Public Health Assessment for

SOLITRON MICROWAVE
PORT SALERNO, MARTIN COUNTY, FLORIDA
CERCLIS NO. FLD045459526
AUGUST 31, 1999

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This public health assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H), for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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PUBLIC HEALTH ASSESSMENT

SOLITRON MICROWAVE

PORT SALERNO, MARTIN COUNTY, FLORIDA

CERCLIS NO. FLD045459526

Prepared by:

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

FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover.) If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations - the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Interactive Process: The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When informed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-56), Atlanta, GA 30333.

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Summary

Solitron Microwave, on Cove Road in Port Salerno, Martin County, Florida, covers approximately 20 acres. Between 1963 and 1987, the General R.F. Fitting Company and Solitron Devices, Inc. manufactured miniature electronic equipment. The facility discarded wastewater in a ditch, in an on-site percolation pond and in underground drains. The site is in a mixed residential and commercial area. On-site surface water, sediment, soil and groundwater are contaminated with metals and organic chemicals. Off-site groundwater is contaminated with metals and organic chemicals.

In this public health assessment, we evaluate the potential for illnesses to be caused by exposure to contaminated surface soil, surface water, sediment, and groundwater. Off-site groundwater and on-site soil are completed exposure pathways. On-site groundwater is a potential exposure pathway. Surface water and sediment are not completed exposure pathways.

Currently the site is a potential public health hazard because people could be exposed in the future to contaminated on-site groundwater. If people install new on-site wells or if contamination moves offsite to private or municipal wells, they could be exposed to the contaminated groundwater. The levels of volatile organic chemicals (VOCs) found in private well water in the past are unlikely to have caused illness. The buildings on this site are not secure and there are no hazardous waste warning signs.

We recommend the Martin County Health Department continue to identify and sample private wells northeast of the site. We recommend government officials continue to inform residents northeast of the site of the potential public health threat resulting from contamination from the site migrating to private or municipal wells. We recommend the maintenance of security around the site to reduce the risk of physical hazards and post hazardous waste warning signs.

Background

In this public health assessment, the Florida Department of Health (FDOH) in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR), evaluates the public health significance of the Solitron Microwave site. Specifically, FDOH decides whether illness is possible from exposure to levels of contaminants at the site and recommends actions to reduce or prevent these illnesses. FDOH has not previously reviewed any data for this site. The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or Superfund) authorizes the ATSDR to conduct public health assessments at hazardous waste sites. The ATSDR, in Atlanta, Georgia, is a federal agency within the U.S. Department of Health and Human Services.

A. Site Description and History

In March 1998, the Environmental Protection Agency, (EPA) proposed the Solitron Microwave site to the Superfund National Priorities List. Solitron Microwave, on Cove Road in Port Salerno, Martin County, Florida, encompasses approximately 20 acres (See Figure 1). Beginning in 1963, the General R.F. Fitting Company occupied the site. They manufactured electronic equipment. In 1968, Solitron Devices, Inc. bought the site and until 1987 also manufactured miniature electronic equipment (EPA 1998a). From about 1964 to 1970, the facility discarded wastewater in the Cove Road ditch, a "more or less natural ditch" which ran into the north-south creek, east of the building. After 1971, the ditch flowed beneath the Cove Road by way of a culvert (FDER 1991). They treated wastewater in the wastewater treatment area, behind the building, then discarded it in an on-site percolation pond. They discarded water from sinks inside the building in underground drains in the northeast part of the site (EPA 1998a). Currently, the site is vacant (See Figure 2 &3).

In 1983, Florida Department of Environmental Protection (FDEP) site inspectors noted leaking pipes and contaminated soil. In February 1985, the EPA conducted a Site Screening Investigation. They found organic and metal compounds in the groundwater, surface water, soil and sediment. (EPA 1998a). In 1989, the FDEP investigated groundwater and soil contamination in the Contamination Assessment Report. They found organic compounds primarily in the surficial aquifer, above 75 feet. They did not find soil contamination above screening levels (FDER 1989).

In late 1988 and early 1989, the EPA found elevated levels of perchloroethylene, trichloroethene, trichloroethane, xylene, acetone, vinyl chloride, methylene chloride and 1,1-dichloroethene in the surficial aquifer under the site above the maximum

contaminant levels (MCLs; EPA 1998a). In 1990, Solitron dug up sediment from the pond. They piled it and covered it with a plastic sheet, however, records do not indicate if the sediment was piled and covered onsite or offsite (EPA 1998b).

In February 1991, FDEP investigated on-site and off-site contamination in Phase II of the Contamination Assessment Report for the Solitron Microwave Site. They found groundwater contaminated with VOCs moved north and offsite and north to Grant Street and east just beyond Ebb Tide Avenue (FDER 1991).

Between 1991 and 1993, the Martin County Health Department (CHD) periodically sampled nearby private wells. They found vinyl chloride in six out of twenty-two of these wells above the MCL (Washam 1998). From February 1992 to April 1993, Solitron provided bottled water to nearby residents with contaminated private wells (EPA 1998). In 1994, they also funded a water main to the neighborhood and municipal water hookups for private wells with levels of contaminants above the MCL (FDER 1991).

In 1995, the Martin CHD continued periodic sampling fifty of nearby private wells. They identified groundwater contamination north of Cove Road but not south of Cove Road (personal communication with Martin CHD Environmental Health Director, January 15, 1999). Residents with contaminants above the MCL in their private well water were hooked up to municipal water (Washam 1998).

In August 1998, the Martin CHD found two more private wells out of twenty-nine wells had vinyl chloride above the Maximum Contaminant Level (MCL). They found trace levels of vinyl chloride or other chemicals and metals in sixteen wells. In December 1998, the Martin CHD requested FDEP connect these homes with vinyl chloride in their well water above the MCL to a municipal water supply. The Martin County Health Department plans to periodically resample private wells and other homes in the area (Letter to Russ Blackburn from Robert Washam 1998).

In 1998, the EPA investigated three areas of potential contamination: the wastewater treatment area, the percolation pond and the septic fields (See Figure 4). The surface water from the pond is contaminated with nickel. The surficial aquifer under the northern portion of the site is contaminated with organic chemicals and metals. Metals, however, are also present in background groundwater and soil samples (EPA 1998a).

On March 3, 1998, the EPA proposed the site to the National Priorities List as a Superfund Site.

B. Site Visit

Julie Smith of the FDOH, Bureau of Environmental Toxicology visited the site June 18, 1998. The site is on Cove Road in a mixed residential and commercial area of Port Salerno. The property is vacant and a chain link fence lines the front of the property. The site is not posted with warning signs. A path leads from the sidewalk around the fence onto the property. The building onsite is abandoned and the door does not lock. Trash, clothes, and graffiti are evidence people have access to the building and homeless people might be living onsite. The property around the building is grassy with palm trees and shady dirt roads. People frequent the area as evidenced by trash and clothes. Several dirt paths lead onto the property. The pond in front of the building is swampy and home to turtles.

A church and a junk yard are directly across the street. A neighborhood of single family homes with some having private wells is across the street to the northeast. The neighborhood is middle to low income. A swampy creek is on the east edge of the neighborhood. The Lil Saints gas station is north east of the site (See Figure 3).

C. Demographics, Land Use and Natural Resource Use

About 6,760 people live within one mile of the site. Five-thousand and forty-four residents are white and 525 are black. Six-hundred and sixty-eight are less than six years old and 1,139 are over the age of sixty-five. There are 1,531 women of childbearing age (Bureau of Census 1990).

A 1989 survey identified ten public wells, two irrigation wells and two U.S. Geological Survey wells within a ½ mile radius of the site (FDER 1989). The Martin County Utilities has five wells within 4000 feet south of the facility. They blend water from these five wells with twenty other wells. This system serves about 53,544 people (Kristiansen 1997). There are sixty-four known private wells within a 1 mile radius of the pond serving about 145 people (EPA 1998b). The EPA has sufficient evidence to assume the private wells are in the surficial aquifer (FDER 1989). The surficial aquifer is the principal source of drinking water in Martin County. The surficial aquifer flows north-north east toward the Manatee Pocket - Manatee Creek (EPA 1998b).

D. Health Outcome Data

We did not evaluate health outcome data for the community around this site. We do not have health-outcome databases capable of searching for effects in such a small population/geographical area. If future environmental investigations find larger areas of exposed populations, we will evaluate health outcome data as considered appropriate.

Community Health Concerns

Some community members are concerned about the quality of their private well water. In June 1999, the FDOH held a public availability session and collected health concerns from nearby residents. These concerns are described in the section Community Health Concerns on page 14.

Environmental Contamination and Other Hazards

In this section, we review the environmental data collected at the site, evaluate sampling adequacy, and select contaminants posing the greatest threat to health (contaminants of concern). We select contaminants of concern based on the following factors:

1. Concentrations of contaminants on and off the site: we eliminate contaminants from further consideration if the concentrations are below standard ATSDR comparison values. This is necessary to assess the public health risk to all contaminants detected, whether site-related or not. We also eliminated contaminants that are essential human nutrients present at low concentrations. Examples of these chemicals are iron, magnesium, calcium, potassium and sodium.

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

3. Community health concerns.

4. For complete and potential exposure pathways, we compare maximum concentrations at the site with published ATSDR standard comparison values. The ATSDR's published standard comparison values are media-specific concentrations used to select contaminants for further evaluation. They are not

used to predict health effects or to set clean-up levels. Contaminants with media concentrations above an ATSDR standard comparison value do not necessarily represent a health threat, but are selected for further evaluation. Contaminants with concentrations below an ATSDR standard comparison value are unlikely to cause illness and are not evaluated further, unless the community has specific concerns about the contaminant.

5. For complete and potential exposure pathways, we compare maximum concentrations with toxicological information including ATSDR toxicological profiles. These profiles are chemical specific and summarize toxicological information found in the scientific literature.

We used the following ATSDR standard comparison values (ATSDR 1998a), in order of priority, to select contaminants of concern:

1. EMEG--Environmental Media Evaluation Guide- ATSDR derived the EMEG from the ATSDR's Minimal Risk Level (MRL) using standard exposure assumptions, such as drinking two liters of water per day and body weight of 70 kg (150 pounds) for adults. MRLs estimate how much contaminant a person could consume without increasing the risk of non-cancer illness, generally for a year or longer.

2. CREG--Cancer Risk Evaluation Guide--ATSDR calculated CREGs from the EPA's cancer potency factors, the contaminant concentration they estimated to result in no more than one excess cancer per one million persons exposed over a lifetime.

3. RMEG--Reference Dose Media Evaluation Guide--ATSDR derived RMEGs from the EPA's Reference Dose (RfD) using standard exposure assumptions. RfDs estimate how much contaminant a person could consume without increasing the risk of non-cancer illness, generally for a year or longer.

Identifying a contaminant of concern in this section does not necessarily mean that exposure will be associated with illnesses. Identification serves to narrow the focus of the public health assessment to those contaminants most important to public health. We evaluate the contaminants of concern in subsequent sections and decide whether exposure has public health significance.

A. On-site contamination

The on-site groundwater is contaminated with vinyl chloride, 1,1-dichloroethene, perchloroethylene, trichloroethene, barium, beryllium, cadmium, chromium, copper mercury, nickel, selenium, carbon tetrachloride above ATSDR screening levels. Lead, aluminum, and 1,1-dichloroethane were also detected in the groundwater but ATSDR does not have screening values for these compounds (see Table 1). The EPA detected the highest level of chromium in the sample termed the 'background sample' that was collected on-site behind the south-west corner of the Solitron building (groundwater flows north-northeast).

Copper and aluminum were also detected in soil, but ATSDR does not have screening values for these compounds (See Table 2). These metals were above background values (ATSDR 1992).

The surface water from the pond is contaminated with nickel. Sediment from the pond remaining after remediation was not contaminated.

B. Off-site contamination

In February 1991, the Martin CHD found contaminated groundwater had moved offsite to the residential area north-northeast of the site. Off-site groundwater is contaminated with vinyl chloride, arsenic, perchloroethylene, trichloroethene, copper and lead above ATSDR screening levels. Aluminum was also detected but ATSDR does not have a screening value for this chemical (See Table 3; Washam 1998).

C. Quality Assurance and Quality Control

In preparing this public health assessment, we relied on the existing environmental data. We assumed consultants who collected and analyzed these samples followed adequate quality assurance and quality control measures concerning chain-of-custody, laboratory procedures, and data reporting. The completeness and reliability of the referenced information determine the validity of the analyses and conclusions drawn for this public health assessment. The available quality assurance and quality control information is presented below.

The FDEP reviewed and approved the 1987 Contamination Assessment Plan and the Quality Assurance Project Plan by Enviropact, Inc. Enviropact conducted the 1989 and

1991 Contamination Assessment Reports for FDEP. FDEP does not require further validation for the Contamination Assessment Reports (Kristiansen 1995).

The Martin County Health Department followed all quality assurance and quality control (QA/QC) procedures for testing of private wells in 1991. The supervisor verified the samples for adherence to protocol and established acceptable QC ranges (Arms 1993).

D. Physical and Other Hazards

The Solitron Building doors are not closed or locked and access to the site is not restricted. There are no warning signs around the property. Equipment in the building may present a physical hazard. People may trip over debris inside the dark building.

Pathway Analysis

The amount of contact people have with hazardous substances is essential to assessing the public health significance of a contaminant. Chemical contaminants in the environment have the potential to harm human health, but only if people have contact with those contaminants.

An exposure pathway is the way an individual contacts contaminants. To decide whether nearby residents have contacted contaminants at the site, we looked at the human exposure pathways. An exposure pathway has five elements: The first element is an original contamination source, like an industrial site. The second element is an environmental media, like air or groundwater, that moves contamination from the source to a place where people can contact the contamination. The third element is a place where people could contact the contaminated soil or groundwater, like topsoil or a drinking water well. The fourth element is the exposure route, like drinking contaminated water or touching contaminated soil. The fifth element is a group of people who can potentially come in contact the contamination, like people living or working near the contaminated site.

We eliminate an exposure pathway if at least one element is missing and will never be present. For completed pathways, all five elements exist and exposure to a contaminant has occurred, is occurring, or will occur. For potential pathways, exposure to a contaminant could have occurred, could be occurring, or could occur in the future.

The public health findings for the community surrounding the site are based on identification of past, present, and future exposure pathways. We identified exposure pathways that are significant to public health in this assessment (See Table 4).

A. Completed Exposure Pathways

The site visit revealed evidence of trespassers on the property, gaps in the fence and possibly homeless people living in the buildings. It is likely that in the past, people trespassing on this site or homeless people came into contact with contaminated soil. Since site access is unrestricted, it is likely that site trespassers are currently being exposed. If site access is not restricted, it is likely that trespassers will continue to be exposed in the future.

Nearby residents may have been exposed to chemicals from this site in their well water. The Martin County Health Department has identified private wells with levels of organic chemicals above standards.

B. Potential Exposure Pathways

People could be exposed in the future to chemicals from this site if they drill new wells into the contaminated aquifer onsite.

People could be exposed in the future to chemicals from this site if contaminated groundwater migrates to their existing wells.

C. Eliminated Exposure Pathways

Surface water and sediment are not likely exposure pathways. It is extremely unlikely that a person would drink from or swim in the on-site ponds with any frequency.

Public Health Implications

In this section we will discuss how and when people contact contaminants and the public health implications of those exposures. We estimated an exposure dose of each contaminant a child (for potential non-cancer effects) and adult (for potential

carcinogenic effects) might receive by coming into contact with contaminated surface soil.

For noncancerous contaminants, we estimate the dose an elementary school child would receive if he or she came into contact with soil almost daily because it is the most conservative exposure scenario. By using the most conservative exposure scenario, we will nonetheless overestimate risk, but we will be sure to protect all individuals, even overtly sensitive individuals, for example, very young and very old people, people with nutritional deficiencies, chronic illnesses, immune system deficiencies or substance abuse.

In surface soil, we estimated the dose that an elementary school child, weighing 24 kilograms (50 pounds), would receive by incidentally eating 200 milligrams of contaminated surface soil or about one-half liter of contaminated water per day, 350 days a year for six years (EPA 1989b).

For groundwater exposure, we estimated the dose for children drinking about one-half liter of water per day. Children represent a sensitive sub population. Exposures that are protective of children are most likely protective of adults.

For carcinogenic compounds, we estimated an exposure dose that an adult, weighing 70 kilograms (150 pounds), would receive over a lifetime (70 years) of incidentally ingesting 100 milligrams of surface soil a day or drinking two liters of contaminated water per day, 350 days out of the year (Risk Assistant, 1994).

To evaluate each contaminant, we compared our exposure estimate with ATSDR and EPA health guidelines. These health guidelines help us screen the contaminants that require further investigation. These values alone, however, cannot determine a particular contaminant's potential health threat. If exposure estimates were less than the health guideline, we did not evaluate the contaminant further. If exposure estimates exceeded the health guideline or if no health guideline existed, we then compared exposure estimates with doses in human or animal studies and described the results.

For noncancerous contaminants, we compared our exposure estimate with health guidelines such as ATSDR's Minimal Risk Level (MRLs) and EPA's Reference Doses (RfDs). RfDs and MRLs estimate the daily exposure dose a person can tolerate without becoming sick over a specified length time (EPA 1989a). We used long-term exposure MRLs before intermediate duration MRLs, if both existed. We used intermediate duration MRLs before short-term exposure MRLs, if both existed, because our exposure estimates are based on a longer term exposure.

For cancerous contaminants, we compared our exposure estimates with EPA's cancer potency factors. We used a potency factor to estimate an upper-bound probability of an individual developing cancer from a lifetime of exposure to a particular level of a potential carcinogen (ATSDR 1992a). These estimates are based on the assumption that there is no safe level of exposure to a carcinogenic contaminant. Each exposure carries some degree of risk, no matter how small. Therefore, we define 'safe exposure' as a reasonable or acceptable degree of risk (for example, one in one million) rather than zero (Williams 1985). To err on the side of safety, these estimates may overestimate the risk associated with cancer. When examining cancer risks, it is important to recognize the background cancer rate in United States is about 25% or 25 in 100 (ATSDR 1993a). If we add a one-in-a million additional cancer risk to the background risk, the risk increases to 25.0001% cancer risk. This means we expect 25.00001 people out of 100 (similarity, 25,000,001 cancers in 100,000,000) in a population will get cancer.

A. Toxicological Evaluation

Non-Cancer Section

Onsite

We do not expect any non-cancer illness from exposure to contaminated on-site soil.

We do not expect any non-cancer illness from potentially drinking on-site groundwater contaminated with acetone, lead, aluminum, 1,1-dichloroethene, perchloroethylene, trichloroethene, barium, beryllium, cadmium, copper, mercury, nickel, selenium, carbon tetrachloride or 1,1-dichloroethane. Our estimated dose from all of these contaminants was below their MRL or RfD. For those contaminants without an MRL or RfD, our estimated dose was far below the dose causing illness in humans or animals (ATSDR 1997a, ATSDR 1997b, ATSDR 1992b, ATSDR 1993c, ATSDR 1990, ATSDR 1997c, ATSDR 1997d).

Vinyl chloride and chromium had concentrations were above standard comparison values. We evaluated these contaminants further.

Vinyl chloride is a colorless gas but it can also dissolve in water. It has other names such as chloroethene, chloroethylene, ethylene monochloride and monochloroethylene. Vinyl chloride at the Solitron Microwave site came from the breakdown of other substances that Solitron used in the manufacturing process (ATSDR 1997e).

We estimated the dose of vinyl chloride that a child would receive if they potentially drank contaminated on-site groundwater. Our estimated dose is above the MRL and 3.3 times higher than the level that caused cellular changes in animal livers. If children drink this water, we would expect cellular changes in their livers. However, there is no evidence anyone drank this water in the past and we do not expect anyone to drink on-site groundwater in the future.

Chromium is a naturally occurring element found in rocks, soil, plants and animals. Certain types of chromium are essential for body functioning (ATSDR 1993b).

We estimated the dose of chromium that a child would receive if they potentially drank contaminated on-site groundwater. Our estimated dose is slightly above the level that caused oral ulcer, diarrhea, abdominal pain, indigestion, vomiting, problems with blood cells and dermatitis in people (ATSDR 1993b). If children drink this water, we would expect these illnesses. However, there is no evidence anyone drank this water in the past and we do not expect anyone to drink on-site groundwater in the future.

Off-site

We do not expect any non-cancer illness from off-site private drinking water contaminated with lead, aluminum, arsenic, perchloroethylene, trichloroethene, or copper. Our estimated dose from all of these contaminants was below our Minimal Response Level (MRL) or EPA's reference dose (RfD). For those contaminants without a MRL or RfD, our estimated dose was far below the dose causing illness in humans or animals (ATSDR 1997a, ATSDR 1997b, ATSDR 1990).

We do not expect any illness from the levels of vinyl chloride found in private wells. From the highest level of vinyl chloride found in one drinking water well, we estimated the dose that a child would receive. Our estimated dose is 82 times higher than ATSDR's MRL for chronic exposure. This MRL was based on a dose given to rats for almost three months who developed changes in their liver cells (basophilic foci of cellular alteration). This dose is multiplied by 1,000, as a safety factor, to develop the MRL. Our estimated dose is ten times lower than the dose causing cellular changes in animals. Our estimated dose of vinyl chloride is slightly higher than the level people may receive from drinking water from pipes made from PVC (polyvinyl chloride; ATSDR 1997e). Since the dose of vinyl chloride is below the level that caused an effect in animals, since only one well had this high level of vinyl chloride, and since residents with contaminated private wells were given bottled drinking water soon after contamination was identified, we do not expect any illnesses from vinyl chloride in private wells.

Cancer

Onsite

We do not expect any increased risk of cancer from drinking 1,1-dichloroethene, beryllium or carbon tetrachloride- contaminated on-site groundwater. The EPA does not have a potency factor to compare the carcinogenic effects of acetone, lead, aluminum, perchloroethylene, trichloroethene, barium, cadmium, chromium, copper, mercury, nickel, selenium or 1,1-dichloroethane. There is not enough information to assess the carcinogenic potential of these compounds in on-site groundwater.

Scientists found that workers who breathe vinyl chloride can develop a rare type of cancer, angiosarcoma of the liver. There are no cancer studies of people who have ingested vinyl chloride. The EPA classifies vinyl chloride as a human carcinogen. If people drink vinyl chloride-contaminated groundwater from under this site for a lifetime, we would expect a moderately increased risk of liver cancer. It is very unlikely, however, that anyone would drink groundwater from directly under the site.

Offsite

We do not expect any increased cancer risk from arsenic-contaminated private drinking water wells. The EPA does not have a potency factor to compare the carcinogenic effects of lead, aluminum, perchloroethylene, trichloroethene and copper. There is not enough information to assess the carcinogenic potential of these compounds in private drinking water wells in the vicinity of this site.

When we compare our estimated dose of off-site private well water contaminated with the highest level of vinyl chloride found with the EPA cancer potency factor, we estimate that if over a lifetime, they would have a low increased risk of liver cancer. However, there is no evidence people drank vinyl chloride-contaminated private well water for 70 years.

B. Children's Health

We estimated doses a child would receive if they came into contact with site related contaminants. We expect children would become ill from drinking vinyl chloride and chromium contaminated on-site groundwater. It is, however, unlikely that children would drink this water. We do not expect children to become ill from drinking off-site contaminated groundwater.

Before birth, children are forming the body organs that need to last a lifetime. This is the time when contaminant injury may lead to serious injury or illness. Injury during certain periods of growth and development may lead to malformation of organs (teratogenesis), disruption of function, and premature death. Exposure of the mother leads to exposure of the fetus since some contaminants cross the placental barrier (ATSDR 1998b).

Small children may have greater exposures to environmental contaminants than adults. Pound for pound of body weight, children drink more water, eat more food, and breathe more air than adults. For example, children in the first six months of life drink seven times as much water per pound as the average adult living in the United States. Children's exposure to contaminants in the environment is also greater because they play close to the ground increasing their exposure to contaminants in dust and soil plus contaminants in the air, and they put many things into their mouths. Their hands, toys and other items may have soil and dust containing contaminants from paint, gasoline, vehicle emissions and industrial sources. In addition, children may accidentally wander or deliberately trespass onto or into restricted locations. The obvious implication for environmental health is that children can have much greater "doses" than adults to contaminants that are present in soil, water, or air (ATSDR 1998b).

C. Community Health Concerns

In June 1999, the FDOH held a public availability session and collected health concerns from nearby residents. In this section, we address each community health concern.

Are properties west of the site contaminated?

Technical studies have shown the contaminated groundwater is moving east, northeast. We do not expect the contamination to move west.

How often are the individual (private) wells tested?

The Martin County Health Department is testing and retesting private wells about every six months.

Has concern passed in the area of those wells tested?

No, the contamination could move into areas that were previously tested.

Is the area being cleaned of chemicals?

The EPA is currently studying the area to develop the best way to manage the site.

Can we have the water lines available with no costs for the line installation because some people are on fixed incomes?

The Florida Statutes say that the Department of Environmental Protection is authorized to hook up private wells to municipal water free of charge to the well owner if they are contaminated above standards called the Maximum Contaminant Levels (MCLs: Personal Communication with the Martin County Health Environmental Health Director June 24, 1999). Contaminants below the MCLs ensure that drinking water is safe for human consumption.

Was our well tested from the well at the pump or at the faucet?

The samples collected by the Martin County Health Department were collected from the faucet.

Conclusions

1. We classify the Solitron Microwave Superfund hazardous waste site as a potential public health hazard because in the future people could be exposed to contaminated groundwater. The on-site groundwater is contaminated. If people install new wells in the contaminated aquifer, they could be at risk of becoming ill.

2. Even though low levels of VOCs are in off-site groundwater, the levels in private well water are unlikely to have caused illness in the past. Nonetheless, on-site contaminated groundwater flows northeast, toward a residential neighborhood with private wells.

3. The Solitron Building is not secure and there are no warning signs around the site.

Recommendations

The recommendations and advice in this public health assessment are based upon the referenced data and information. Additional data could alter these recommendations.

1. Prohibit new wells in the area of known groundwater contamination.

2. Continue to identify and sample private wells northeast of the site. Prohibit domestic use of any private wells contaminated above standards. Continue to inform residents northeast of the site of the potential public health threat resulting from contamination migrating to private or municipal wells.

3. Maintain security around the site to reduce the risk of injury from physical hazards. Post hazardous waste warning signs around the property as required by Florida Statues.

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

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CERTIFICATION

This Solitron Public Health Assessment was prepared by the Florida Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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Division of Health Assessment and Consultation (DHAC)
ATSDR

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

Richard Gillig
Chief, SSAB, DHAC, ATSDR

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Appendix

Table 1
Maximum contaminant concentrations in on-site groundwater above ATSDR screening values

Chemical	Maximum Level (ppb)	Citation	Comparison Value (ppb)
Vinyl Chloride	2,800	EPA 1998a	0.2 EMEG
Lead	66	EPA 1998a	none
Aluminum	13000	EPA 1985	none
1,1-Dichloroethene	119	EPA 1998b	0.06 CREG
Perchloroethylene	102	EPA 1998b	0.7 CREG
Trichloroethene	271	EPA 1998b	3.0 CREG
Barium	3700	EPA 1998a	700 RMEG.
Beryllium	5	EPA 1998a	0.008 CREG
Cadmium	10	EPA 1998a	2.0 EMEG
Chromium	3300	EPA 1998a	30 RMEG.
Copper	2200	EPA 1998a	1300 MCL
Mercury	4	EPA 1998a	2.0 MCL
Nickel	1300	EPA 1998a	200 RMEG.
Selenium	150	EPA 1998a	50 RMEG.
Carbon tetrachloride	2.9	FDER 1991	0.3 CREG
1,1-Dichloroethane	97.9	FDER 1991	none

EMEG = Environmental Media Evaluation Guide
RMEG = Reference Dose Media Evaluation Guide
CREG = Cancer Risk Evaluation Guide
MCL = Maximum Contaminant Level
ppm = parts per billion

Table 2
Maximum contaminant concentrations in on-site soil above ATSDR screening values

Chemical	Maximum Level (ppm)	Citation	Comparison Value (ppm)
Copper	50	EPA 1985	none
Aluminum	890	FDER 1989	none

Table 3
Maximum contaminant concentrations in private well water above ATSDR screening values

Chemical	Maximum Level (ppb)	Citation	Comparison Value (ppb)
Vinyl Chloride	74	Washam 1998	0.2 EMEG
Lead	14	Washam 1998	none
Aluminum	45	Washam 1998	none
Arsenic	1.4	Washam 1998	0.02 CREG
Perchloroethylene	14	EPA 1998b	0.7 CREG
Trichloroethene	33	EPA 1998b	3.0 CREG
Copper	1400	Washam 1998	1300 MCLG

MCLG = Maximum Contaminant Level Goal

Table 4

Pathway Name	Completed Exposure Pathway Elements					Time
	Source	Environmental Media	Point of Exposure	Route of Exposure	Exposed Population*	
Private Well Water	Solitron Microwave Site	surficial aquifer	off-site private wells	Ingestion	145	past, current, future
Soil	Solitron Microwave Site	soil	on-site surface soil	Ingestion	25	past, current, future

*People potentially exposed because of a completed exposure pathway - potential access to contaminated media.

Figure 1

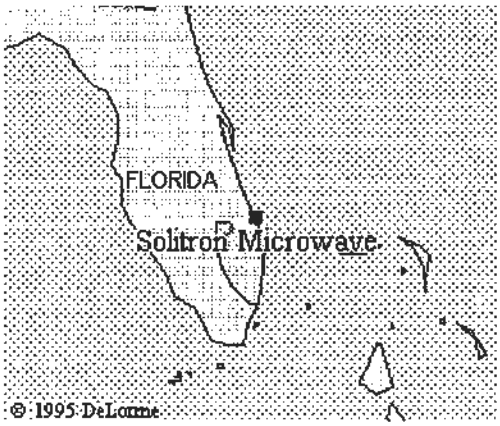


Figure 2

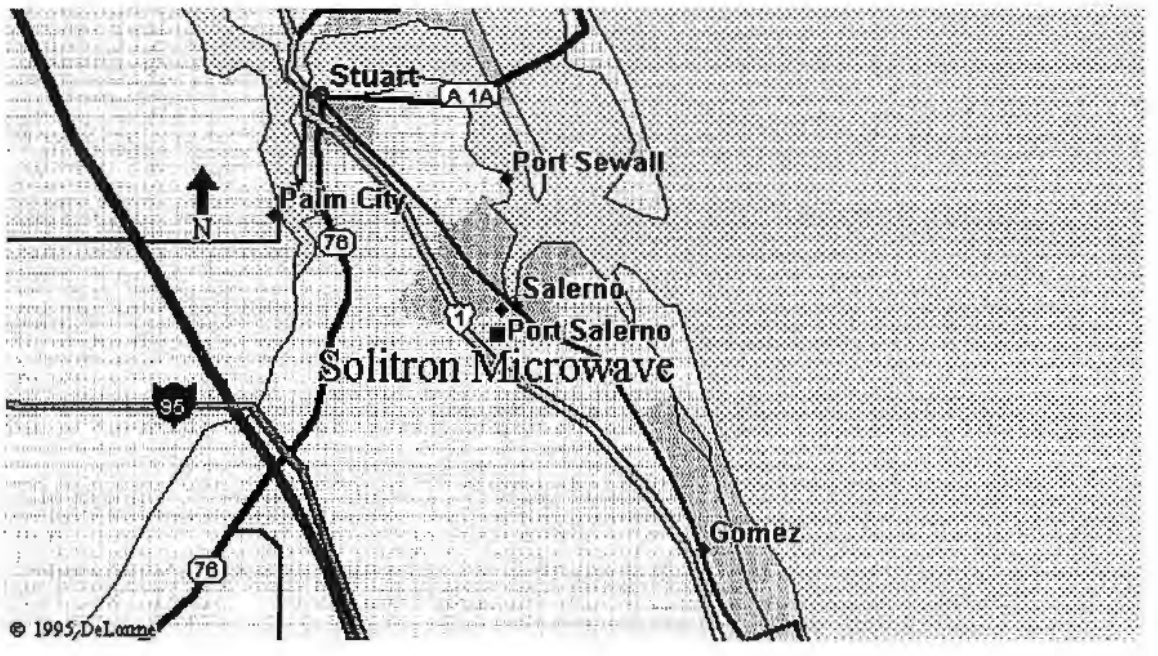
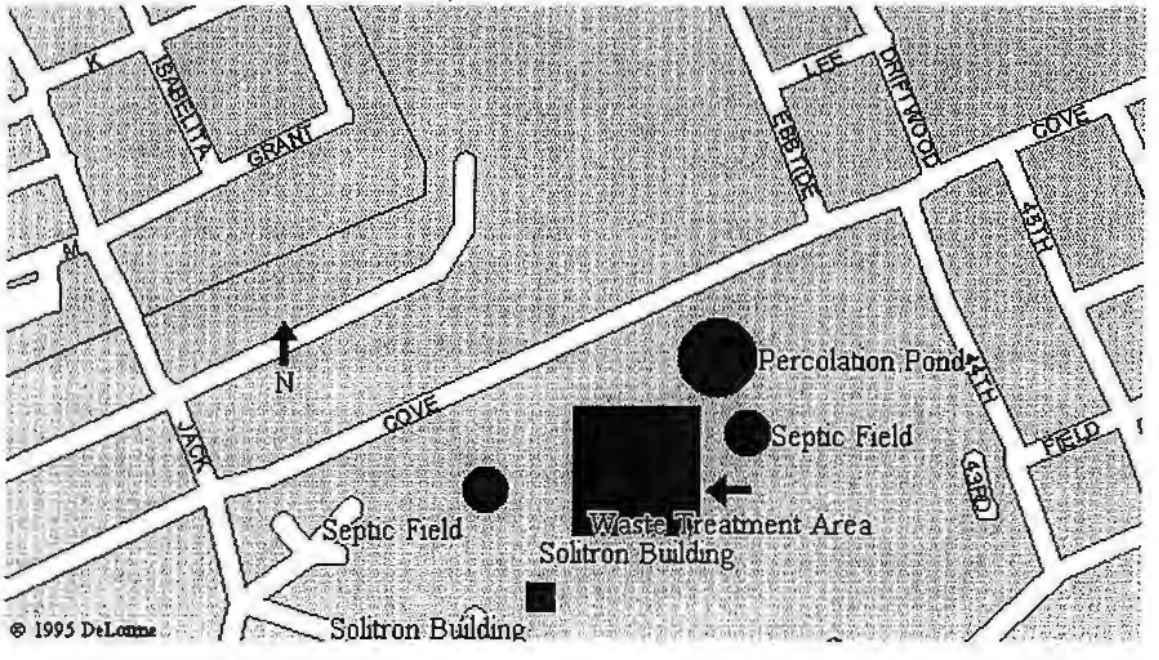

Stuart
A 1A
Port Sewall
Palm City
N
76
Salerno
1
Port Salerno
Solitron Microwave
95
Gomez
76
© 1995 DeLorme

Figure 3


Salerno
Port Salerno
Affected Neighborhood
N
Coral Gardens
Church of Christ
pond
Solitron Microwave
BROWARD
EBBTIDE
CHANNEL
GREAT POCKET
SE HANSONS
COVE
ARTHUR
FRONT
COLLINS
WILSIES
DELL
PINE
GRAFTON
47TH
45TH
44TH
MURRAY
WESLEY
SALVATORI
MARIE
SALVATARI
MELODEE WAY
BRANDYWINE WAY
BURNING TREE
MEDINAH
MARINER SANDS
DIXIE
MIMOSA
BAMBOO
ORCHID
CYPRESS
AVALON
COVE
HOLLY
FAIRLANE
CABLE
JANET
PINE
GRANT
FLOUNDER
GROUPER
HORIZON
KINGFISH
JACK
ALICIA
© 1995 DeLorme

Figure 4


K
ISABELITA
GRANT
M
LEE
DRIFTWOOD
EBBTIDE
COVE
45TH
N
Percolation Pond
44TH
COVE
JACK
Septic Field
FIELD
43RD
Septic Field
Waste Treatment Area
Solitron Building
Solitron Building
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