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.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO
or
HEALTH CONSULTATION

PUBLIC COMMENT RELEASE

SPRAGUE ELECTRIC COMPANY
SEMINOLE COUNTY, FLORIDA

EPA FACILITY ID: FLD004072658

Prepared By:

Florida Department of Health
Bureau of Environmental Public Health Medicine
Under cooperative agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry (ATSDR)

This information is distributed by the Agency for Toxic Substances and Disease Registry for public comment under applicable information quality guidelines. It does not represent and should not be construed to represent final agency conclusions or recommendations.
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>ATSDR</strong></td>
<td>Agency for Toxic Substances and Disease Registry</td>
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<tr>
<td><strong>bls</strong></td>
<td>below land surface</td>
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<td><strong>CHD</strong></td>
<td>County Health Department</td>
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<tr>
<td><strong>CV</strong></td>
<td>comparison value</td>
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<tr>
<td><strong>DCA</strong></td>
<td>dichloroethane</td>
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<tr>
<td><strong>DCE</strong></td>
<td>dichloroethylene</td>
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<tr>
<td><strong>EPA</strong></td>
<td>U.S. Environmental Protection Agency</td>
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<td><strong>DEP</strong></td>
<td>Florida Department of Environmental Protection</td>
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<td><strong>DOH</strong></td>
<td>Florida Department of Health</td>
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<tr>
<td><strong>kg</strong></td>
<td>kilogram</td>
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<tr>
<td><strong>MCL</strong></td>
<td>maximum contaminant level (EPA)</td>
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<tr>
<td><strong>μg/L</strong></td>
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<td><strong>mg/L</strong></td>
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<td><strong>mg/kg</strong></td>
<td>milligrams per kilogram</td>
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<td><strong>NPL</strong></td>
<td>National Priority List</td>
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<tr>
<td><strong>PCE</strong></td>
<td>tetrachloroethylene</td>
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<tr>
<td><strong>PHAP</strong></td>
<td>Public Health Action Plan</td>
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<tr>
<td><strong>ppb</strong></td>
<td>parts per billion</td>
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<td><strong>ppm</strong></td>
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<tr>
<td><strong>RfD</strong></td>
<td>reference dose</td>
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<tr>
<td><strong>TCA</strong></td>
<td>trichloroethane</td>
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<tr>
<td><strong>TCE</strong></td>
<td>trichloroethylene</td>
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<tr>
<td><strong>VOC</strong></td>
<td>volatile organic compound</td>
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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 and 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 vapor intrusion.

Florida DOH concludes that exposure to the contaminants in the on-site drainage ditch and stormwater 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 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 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 responsible parties have not monitored indoor air quality in the manufacturing building housing current workers and the pathway has not been evaluated off-site.

Contaminant levels found in samples collected from the on-site ditch and the stormwater retention pond were below health-based comparison values and therefore not likely to harm health.

**NEXT STEPS**

The US 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 responsible parties should investigate groundwater contamination in all directions from the site.

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

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

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 solicit public comment on this draft report and will address any comments and health concerns in the final report.

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 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

Sprague is located at 1221 North US Highway 17/92 in Longwood, Seminole County, Florida (Figure 1). Sprague is approximately 32 acres with three (3) main buildings. Most of the site is paved with asphalt. An on-site stormwater 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 Highlands Elementary 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


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) 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, originally installed in 1959 for heating oil storage, 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). 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 subsurface (former UST and septic systems) and surface soil sampling was not included in the investigation. 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.

In 1987, Sprague agreed to clean up the 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 contain or clean up the contamination. Florida DEP referred the Sprague site to the US Environmental Protection Agency (EPA) in 2003.

In 2004, EPA requested a comprehensive Remedial Investigation and Feasibility Study (RI/FS) to determine the full extent of contamination and to identify cleanup alternatives. 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 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. URS finalized the RI for the first section 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.

EPA is working to delineate the area of contaminated groundwater at both Sprague and General Dynamics-Longwood, 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 these sites along with their close proximity and very similar operational histories.

**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 [EPA 2009].

COMMUNITY HEALTH CONCERNS

Sprague and General Dynamics are adjacent sites; therefore the affected community is identical for both sites. Florida DOH initially assessed General Dynamics-Longwood site 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 (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.

Florida DOH solicited public comment for the General Dynamics-Longwood health consultation report from March 31, 2010 through May 31, 2010. The “mail-out” was expanded to include 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. (For a complete list of concerns and comments with corresponding responses, see Appendix C.)

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 2009].

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]. The City of Winter Springs detected low levels of \textit{cis}-1,2-DCE, a contaminant at Sprague, in PW-3 West and in an irrigation well south of Sprague.

\textbf{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. \textit{a source of contamination like a hazardous waste site},
2. \textit{an environmental medium like air, water, or soil that can hold or move the contamination},
3. \textit{a point where people come into contact with a contaminated medium like water at the tap or soil in the yard},
4. \textit{an exposure route like ingesting (contaminated soil or water) or breathing (contaminated air)},
5. \textit{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 exposure pathway for current Dearborn employees working at the Sprague facility and for residents living in buildings above contaminated 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). None of the 73 samples exceeded Florida DEP direct exposure residential soil criteria, and no one is being exposed to subsurface soil. Florida DOH does not consider the on-site soil at the Sprague site to be a current public health concern. The levels found are below health-based guidelines. The site is covered with asphalt and large commercial buildings with very few grassy areas. There is no indication that contaminants in the soil are migrating off-site.

Environmental Sampling

Since 1984, EPA and consultants for the property owners have collected thousands of groundwater, soil and surface water samples at Sprague. Analytical data indicate that the contamination in the surficial aquifer underneath both Sprague and General Dynamics has migrated off-site hundreds of yards but 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 a fixed based 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 (8 Floridan aquifer and 64 surficial aquifer) (Figure 7). They analyzed all monitoring well samples for VOCs using EPA Method 8206B at a fixed based laboratory. In addition, they selected and sampled three (3) monitoring wells for lead and 1,4-dioxane.

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 being used 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 5 µg/L.

Off-site Drinking Water Wells:

Florida DOH considers shallow groundwater contamination at the Sprague site a 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.

Florida DOH has evaluated the latest available municipal well data for wells within a mile of the site. The latest sampling for VOCs in municipal well systems within one mile of the site occurred in 2008 and found no concentrations above EPA drinking water MCLs.

Since 2001, the City of Winter Springs production well (PW-3 West) has contained cis-1,2-DCE from below detection limits (BDL) to 2.61 µg/L. The City of Winter Springs has also found cis-1,2-DCE from below detection limits 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). Two of these wells are fitted with filters supplied and maintained by Sprague. Sprague has not supplied a filter for the well contaminated with the vinyl chloride.

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. 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), cis1,2-DCE (2.8 µg/L), and vinyl chloride (1.2 µg/L). A sediment sample from the ditch contained 1,1-DCE (.0182 mg/kg) (Table 8 & 9).

The levels of TCE, cis1,2-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 September 1, 2005 and again on September 28, 2005. 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 (µg/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:

\[
\text{Dose} = \frac{\text{concentration} \times \text{ingestion rate}}{\text{body weight}}
\]

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.

For most chemicals, too little is known about the combined toxic effect of multiple contaminants to assess the health risk from exposure to mixtures. The science of toxicology is only now addressing this issue. 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 = 0.00000177 = 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). 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.

Florida DOH solicited public comment for the General Dynamics-Longwood health consultation report from March 31, 2010 through May 31, 2010. We received 15 comment forms and two e-mails from residents near the sites. A list of the comments complete with responses is located in Appendix C.
Florida DOH will offer this draft report to the community for public comment and will address any additional concerns in the final report.

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 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 responsible party found high levels of TCE in the soil gas underneath the manufacturing building. However, Florida DOH would need indoor air monitoring data to determine the public health threat to nearby residents and current workers from vapor intrusion. EPA and the 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 stormwater retention pond is unrestricted, incidental ingestion and skin contact with this water is unlikely to cause harm. The levels of contaminants found in the 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, quarterly to protect public health. The City of Winter Springs should test the municipal well that is currently affected but below drinking water standards, quarterly to protect public health.

2. The Seminole CHD should test private drinking water wells within 1-mile of the site for VOCs. EPA should alert municipal wells owners within 1-mile of the 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 contaminated groundwater.

**PUBLIC HEALTH ACTION PLAN**

1. EPA and the responsible parties will determine the extent of groundwater contamination.

2. EPA and the 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 responsible parties will evaluate the potential for vapor intrusion in off-site buildings above contaminated groundwater.

4. Florida DOH will re-evaluate the health threat when more data become available.

5. Florida DOH will offer this draft report to the community for public comment and will address any concerns in the final report.
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REFERENCES


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

<table>
<thead>
<tr>
<th>COMPLETED PATHWAY NAME</th>
<th>SOURCE</th>
<th>ENVIRONMENTAL MEDIA</th>
<th>POINT OF EXPOSURE</th>
<th>ROUTE OF EXPOSURE</th>
<th>EXPOSED POPULATION</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking water from nearby private wells</td>
<td>Solvent disposal at Sprague</td>
<td>Groundwater</td>
<td>Drinking water in nearby homes</td>
<td>Ingestion</td>
<td>About 10 users of 3 nearby private wells</td>
<td>Current and Future</td>
</tr>
<tr>
<td>Showering with water from nearby private wells</td>
<td>Solvent disposal at Sprague</td>
<td>Groundwater</td>
<td>Showers in nearby homes</td>
<td>Inhalation of vapors</td>
<td>About 10 users of 3 nearby private wells</td>
<td>Current and Future</td>
</tr>
<tr>
<td>Drinking water from impacted municipal wells</td>
<td>Solvent disposal at Sprague</td>
<td>Groundwater</td>
<td>Drinking water</td>
<td>Ingestion</td>
<td>About 3,000 people</td>
<td>Current and Future</td>
</tr>
<tr>
<td>Lawn irrigation with water from impacted irrigation well</td>
<td>Solvent disposal at Sprague</td>
<td>Groundwater</td>
<td>Lawn irrigation</td>
<td>Ingestion and Inhalation of vapors</td>
<td>About 100 people</td>
<td>Current and Future</td>
</tr>
</tbody>
</table>
Table 2: Potential Human Exposure Pathways at the Sprague Electric Superfund Site

<table>
<thead>
<tr>
<th>POTENTIAL PATHWAY NAME</th>
<th>POTENTIAL EXPOSURE PATHWAY ELEMENTS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SOURCE</td>
<td>ENVIRONMENTAL MEDIA</td>
</tr>
<tr>
<td>Vapor intrusion from contaminated groundwater</td>
<td>Solvent disposal at Sprague</td>
<td>Indoor air</td>
</tr>
<tr>
<td>Vapor intrusion from contaminated groundwater</td>
<td>Solvent disposal at Sprague</td>
<td>Indoor air</td>
</tr>
<tr>
<td>Storm water retention pond</td>
<td>Solvent disposal at Sprague</td>
<td>Surface water</td>
</tr>
<tr>
<td>Ditch</td>
<td>Solvent disposal at Sprague</td>
<td>Sediment</td>
</tr>
</tbody>
</table>
### Table 3: Eliminated Human Exposure Pathways at the Sprague Electric Superfund Site

<table>
<thead>
<tr>
<th>COMPLETED PATHWAY NAME</th>
<th>COMPLETED EXPOSURE PATHWAY ELEMENTS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-site soil</td>
<td><strong>SOURCE</strong>: Solvent disposal at Sprague</td>
<td>Current</td>
</tr>
<tr>
<td></td>
<td><strong>ENVIRONMENTAL MEDIA</strong>: soil</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>POINT OF EXPOSURE</strong>: none</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>ROUTE OF EXPOSURE</strong>: Incidental Ingestion</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>EXPOSED POPULATION</strong>: none</td>
<td></td>
</tr>
</tbody>
</table>
Table 4: Maximum Concentrations in Nearby Private Drinking Water Wells (2010)

<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Maximum Concentration (µg/L)</th>
<th>Comparison Value (µg/L)</th>
<th>Source of Comparison Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-dichloroethylene (1,1-DCE)</td>
<td>0.48</td>
<td>90</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>cis-1,2-dichloroethylene (cis-1,2 DCE)</td>
<td>9.6</td>
<td>70</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>trans-1,2-dichloroethylene (trans-1,2 DCE)</td>
<td>0.32</td>
<td>100</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Tetrachloroethylene (PCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>1,1,1-trichloroethane (1,1,1-TCA)</td>
<td>BDL</td>
<td>200</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Trichloroethylene (TCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>1.2</td>
<td>30</td>
<td>ATSDR Chronic EMEG</td>
</tr>
</tbody>
</table>

µg/L = micrograms per liter
* Screening guidelines only used to select chemicals for further scrutiny, not to the judge the risk of illness.
Source of data: Seminole CHD, unpublished data, 2010
BDL= below detection limit
EMEG= Environmental Media Evaluation Guide
### Table 5: Maximum Concentrations in City of Winter Springs Production Well #3 (2001-2008)

<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Maximum Concentration (µg/L)</th>
<th>Comparison Value (µg/L)</th>
<th>Source of Comparison Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-dichloroethylene (1,1-DCE)</td>
<td>BDL</td>
<td>90</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>cis-1,2-dichloroethylene (cis-1,2 DCE)</td>
<td>2.61</td>
<td>70</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>trans-1,2-dichloroethylene (trans-1,2 DCE)</td>
<td>BDL</td>
<td>100</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Tetrachloroethylene (PCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>1,1,1-trichloroethane (1,1,1-TCA)</td>
<td>BDL</td>
<td>200</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Trichloroethylene (TCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>BDL</td>
<td>30</td>
<td>ATSDR Chronic EMEG</td>
</tr>
</tbody>
</table>

µg/L = micrograms per liter  
* Screening guidelines only used to select chemicals for further scrutiny, not to the judge the risk of illness.  
Source of data: Stillwater 2008  
BDL = below detection limit  
MCL = maximum contaminant level  
EMEG = Environmental Media Evaluation Guide
Table 6: Maximum Contaminant Concentrations in Neighborhood Irrigation Well (2002-2010)

<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Maximum Concentration (µg/L)</th>
<th>Comparison Value (µg/L)</th>
<th>Source of Comparison Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-dichloroethylene (1,1-DCE)</td>
<td>BDL</td>
<td>90</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>cis-1,2-dichloroethylene (cis-1,2 DCE)</td>
<td>5.41</td>
<td>70</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>trans-1,2-dichloroethylene (trans-1,2 DCE)</td>
<td>BDL</td>
<td>100</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Tetrachloroethylene (PCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>1,1,1-trichloroethane (1,1,1-TCA)</td>
<td>BDL</td>
<td>200</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Trichloroethylene (TCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>BDL</td>
<td>30</td>
<td>ATSDR Chronic EMEG</td>
</tr>
</tbody>
</table>

µg/L = micrograms per liter
* Screening guidelines only used to select chemicals for further scrutiny, not to the judge the risk of illness.
Source of data: Stillwater 2008
BDL= below detection limit
MCL= maximum contaminant level
EMEG= Environmental Media Evaluation Guide
<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Maximum Concentration (µg/L)</th>
<th>Comparison Value (µg/L)</th>
<th>Source of Comparison Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-dichloroethylene (1,1-DCE)</td>
<td>26,500</td>
<td>90</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>Sample depth: 22’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cis-1,2-dichloroethylene (cis-1,2 DCE)</td>
<td>6200</td>
<td>70</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Sample depth: 42’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>trans-1,2-dichloroethylene (trans-1,2 DCE)</td>
<td>8.8</td>
<td>100</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Sample depth: 12’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetrachloroethylene (PCE)</td>
<td>1880</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Sample depth: 22’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,1,1-trichloroethane (1,1,1-TCA)</td>
<td>561</td>
<td>200</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Sample depth: 32’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethylene (TCE)</td>
<td>25,100</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Sample depth: 42’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>251</td>
<td>30</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>Sample depth: 42’</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

µg/L = micrograms per liter
* Screening guidelines only used to select chemicals for further scrutiny, not to judge the risk of illness.
Source of data: URS 2009
BDL= below detection limit
MCL= maximum contaminant level
EMEG= Environmental Media Evaluation Guide
Table 8: Maximum Concentrations in On-site and Off-site Surface Water (2005)

<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Maximum Concentration (µg/L)</th>
<th>Comparison Value (µg/L)</th>
<th>Source of Comparison Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-dichloroethylene (1,1-DCE)</td>
<td>BDL</td>
<td>90</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>cis-1,2-dichloroethylene (cis-1,2 DCE)</td>
<td>2.8</td>
<td>70</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>trans-1,2-dichloroethylene (trans-1,2 DCE)</td>
<td>BDL</td>
<td>100</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Tetrachloroethylene (PCE)</td>
<td>BDL</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>1,1,1-trichloroethane (1,1,1-TCA)</td>
<td>BDL</td>
<td>200</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Trichloroethylene (TCE)</td>
<td>1.8</td>
<td>5</td>
<td>EPA MCL</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>1.2</td>
<td>30</td>
<td>ATSDR Chronic EMEG</td>
</tr>
</tbody>
</table>

µg/L = micrograms per liter
* Screening guidelines only used to select chemicals for further scrutiny, not to the judge the risk of illness.
Source of data: URS 2009
BDL = below detection limit
MCL = maximum contaminant level
EMEG = Environmental Media Guide
Table 9: Maximum Concentrations in On-site and Off-site Sediment (2005)

<table>
<thead>
<tr>
<th>Contaminants</th>
<th>Maximum Concentration (mg/kg)</th>
<th>Comparison Value (mg/kg)</th>
<th>Source of Comparison Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-dichloroethylene (1,1-DCE)</td>
<td>0.182</td>
<td>500</td>
<td>ATSDR Chronic EMEG</td>
</tr>
<tr>
<td>cis-1,2-dichloroethylene (cis-1,2 DCE)</td>
<td>BDL</td>
<td>20,000</td>
<td>ATSDR Intermediate EMEG</td>
</tr>
<tr>
<td>trans-1,2-dichloroethylene (trans-1,2 DCE)</td>
<td>BDL</td>
<td>10,000</td>
<td>ATSDR Intermediate EMEG</td>
</tr>
<tr>
<td>Tetrachloroethylene (PCE)</td>
<td>BDL</td>
<td>500</td>
<td>ATSDR RMEG</td>
</tr>
<tr>
<td>1,1,1-trichloroethane (1,1,1-TCA)</td>
<td>BDL</td>
<td>1,000,000</td>
<td>ATSDR Intermediate EMEG</td>
</tr>
<tr>
<td>Trichloroethylene (TCE)</td>
<td>BDL</td>
<td>400</td>
<td>ATSDR Acute EMEG</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>BDL</td>
<td>200</td>
<td>ATSDR Chronic EMEG</td>
</tr>
</tbody>
</table>

* Screening guidelines only used to select chemicals for further scrutiny, not to the judge the risk of illness.
Source of data: URS 2009
mg/kg = milligrams per kilograms
BDL = below detection limit
MCL = maximum contaminant level
EMEG = Environmental Media Evaluation Guide
RMEG = Reference Dose Media Evaluation Guide
Appendix B: Figures
Figure 1: Sprague Site Location
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
Figure 8: On-site and Off-site Surface Water and Sediment Sampling Locations
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 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 public 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 public 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 public 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.
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