

This assessment takes into account the special vulnerabilities of children. It specifically assesses the health risk for children drinking contaminated water, showering with contaminated water, and/or playing in the soil near the Sprague site. The contaminants found thus far are not at levels likely to cause harm in children.

COMMUNITY HEALTH CONCERNS

EVALUATION

Florida DOH received three health concerns in regards to the Sprague and General Dynamics initial open house in January 2010.

1). Residents expressed concerns about shallow irrigation wells in the adjacent neighborhood posing a health risk to people living nearby.

Even though groundwater contamination from Sprague and General Dynamics is generally moving to the north, one irrigation well in the Highlands neighborhood to the south has been impacted. The levels found in this well so far, are well below health-based guidelines. Due to the close proximity of Sprague, General Dynamics, the elementary school, daycare and residential neighborhood, EPA should consider testing of shallow irrigation wells in this area.

2). Residents expressed concerns about exposures to former workers from their exposure to VOCs.

The health of workers is the responsibility of the Occupational Safety and Health Administration (OSHA) and the Centers for Disease Control and Prevention (CDC)/National Institute for Occupational Safety and Health (NIOSH). For more information about NIOSH:

<http://www.cdc.gov/niosh/hhe/HHEprogram.html> .Exposures directly related to worker activities fall under the purview of these agencies (ATSDR 2005).

Vapor intrusion is a potential exposure pathway for current Dearborn employees working at the Sprague facility. EPA and the responsible parties will evaluate the potential for vapor intrusion in the manufacturing building by monitoring indoor air quality during groundwater remediation and soil vapor extraction.

3). Residents also expressed concerns about the safety of the municipal drinking water supply in the area.

The City of Winter Springs production well #3 has been impacted with *cis*-1,2-DCE, a contaminant of concern associated with both Sprague and General Dynamics. The levels found so far are well below any health-based guidelines. Florida DOH has evaluated the latest available municipal well data for wells within a mile of the site. The latest sampling for VOCs occurred in 2008 and found no concentrations above EPA MCLs.

This document was available for public comment from October 22, 2010 to December 6, 2010. Florida DOH received three health concerns and many general comments about the site from nearby residents. Florida DOH also received comments from Great American Financial Resources Inc. (GAFRI). A list of the comments complete with responses is located in Appendix D.

CONCLUSIONS

1. The Seminole CHD found contaminants associated with Sprague and General Dynamics in two nearby private drinking water wells. Currently, the contaminant levels found in the private wells are below health-based comparison values and not likely to cause non-cancer illness and the theoretical risk is very low for cancer effects. The City of Winter Springs also found site-associated contaminants in pre-treated water in one of their municipal supply wells and one private irrigation well. The contaminant levels found in these wells are below health-based comparison values for both non-cancer and cancer and are not likely to harm people's health.
2. Florida DOH cannot determine the future public health threat to nearby private wells and municipal wells because EPA has not determined the full extent of the groundwater contamination.
3. Consultants for the potential responsible parties found high levels of TCE in the soil gas underneath the on-site manufacturing building. Florida DOH needs indoor air monitoring data to determine the public health threat to nearby residents and current workers from vapor intrusion. EPA and the potential responsible parties have not monitored indoor air quality in the manufacturing building currently housing Dearborn employees and the vapor intrusion pathway has not been evaluated in off-site buildings above contaminated groundwater.
4. Although public access to the on-site drainage ditch and storm water retention pond is unrestricted, incidental ingestion and skin contact with this water is unlikely to cause harm. The levels of contaminants found in the surface water and sediment samples from these areas are well below federal health-based comparison values.

RECOMMENDATIONS

1. The Seminole CHD should test private wells that are currently affected but below drinking water standards, for VOCs quarterly to protect public health. The City of Winter Springs should test the municipal well that is currently affected but below drinking water standards, for VOCs, quarterly to protect public health.
2. Private drinking water wells within 1- mile of the site should be tested for VOCs. EPA should alert municipal and private well water owners within 1-mile of the site about possible contamination and potential risk. Municipal well owners should consider more frequent water quality testing. EPA should consider testing nearby private irrigation wells. Periodic monitoring should continue until EPA and the responsible parties determine the full extent of groundwater contamination.
3. Because of the elevated levels of TCE in the soil gas underneath the manufacturing building, EPA and the responsible parties should evaluate the potential for vapor intrusion in both on- and off-site buildings above the contaminated groundwater plume.

PUBLIC HEALTH ACTION PLAN

1. EPA and the potential responsible parties will determine the extent of groundwater contamination.
2. EPA and the potential responsible parties will evaluate the potential for vapor intrusion on-site by monitoring indoor air quality in the main building during groundwater remediation and soil vapor extraction.
3. EPA and the potential responsible parties will evaluate the potential for vapor intrusion in off-site buildings above the contaminated groundwater plume.
4. Florida DOH will re-evaluate the possibility of adverse health impacts when more data become available.

AUTHORS, TECHNICAL ADVISORS

Florida Department of Health Author

Elizabeth Tull

Bureau of Environmental Public Health Medicine

Division of Environmental Health

(850) 245-4299

Florida Department of Health Designated Reviewer

Randy Merchant

Bureau of Environmental Public Health Medicine

Division of Environmental Health

(850) 245-4299

ATSDR Reviewer

Jennifer Freed

Technical Project Officer

Division of Health Assessment and Consultation

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Appendix A: Tables

Table 1: Completed Human Exposure Pathways at the Sprague Electric Superfund Site

COMPLETED PATHWAY NAME	COMPLETED EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Drinking water from nearby private wells	Solvent disposal at Sprague	Groundwater	Drinking water in nearby homes	Ingestion	About 10 users of 3 nearby private wells	Current and Future
Showering with water from nearby private wells	Solvent disposal at Sprague	Groundwater	Showers in nearby homes	Inhalation of vapors	About 10 users of 3 nearby private wells	Current and Future
Drinking water from impacted municipal wells	Solvent disposal at Sprague	Groundwater	Drinking water	Ingestion	About 3,000 people	Current and Future
Lawn irrigation with water from impacted irrigation well	Solvent disposal at Sprague	Groundwater	Lawn irrigation	Ingestion and Inhalation of vapors	About 100 people	Current and Future

Table 2: Potential Human Exposure Pathways at the Sprague Electric Superfund Site

POTENTIAL PATHWAY NAME	POTENTIAL EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Vapor intrusion from contaminated groundwater	Solvent disposal at Sprague	Indoor air	Nearby homes over contaminated groundwater	Inhalation	About 10 residents of 3 nearby homes over contaminated groundwater	Current and future
Vapor intrusion from contaminated groundwater	Solvent disposal at Sprague	Indoor air	On-site	Inhalation	Current Dearborn Employees	Current and future
Storm water retention pond	Solvent disposal at Sprague	Surface water	Possibility of trespass on- site	Ingestion	Children from nearby school, daycare and residential neighborhood	Current and future
Ditch	Solvent disposal at Sprague	Sediment	Possibility of trespass on- site	Incidental ingestion	Children from nearby school and residential neighborhood	Current and future

Table 3: Eliminated Human Exposure Pathways at the Sprague Electric Superfund Site

COMPLETED PATHWAY NAME	COMPLETED EXPOSURE PATHWAY ELEMENTS					TIME
	SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
On-site soil	Solvent disposal at Sprague	soil	none	Incidental Ingestion	none	Current

Table 4: Maximum Concentrations in Nearby Private Drinking Water Wells (2010)

Contaminants	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Source of Comparison Value
1,1-dichloroethylene (1,1-DCE)	0.48	7	EPA MCL
cis-1,2-dichloroethylene (cis-1,2 DCE)	9.9	70	EPA MCL
trans-1,2-dichloroethylene (trans-1,2 DCE)	0.32	100	EPA MCL
Tetrachloroethylene (PCE)	<0.20	5	EPA MCL
1,1,1-trichloroethane (1,1,1-TCA)	<0.20	200	EPA MCL
Trichloroethylene (TCE)	<0.22	5	EPA MCL
Vinyl Chloride	1.2	2	EPA MCL

µg/L = micrograms per liter

Comparison values are screening guidelines used to select chemicals for further scrutiny, not to judge the risk of illness.

Table 5: Pre-Treatment Maximum Concentrations in City of Winter Springs Production Well #3 (2001-2008)

Contaminants	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Source of Comparison Value
1,1-dichloroethylene (1,1-DCE)	<0.5	7	EPA MCL
cis-1,2-dichloroethylene (cis-1,2 DCE)	2.61	70	EPA MCL
trans-1,2-dichloroethylene (trans-1,2 DCE)	<0.5	100	EPA MCL
Tetrachloroethylene (PCE)	<0.5	5	EPA MCL
1,1,1-trichloroethane (1,1,1-TCA)	<0.5	200	EPA MCL
Trichloroethylene (TCE)	<0.5	5	EPA MCL
Vinyl Chloride	<0.5	2	EPA MCL

µg/L = micrograms per liter

Comparison values are screening guidelines used to select chemicals for further scrutiny, not to judge the risk of illness.

MCL= maximum contaminant level

Table 6: Maximum Contaminant Concentrations in Neighborhood Irrigation Well (2002-2010)

Contaminants	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Source of Comparison Value
1,1-dichloroethylene (1,1-DCE)	<0.5	7	EPA MCL
cis-1,2-dichloroethylene (cis-1,2 DCE)	5.41	70	EPA MCL
trans-1,2-dichloroethylene (trans-1,2 DCE)	<0.5	100	EPA MCL
Tetrachloroethylene (PCE)	<0.5	5	EPA MCL
1,1,1-trichloroethane (1,1,1-TCA)	<0.5	200	EPA MCL
Trichloroethylene (TCE)	<0.5	5	EPA MCL
Vinyl Chloride	<0.5	2	EPA MCL

µg/L = micrograms per liter

Comparison values are screening guidelines used to select chemicals for further scrutiny, not to judge the risk of illness.

MCL= maximum contaminant level

Table 7: Maximum Concentrations in Onsite Groundwater (2005-2006)

Contaminants	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Source of Comparison Value
1,1-dichloroethylene (1,1-DCE) Sample depth: 22'	26,500	7	EPA MCL
cis-1,2-dichloroethylene (cis-1,2 DCE) Sample depth: 42'	6200	70	EPA MCL
trans-1,2-dichloroethylene (trans-1,2 DCE) Sample depth: 12'	8.8	100	EPA MCL
Tetrachloroethylene (PCE) Sample depth: 22'	1880	5	EPA MCL
1,1,1-trichloroethane (1,1,1-TCA) Sample depth: 32'	561	200	EPA MCL
Trichloroethylene (TCE) Sample depth: 42'	25,100	5	EPA MCL
Vinyl Chloride Sample depth: 42'	251	2	EPA MCL

µg/L = micrograms per liter

Comparison values are screening guidelines used to select chemicals for further scrutiny, not to judge the risk of illness.

MCL= maximum contaminant level

Table 8: Maximum Concentrations in On-site and Off-site Surface Water (2005)

Contaminants	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Source of Comparison Value
1,1-dichloroethylene (1,1-DCE)	< 0.19	7	EPA MCL
cis-1,2-dichloroethylene (cis-1,2 DCE)	2.8	70	EPA MCL
trans-1,2-dichloroethylene (trans-1,2 DCE)	<0.12	100	EPA MCL
Tetrachloroethylene (PCE)	<0.17	5	EPA MCL
1,1,1-trichloroethane (1,1,1-TCA)	<0.11	200	EPA MCL
Trichloroethylene (TCE)	1.8	5	EPA MCL
Vinyl Chloride	1.2	2	EPA MCL

µg/L = micrograms per liter

Comparison values are screening guidelines used to select chemicals for further scrutiny, not to judge the risk of illness.

Source of data: URS 2009

MCL= maximum contaminant level

Table 9: Maximum Concentrations in On-site and Off-site Sediment (2005)

Contaminants	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Source of Comparison Value
1,1-dichloroethylene (1,1-DCE)	0.182	500	ATSDR Chronic EMEG
<i>cis</i>-1,2-dichloroetheylene (<i>cis</i>-1,2 DCE)	<0.00057	20,000	ATSDR Intermediate EMEG
<i>trans</i>-1,2-dichloroethylene (<i>trans</i>-1,2 DCE)	<0.00045	10,000	ATSDR Intermediate EMEG
Tetrachloroethylene (PCE)	<0.00058	500	ATSDR RMEG
1,1,1-trichloroethane (1,1,1-TCA)	<0.00087	1,000,000	ATSDR Intermediate EMEG
Trichloroethylene (TCE)	<0.00065	400	ATSDR Acute EMEG
Vinyl Chloride	<0.00059	200	ATSDR Chronic EMEG

Comparison values are screening guidelines used to select chemicals for further scrutiny, not to judge the risk of illness.

Source of data: URS 2009

mg/kg = milligrams per kilograms

MCL= maximum contaminant level

EMEG= Environmental Media Evaluation Guide

RMEG= Reference Dose Media Evaluation Guide

Appendix B: Figures

**FORMER SPRAGUE ELECTRIC COMPANY
LONGWOOD, FLORIDA
HUMAN HEALTH RISK ASSESSMENT**

SITE LOCATION MAP

ARCADIS

FIGURE 1

Figure 2: Sprague Site Boundary and Main Features

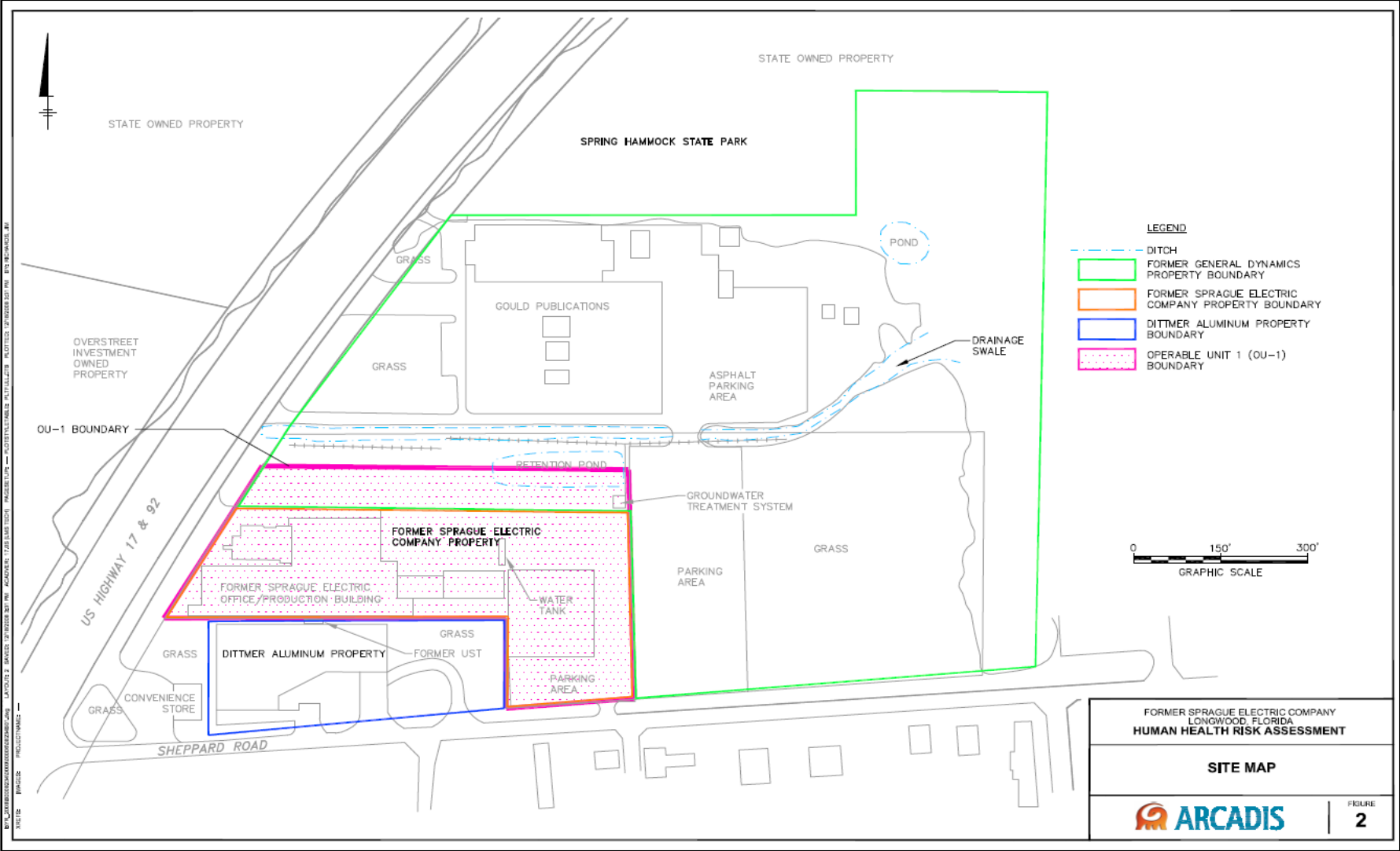


Figure 3: Sprague Surrounding Area Map

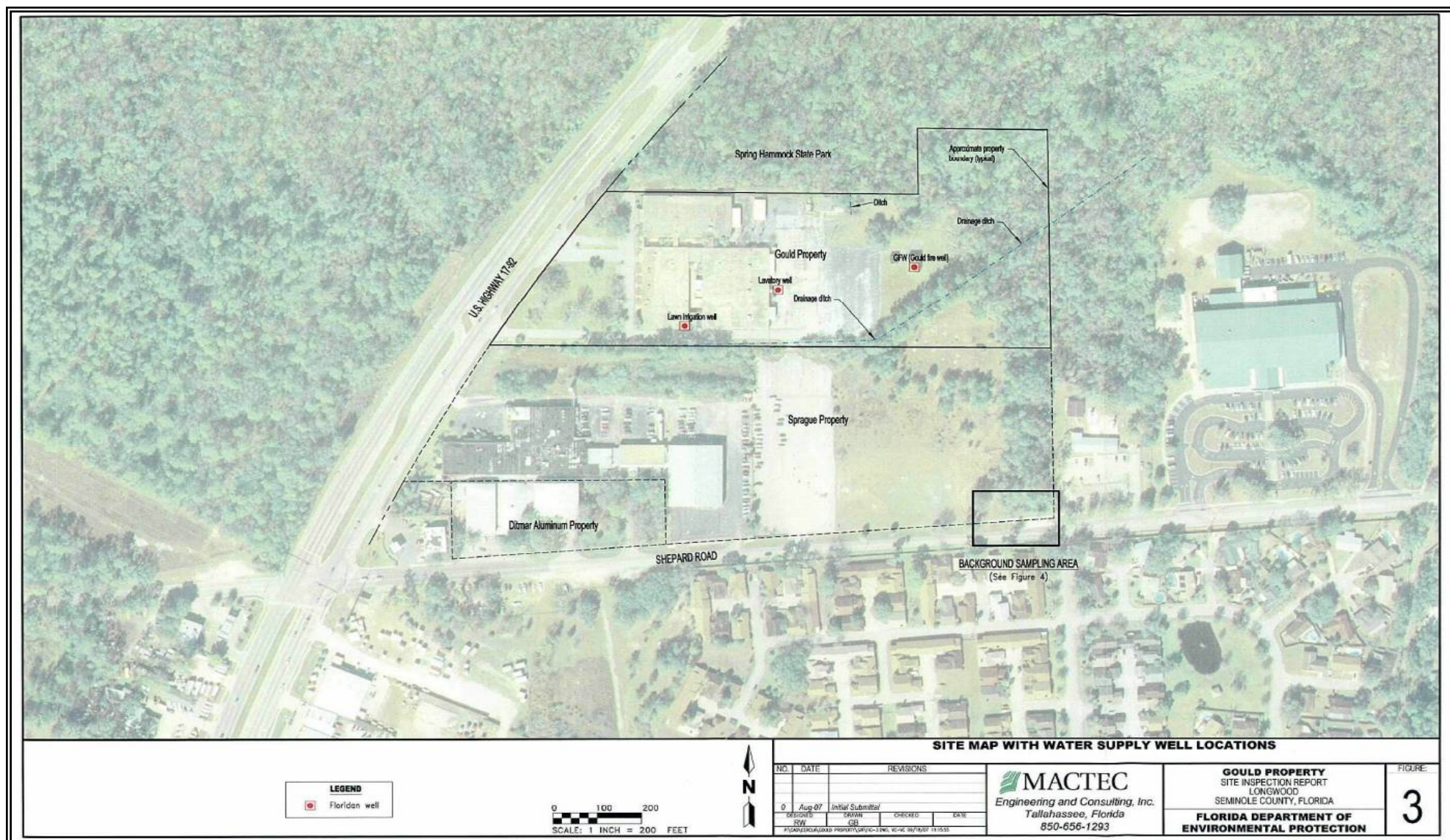


Figure 4: Sprague and General Dynamics Groundwater Contamination

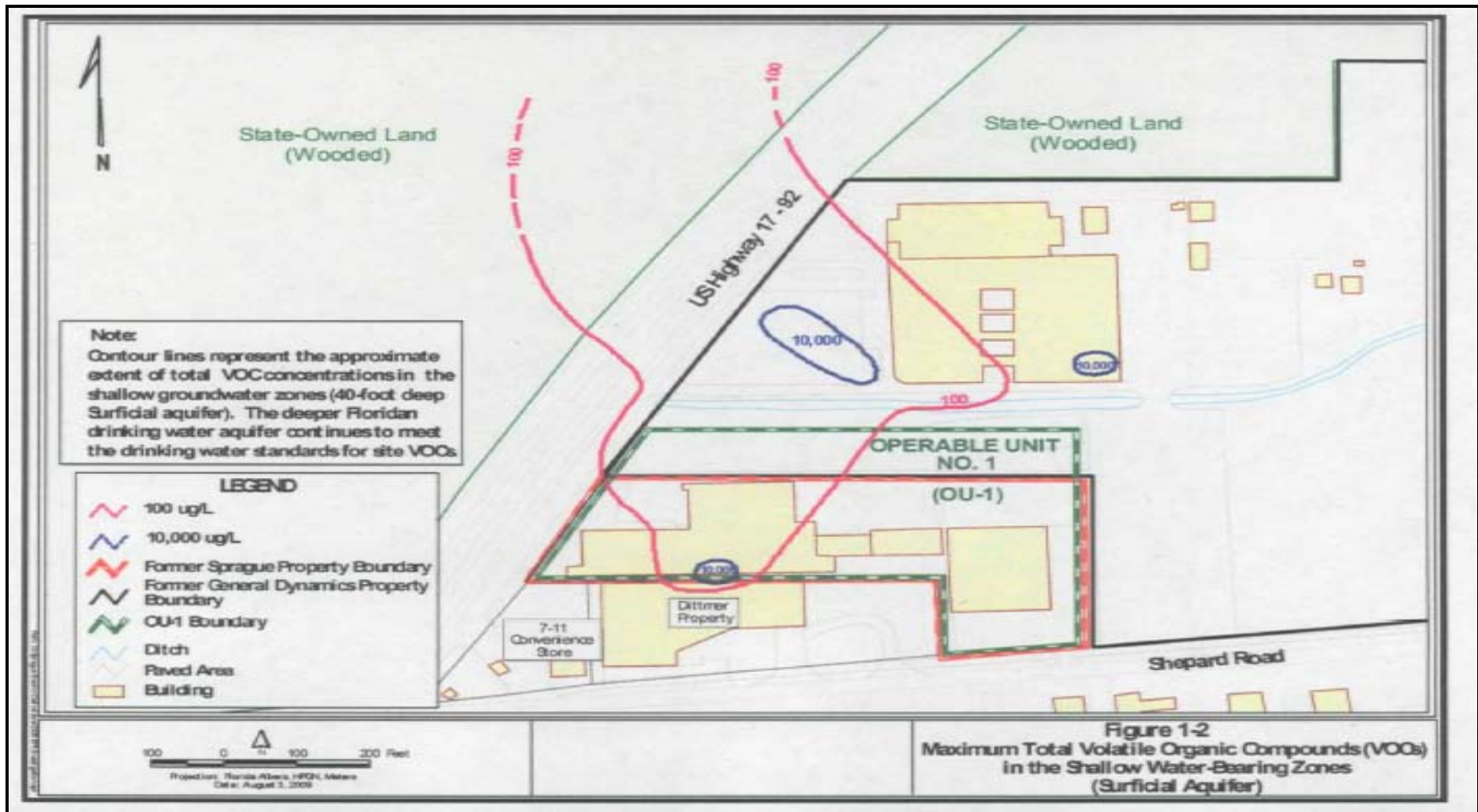


Figure 5: Impacted Well Locations

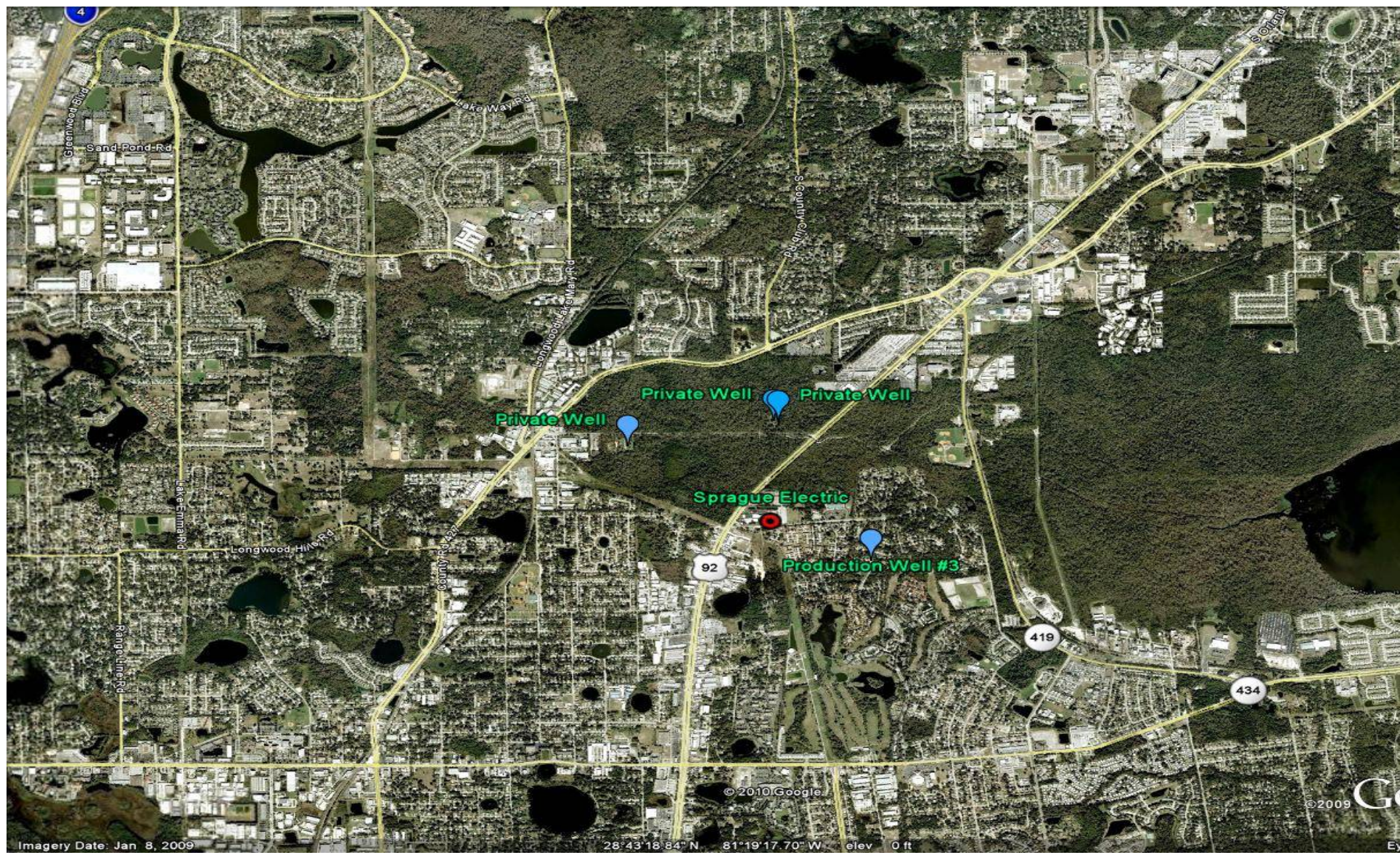


Figure 6: Direct Push Groundwater Sample Locations

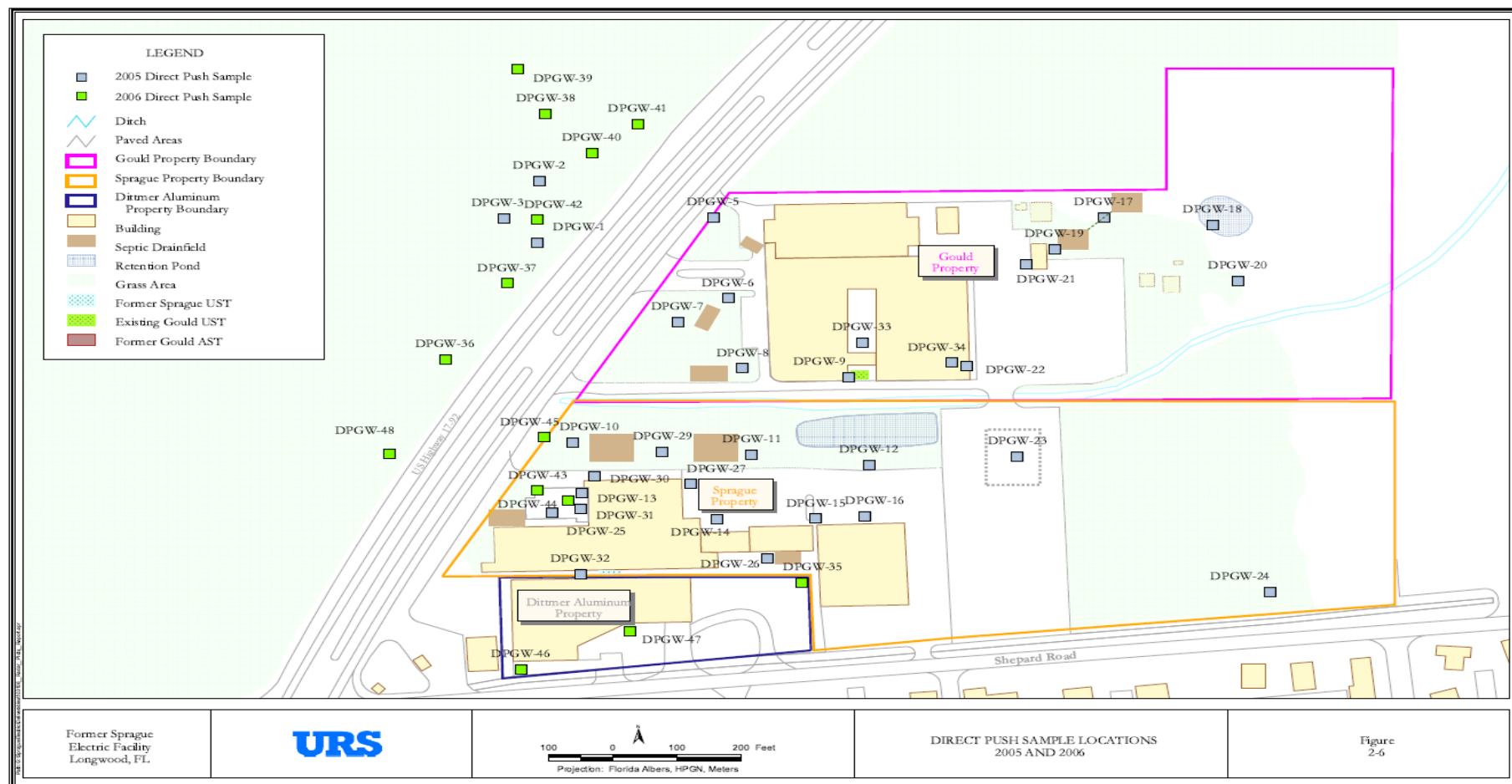
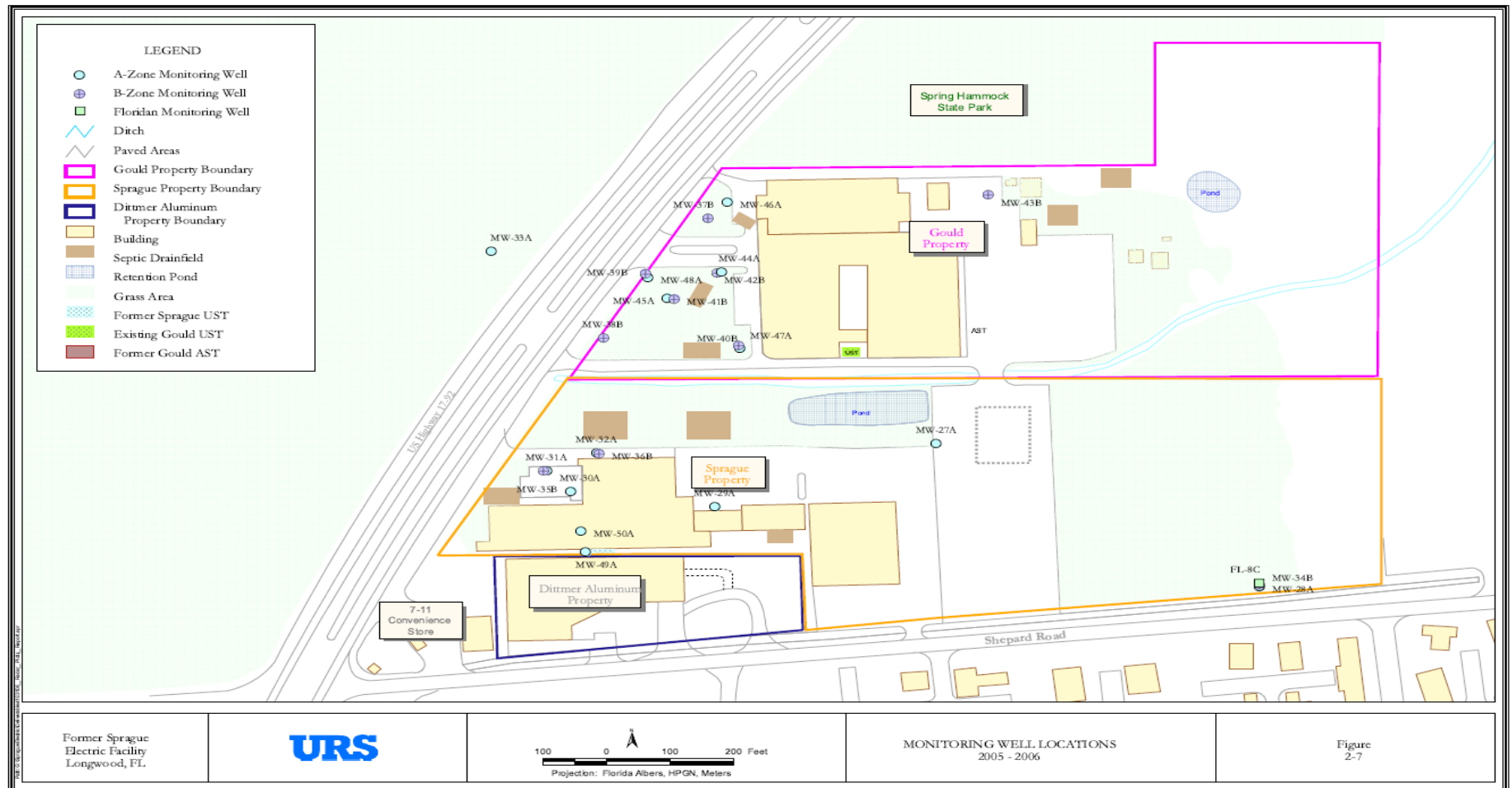


Figure 7: Monitor Well Locations



Former Sprague Electric Facility Longwood, FL

URS

Projection: Florida Albers, HPGN, Meters

ON-SITE AND OFF-SITE SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

Figure 2.2

LEGEND

- Surface Water Sample Location
- Sediment Sampling Location
- Existing A-Zone Monitoring Well Location
- Existing B-Zone Monitoring Well Location
- Ditch
- Paved Area
- Gould Property Boundary
- Sprague Property Boundary
- Danner Aluminum Property Boundary
- Building
- Septic Drainfield
- Retention Pond
- Grass Area
- Former Sprague UST
- Existing Gould UST
- Former Gould AST

Appendix C: Community Involvement

Community Concerns Evaluation:

Rheumatoid arthritis:

The chemical levels found thus far in drinking water supplies have been all below health based guidelines and would not be expected to cause rheumatoid arthritis.

Resident updates:

Florida DOH will continue to provide nearby residents with health information for both the Sprague Electric and General Dynamics-Longwood sites.

Plume delineation and additional well testing:

Florida DOH has recommended that EPA and the potential responsible parties continue to work toward delineating the vertical and lateral extent of the contamination plume. Florida DOH has recommended more frequent well testing within one mile of the site to ensure the safety of the drinking water supply.

Length of the notification and clean up process:

Investigation and clean up at hazardous waste sites and Superfund sites typically takes many years.

Threat to the aquifer in an environmentally sensitive area:

Florida DOH has recommended that the full extent of the plume be investigated.

Pet cancer deaths:

Florida DOH focuses on human health and possible human exposures and recommends you contact your veterinarian about pet health.

Safety of drinking water/potential health effects from drinking and showering in contaminated water:

The chemical levels found thus far in drinking water supplies have all been below health based guidelines and would not be expected to harm human health.

Florida DOH recommends more frequent well testing within one mile of the site to ensure the safety of the drinking water supply.

Private irrigation well sampling:

Florida DOH recommends that EPA consider testing private irrigation wells in the area near the site.

Proximity of the school and potential health effects to students:

Florida DOH is aware the nearby school receives municipal drinking water supplies. Florida DOH recommends more frequent well testing within one mile of the site to ensure the safety of the drinking water supply.

Children playing in the area, specifically playing soccer on the vacant lot next to the Sprague Electric site:

The vacant lot adjacent to Sprague is not within the hazardous waste site boundary. The contamination associated with Sprague is in the groundwater. Florida DOH is unaware of any contamination on the vacant lot or of any possible route of exposure.

Is the City of Winter Springs in the Loop?

Florida DOH has contacted the City of Winter Springs about this report. They are actively monitoring water supplies for contaminants.

APPENDIX D: RESPONSE TO PUBLIC COMMENTS

This document was available for public comment from October 22, 2010 to December 6, 2010. Florida DOH received three health concerns and many general comments about the site from nearby residents. Florida DOH also received comments from the potentially responsible party, Great American Financial Resources Inc. (GAFRI). The following is a summary of the comments and Florida DOH response. To receive the full text of the comments please contact Florida DOH.

Community Comments/Concerns and Responses:

Comment: One resident wanted more information about a possible link between bladder and prostate cancer and the chemicals at the site.

Response: There are 7 reported contaminants of concern associated with Sprague and General Dynamics: 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1,1-TCA, PCE, TCE and vinyl chloride. There is not sufficient information to classify 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and 1,1,1-TCA as to human carcinogenicity. PCE is associated with bladder cancer, however it has not been found in nearby municipal wells. TCE is associated with both bladder and prostate cancer, however it has not been found in nearby municipal wells. Vinyl chloride is not associated with bladder or prostate cancer.

Comment: Several Winter Springs residents expressed concern about possible pollution impacting a Winter Springs City well located about a ½ mile from the Sprague site in the Highlands subdivision.

Response: To date, the City of Winter Springs water supply has never had any violations of drinking water standards. The City of Winter Springs tests for VOCs quarterly and the treatment plant is equipped with an aeration system to ensure the safety of residents. While production well #3 has been impacted with *cis*-1,2-DCE, a contaminant of concern associated with both Sprague and General Dynamics, the levels found in the pre-treated water supply are well below any health-based guidelines. Florida DOH has recommended that EPA and the potential responsible parties continue to work towards delineating the vertical and lateral extent of the contamination plume. Florida DOH has recommended more frequent well testing within one mile of the site to ensure the safety of the public and private water supply.

Comment: A Winter Springs resident expressed concern about cancer.

Response: The City of Winter Springs production well #3 has been impacted with *cis*-1,2-DCE, the levels found so far are well below any health-based guidelines.

EPA has given *cis*-1,2-DCE a "not classifiable" rating as to human carcinogenicity. Therefore, it is not possible to calculate a theoretical increased cancer risk.

Comment: A former resident of Winter Springs expressed concern about the possibility of past exposures and the resulting health effects.

Response: Currently, the chemical levels found in pre-treated drinking water supplies have all been below health-based guidelines and would not be expected to harm human health. The neighborhood adjacent to the contamination has been connected to the municipal water system since 1972. The municipal water supply is monitored for VOCs quarterly and is treated with an aeration system. The City of Winter Springs has never had a violation of drinking water standards. Past exposure from groundwater or air contamination can not be estimated because there was no sampling done at the time.

Comment: A Winter Springs resident wanted to know why a hazardous waste site would be allowed so close to so many residents and directly on top of the local aquifer and main drinking source of local residents. He wants to know why governmental agencies don't know the extent of the problem since the contaminants were released decades ago. He wants to know how long the contamination to Winter Springs water has been going on.

Response: EPA is responsible for overseeing the cleanup of this site. Florida DOH has recommended that EPA and the potential responsible party investigate the full extent of the plume.

Comment: One Winter Springs resident wants to know when and what is going to be done to clear this area of toxic chemicals.

Response: EPA is responsible for overseeing the cleanup of this site. Florida DOH focuses on human health and possible human exposures.

Comment: A Winter Springs resident wanted to know what health effects are associated with what we have found in this report.

Response: The chemical levels found thus far in drinking water supplies have all been below health-based guidelines and would not be expected to harm human health. Florida DOH recommends additional testing near the site to ensure the safety of the public water supply. In addition, Florida DOH has recommended that EPA and the potential responsible party investigate the full extent of the contaminated groundwater.

Comment: A Winter Springs resident was concerned about consuming toxic chemicals in the local water supply.

Response: The City of Winter Springs monitors water quality on a regular basis to ensure the safety of residents. While production well #3 has been impacted with *cis*-1,2-DCE, a contaminant of concern associated with both Sprague and General Dynamics, the levels found so far are in the pre-treated supply and are well below any health-based guidelines. Florida DOH has recommended that EPA and the potential responsible party investigate the full extent of the contaminated groundwater.

Comment: One resident wanted to know if the City of Winter Springs knew about the contamination at the sites.

Response: The City of Winter Springs continues to actively monitor its water supplies for contaminants.

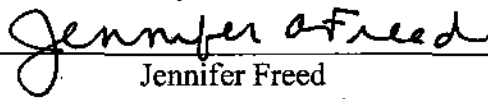
Great American Financial Resources Inc. (GAFRI) Comments and Responses:

Comment: GAFRI expressed concerns about the health assessment process and maintains that the source of groundwater contamination has yet to be determined.

Response: Florida DOH follows standard ATSDR procedures in assessing the public health threat around hazardous waste sites. Florida DOH has revised the report to more accurately reflect the uncertainty of the source of the contamination in these wells.

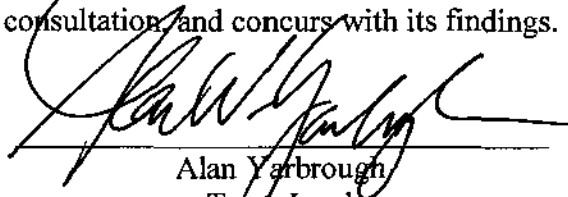
CERTIFICATION

The Florida Department of Health, Division of Environmental Health prepared this Health Consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry. It followed approved methodology and procedures existing at the time it began and completed editorial review.



Jennifer Freed
Technical Project Officer,
CAT, CAPEB, DHAC

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



Alan Yarbrough
Team Lead
CAT, CAPEB, DHAC, ATSDR