

# Public Health Assessment for

CITY INDUSTRIES  
ORLANDO, ORANGE COUNTY, FLORIDA  
CERCLIS NO. FLD055945653  
AUGUST 28, 1992

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
Agency for Toxic Substances and Disease Registry



PUBLIC HEALTH ASSESSMENT

CITY INDUSTRIES

ORLANDO, ORANGE COUNTY, FLORIDA

CERCLIS NO. FLD055945653

Prepared by

Florida Department of Health and Rehabilitative Services (HRS)  
Under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry (ATSDR)

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## SUMMARY

The City Chemical National Priorities List (NPL) site is located near the community of Goldenrod, Orange County, approximately 1.2 miles east of Winter Park and 2.2 miles northeast of Orlando, Florida. Poor waste handling and intentional dumping by the City Chemical Company contaminated soils, surface water, and groundwater with chlorinated and nonchlorinated volatile organic compounds (VOCs). The Florida Department of Environmental Regulation and the U.S. Environmental Protection Agency removed abandoned tanks and cleaned contaminated soil in 1983 and 1984, leaving only groundwater contamination. Groundwater contamination is confined to the surficial aquifer and has migrated approximately 600 feet off site to the east. The area surrounding the site is light industrial and there is currently no use of the contaminated surficial aquifer. The community is concerned, however, about potential migration of contaminants to the Floridan Aquifer, which is the potable-water supply, and about exposure to the VOCs from the proposed remediation.

Future exposure pathways of concern include ingestion of VOC contaminated groundwater by residents and inhalation of VOCs from the contaminated groundwater by nearby workers. Since there has been no exposure to the contaminated groundwater to date, there is no apparent public health hazard at this site. The groundwater at this site, however, should be remediated as soon as possible. This site may become a public health hazard if the contaminated groundwater is not remediated and reaches an existing well. Ingestion and/or inhalation of the chlorinated and nonchlorinated VOCs in the contaminated groundwater are likely to cause adverse health effects following long-term exposure.

No follow-up health activities are indicated at this time because there is no evidence that people have been exposed to contaminants associated with the site. If information becomes available indicating exposure to contaminants at levels of concern, ATSDR will evaluate that information to determine what actions, if any, are necessary.

The U.S. Environmental Protection Agency (EPA) is remediating groundwater both on- and off-site; design and construction of the groundwater cleanup system is underway. Although EPA or the county water supply authority have not formally agreed to carry out recommendations not to allow new well construction in the area and to restrict the use of groundwater in the area, no wells have been contaminated and the installation of new wells in this area is unlikely.

## BACKGROUND

### A. SITE DESCRIPTION AND HISTORY

The City Chemical Company, also known as City Industries, Inc., is listed by the U.S. Environmental Protection Agency (EPA) on the National Priorities List (NPL). This 1 acre site is located at 3920 Forsyth Road in a light industrial area near the community of Goldenrod. Goldenrod is in the eastern section of Orange County, Florida, approximately 1.2 miles east of Winter Park and 2.2 miles northeast of Orlando (see Figures 1 and 2 in the Appendix). The facility operated from 1971 to August 1983 and received, handled, stored, reclaimed, and disposed of a wide variety of waste chemicals. Those chemicals included chlorinated and nonchlorinated organic solvents, paint and varnish wastes, acid/alkaline plating wastes, waste inks, and other solvents (EPA 1990a). Reclamation of solvents was attempted using a chemical still.

Soil and groundwater at the site were contaminated by poor waste-handling practices and intentional dumping. Stormwater run-off from the site flows into a ditch along the east side of the property and then into a large county-maintained drainage canal east of the site. The site was abandoned by the owner in August 1983, leaving 1,200 drums of hazardous waste and thousands of gallons of sludge in a number of large holding tanks on site.

Due to an imminent risk to public health, the Florida Department of Environmental Regulation (DER) removed 1,200 waste drums together with the waste liquids in the storage tanks. The removal occurred from August to September 1983. In February 1984, the remaining sludge and storage tanks were removed by EPA. EPA heat-treated 1,670 tons of contaminated soil on site in May 1984 to remove volatile organic compounds (VOCs). Approximately 10 tons of the most highly contaminated soil were removed to an approved hazardous waste landfill. Florida DER removed three underground storage tanks in July 1985.

The site was proposed for the NPL in August 1984. EPA completed a preliminary assessment of the site in December 1984 and found VOCs in the shallow aquifer both on and off site. Contamination assessment work, completed in October 1985, documented significant contamination in the surficial aquifer off site to the east (hydraulically downgradient). Due to the magnitude of the groundwater contamination, an additional contamination assessment was performed and completed in May 1986. That assessment concluded that contaminated groundwater had migrated approximately 600 feet to the east of the site (ESE 1986a). A surface depression was discovered in proximity to the site, raising concern that a sinkhole had developed and formed a connection between the surficial and Floridan aquifers. EPA

installed a monitoring well to sample the Floridan aquifer and found the aquifer was not contaminated (ESE 1986b).

Approximately 32 of the 250 identified Potentially Responsible Parties (PRPs) formed a steering committee in 1984 and entered into a consent agreement with Florida DER to perform a feasibility study (FS). A draft FS was submitted by the committee in December 1988 and subsequently modified in June and December 1989. At Florida DER's request, the lead management role for the site was transferred from Florida DER to EPA in March 1989. A preliminary health assessment (ATSDR 1989), addressing the public health implications of this site, was prepared in April 1989 by the Florida Department of Health and Rehabilitative Services (HRS) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

In April 1990, EPA issued its Record of Decision (ROD) for the site, detailing the preferred remedial alternative. The preferred remedial alternative includes the installation of a series of extraction wells east of the site, aeration of the contaminated groundwater at an on-site groundwater treatment plant to remove the VOCs, and discharge of the treated water to the City of Orlando's Iron Bridge Wastewater Treatment Plant. The VOCs released into the air from the groundwater treatment plant will be monitored and any excess VOCs will be removed from the air before it is released. A second alternative is similar to the preferred alternative except that after aeration, the water would receive additional treatment using carbon filters before discharging to a county-maintained drainage canal east of the site. Design and construction of the groundwater treatment plant is projected to take approximately 14 months. Clean-up of the groundwater is projected to take approximately 15 years (EPA 1990b).

## **B. SITE VISIT**

A site visit was conducted by DER, HRS, EPA Region IV, and ATSDR Region IV representatives on February 6, 1990. The site consisted of two small buildings located on a fenced, 1-acre lot. There were no tanks or containers on the site, no evidence of unauthorized site access, and no obvious physical hazards. The area to the south of the site was wooded. The rest of the surrounding area was light industrial properties and warehouses. No recent site visits have been conducted.

## **C. DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE**

The area surrounding the site is zoned for industrial and commercial development. Future development is likely to continue to be industrial and commercial. The closest residential areas

are located approximately 0.25 mile to the north and 0.5 mile to the south. The Crane Strand wetland area is located approximately 1 mile to the northwest. Wooded areas are located immediately south and southwest of the site and approximately 0.25 mile east of the site. The population within a 3-mile radius of the site is approximately 120,000. The population is generally middle-income with a typical age distribution and male to female ratio. Included in the 3-mile radius are schools, a nursing home, and a hospital. The Winter Park Water Treatment Plant #5 is located approximately 0.5 mile west-southwest of the site. This water treatment plant draws its water from wells at least 700 feet deep in the Florida Aquifer. Due to the sandy surface soils in this area, the shallow unconfined aquifer is vulnerable to contamination. The deeper Floridan Aquifer, however, is afforded some protection from contamination by 40 to 100 feet of low permeability clays of the Hawthorn Formation.

#### **D. HEALTH OUTCOME DATA**

The Florida HRS maintains a cancer registry data base covering cancers reported in Florida from 1981 through 1987.

#### **COMMUNITY HEALTH CONCERNS**

On February 6, 1990, representatives from EPA, DER, HRS, and ATSDR held a public meeting where they shared information and responded to questions about the findings of the FS. The community health concerns expressed at this meeting follow. The major non-health community concern is that the remediation be started as soon as possible and that the community be kept informed of the progress. The community supports the preferred remedial alternative of treatment via aeration and discharge to the City of Orlando's Iron Bridge Wastewater Treatment Plant but opposes the second option of aeration followed by carbon filtration and discharge to the county maintained drainage canal. The community also wants to know about the possibility of human exposure to contaminated water used for irrigation.

**Community Health Concern #1:** The drinking water supply may become contaminated.

**Community Health Concern #2:** Contact with water from shallow wells used for lawn irrigation may impact human health.

**Community Health Concern #3:** Groundwater contaminants may have short- and long-term health effects on humans and animals.

**Community Health Concern #4:** Discharge of treated groundwater the county-maintained drainage canal may pose health risks to both humans and animals.

**Community Health Concern #5:** There are possible health effects from exposure to vapors from the groundwater contamination.

**Community Health Concern #6:** There are possible health effects from, and aesthetic objections to, vapors from aeration of the contaminated groundwater.

#### ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

To identify facilities that could contribute to the groundwater contamination near the City Chemicals site, the 1987, 1988, and 1989, Toxic Chemical Release Inventory (TRI) data base was searched. TRI was developed by EPA from the chemical release (air, water, soil) information provided by certain industries. No releases were reported in the 32792 ZIP code from 1987 to 1989. This ZIP code includes the community of Goldenrod and the City Chemical site.

##### A. ON- AND OFF-SITE CONTAMINATION

Groundwater contamination both on and off site will be discussed together since, for the purposes of this public health assessment, the distinction is not critical. The distinction is not critical since the on- and off-site groundwater contamination appears to be continuous. Additionally, there are no on-site users of the groundwater and no off-site wells that are currently contaminated. The highest groundwater contaminant concentration occur off site in the direction of groundwater flow.

The most recent data indicate that groundwater contamination occurs both on and off site in the shallow or "surficial" aquifer. Groundwater contamination has not been detected in the deeper Floridan aquifer. The groundwater in the surficial aquifer is contaminated with both chlorinated and nonchlorinated VOCs. Post remediation data show that contaminants remaining in the soil, surface water, and air following remediation in 1984 are not a threat to human health or the environment (EPA 1990b). Therefore, groundwater is the only remaining media of concern.

The compounds in Table 1 were found in the groundwater of the surficial aquifer at or above levels of concern:

Table 1. Concentrations of Volatile Organic Compounds in the Surficial Aquifer.

Contaminant	Range of Concentration in Surficial Aquifer ( $\mu\text{g/L}$ )	Comparison Value ( $\mu\text{g/L}$ )
Acetone	ND - 262,000	1,000 <sup>a</sup>
Benzene	ND - 74	1.2 <sup>b</sup>
1,1-Dichloroethene	ND - 18,000	90 <sup>c</sup>
t-1,2-Dichloroethene	ND - 7,200	100 <sup>d</sup>
Methylene Chloride	ND - 126,000	600 <sup>c</sup>
Methyl Ethyl Ketone	ND - 10,800	200 <sup>d</sup>
Methyl Isobutyl Ketone	ND - 60,000	No Health Criteria
Phthalates	ND - 8	No Health Criteria
Tetrachloroethene	ND - 1,100	100 <sup>a</sup>
Toluene	ND - 26,700	1,000 <sup>d</sup>
1,1,1-Trichloroethane	ND - 10,000	200 <sup>d</sup>
Trichloroethene	ND - 150,000	0 <sup>e</sup>

$\mu\text{g/L}$  = Micrograms per Liter (parts per billion)

ND = Not Detected

a = calculated from the Reference Dose (child)

b = calculated from the Cancer Slope Factor

c = Environmental Media Evaluation Guide

d = Lifetime Health Advisory

e = Maximum Contaminant Level Goal

(Modified from Geraghty and Miller, 1989)

## B. QUALITY ASSURANCE AND QUALITY CONTROL

In preparing this public health assessment, it was assumed that adequate quality assurance and quality control measures were followed in preparation of the referenced documents with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of the analysis and conclusions drawn for this public health assessment are dependent upon the completeness and reliability of the referenced information. The data collected for the contamination assessment is assumed to be valid since it closely agrees with the data submitted in the Site Data Augmentation: Analytical Data and Quality Assurance Summary Report, which was formally validated (Geraghty and Miller 1988). The data in the above table were drawn from both of these sources.

## C. PHYSICAL AND OTHER HAZARDS

There were no physical or other non-chemical hazards observed at this site.

## PATHWAY ANALYSIS

### A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

**Source of Contamination:** The source of the contaminated groundwater is from poor waste-handling practices and intentional dumping at this site.

**Environmental Media and Transport:** Contaminated soil was either removed to a hazardous waste landfill or remediated by incineration in 1984 and returned to the site. Samples taken following site remediation indicated that the remaining soil, surface water, and air do not contain contaminants at concentrations high enough to endanger human health or the environment (EPA, 1990b). Therefore, groundwater is the only remaining medium of concern at this site.

Contamination of the groundwater appears to be confined to the upper or "surficial" aquifer. Analyses of samples from on and off site wells screened in the deeper Floridan aquifer have not indicated contamination. The Floridan aquifer in this area is believed to be covered by up to 170 feet of relatively low permeability sands and clays of the Hawthorne Formation (Geraghty & Miller 1989). The thickness of this formation retards the vertical movement of water and contaminants from the surficial aquifer into the Floridan aquifer.

Contaminant transport is believed to occur by movement with the groundwater since most of these contaminants are soluble to a degree in water. Groundwater flow and, thus contaminant transport, in the surficial aquifer is to the east. The rate of groundwater flow in this aquifer has been identified in the contamination assessments as ranging from 10 to 145 feet per year (ESE 1986a). Contaminated groundwater in the surficial aquifer has migrated approximately 600 feet to the east of the site. Retardation of movement of these contaminants through the surficial aquifer by adsorption to soil particles is likely to be minimal due to the low organic content and high porosity of the aquifer material. Volatilization of these contaminants from the groundwater is not a significant transport mechanism.

**Point of Exposure:** The wells installed to delineate and monitor the movement of contaminated groundwater are the only existing points of potential human contact. No other wells are known to be contaminated at this time. Existing wells that may be impacted by future migration of the contaminated groundwater and/or wells that may be installed in the currently contaminated area are possible future points of exposure.

Although depth to groundwater is fairly shallow in this area (3 to 5 feet below land surface), volatilization of the chlorinated

and nonchlorinated VOCs from the surface of the groundwater, as predicted by their Henry's Constants, is not likely to result in levels of concern in the atmosphere. It is conceivable, although unlikely, that contaminants at levels of concern could accumulate by volatilization from the groundwater up through the soil and into the air in enclosed, unventilated spaces.

## **B. HUMAN EXPOSURE PATHWAYS**

**Route of Exposure:** Although the area of contaminated groundwater has extended off site, it has not yet reached any wells other than monitoring wells installed to track the groundwater contamination. If existing irrigation or industrial wells become contaminated, inhalation would be the most likely route of exposure to the chlorinated and nonchlorinated VOCs. The planned groundwater remediation will reduce the potential for human exposure.

Inhalation of the chlorinated and nonchlorinated VOCs are minor routes of exposure for personnel sampling the monitoring wells. If sampling personnel follow safety procedures, their exposure should be minimal.

**Receptor Populations:** Personnel sampling the existing groundwater monitoring wells are the only known population potentially exposed to the chlorinated and nonchlorinated VOCs at this site. Future receptor populations would include workers at nearby businesses where irrigation and/or "make up water" (industrial) wells may become contaminated. In the unlikely event that the Floridan wells at the City of Winter Park Water Treatment Plant #5 ever become contaminated, the exposed population would include 115,300 residents of Winter Park, Maitland, and Casselberry (EPA 1990b).

## **PUBLIC HEALTH IMPLICATIONS**

### **A. TOXICOLOGICAL EVALUATION**

Since there are currently no wells, except for monitoring wells, in the area of contaminated groundwater, no exposure to the chlorinated and nonchlorinated VOCs is believed to have occurred in the past. Existing wells that may become contaminated in the future will be of concern depending on their use.

Use of the contaminated groundwater as a potable-water supply is unacceptable due to concentrations of carcinogenic and noncarcinogenic contaminants. Specifically, the maximum concentrations of benzene, 1,1-dichloroethene, methylene chloride, tetrachloroethene, trichloroethene, and total

phthalates in the groundwater pose an unacceptable lifetime excess cancer risk. An unacceptable lifetime excess cancer risk is defined as a risk greater than 1 in 1 million. The lifetime excess cancer risk from ingestion of these contaminants together is likely to be greater than the risk of ingestion of each contaminant separately.

The maximum concentrations of acetone, trans-1,2-dichloroethene, methyl ethyl ketone, and methyl isobutyl ketone in the groundwater pose an unacceptable noncarcinogenic health risk. The groundwater extraction/treatment system is under construction. If the system is successful, the concentrations of contaminants available to migrate to drinking water, industrial water, or irrigation water supplies will be diminished and eventually stopped.

#### **B. HEALTH OUTCOME DATA EVALUATION**

No adverse health effects are expected since there has been no exposure to the contaminated groundwater. The Florida HRS cancer registry data base was not searched since there has been no exposure to the contaminated groundwater, and no change in the background cancer incidence rate is expected.

#### **C. COMMUNITY HEALTH CONCERNS EVALUATION**

**Community Health Concern #1:** The drinking water supply may become contaminated.

Contamination of the public water supply by the contaminated groundwater from this site may eventually occur if not remediated, but such contamination is unlikely in the near future for the following reasons. First, the contaminated groundwater appears to be confined to the shallow surficial aquifer, which in this area is about 60 feet deep. The nearest public supply well, at the Winter Park Water Treatment Plant #5, draws groundwater from the Floridan Aquifer from wells cased at least 700 feet deep.

Second, the Floridan aquifer in this area is believed to be covered by approximately 40 to 100 feet of relatively low-permeability sands and clays of the Hawthorn Formation. The thickness of this formation retards the movement of water and contaminants from the surficial aquifer into the Floridan aquifer.

Third, the direction of the groundwater flow in both the surficial and the Floridan aquifer is to the east, away from the public supply well, located about 0.5 mile west-southwest of the site. If the contaminated groundwater did move through the Hawthorn Formation into the Floridan aquifer, it is unlikely to

move in the direction of the public supply wells. Also, the public supply wells are required to be tested for contamination every 3 years by DER.

**Community Health Concern #2:** Contact with water from shallow wells used for lawn irrigation may impact human health.

There have not been any irrigation wells identified in the area of contaminated groundwater. Given the current rate and direction of movement of the contaminated groundwater to the east, it is unlikely that any wells used for lawn irrigation will be impacted in the near future.

**Community Health Concern #3:** Groundwater contaminants may have short- and long-term health effects on humans and animals.

Short-term health effects which may result from ingestion of, or inhalation of vapors from, the contaminated groundwater are drowsiness, dizziness, headaches, and nausea. Long-term effects which may result from exposure to the contaminated groundwater are damage to the liver, kidneys, heart, lungs, and nervous system as well as reproductive disorders and cancer. However, for these effects to occur, there must be some kind of exposure to the contaminated groundwater such as inhalation or ingestion. Currently, the contaminated groundwater is not being used, and there is no known exposure.

**Community Health Concern #4:** Discharge of treated groundwater to the county-maintained drainage canal may pose health risks to both humans and animals.

If the treated groundwater is discharged to the county-maintained canal, it will have to meet surface-water standards which are protective of both humans and animals.

**Community Health Concern #5:** Adverse health effects are possible from exposure to vapors from the groundwater contamination.

The only possible risk of adverse health effects from groundwater vapors would be from prolonged inhalation of air in enclosed, unventilated spaces directly over the contaminated groundwater, such as basements with dirt floors, storage sheds with dirt floors, etc. Such unventilated spaces are not known to exist over the contaminated groundwater.

**Community Health Concern #6:** There are possible health effects from, and aesthetic objections to, vapors from aeration of the contaminated groundwater.

The concentrations of VOCs transferred from the groundwater to the atmosphere by the aeration system are unlikely to cause health effects or odor problems, given the removal rate of the aeration system and mixing of the VOCs from the aeration system with the ambient air. EPA has agreed to require pollution control equipment if monitoring at the aeration system shows that it is necessary.

On February 21, 1992, Florida HRS mailed a one page summary of the draft public health assessment to the local residents, media, and elected officials. The summary announced the availability of the draft public health assessment at the local document repository and solicited public comment until March 27, 1992. HRS did not receive any inquiries or comments by this date.

## CONCLUSIONS

Since there has been no exposure to the contaminated groundwater, there is no apparent public health hazard at this site. The site may become a public health hazard if the contaminated groundwater is not remediated and reaches an existing well. If the site is not remediated, exposures to the chlorinated and nonchlorinated VOCs in the groundwater are likely to occur at concentrations that, upon long-term exposure, could cause adverse health effects.

1. Contaminated groundwater from this site, if not remediated, will eventually impact existing potable and nonpotable water wells. Use of the contaminated groundwater as a potable-water supply is unacceptable due to concentrations of both carcinogenic and noncarcinogenic contaminants. Acceptability of the contaminated groundwater as a nonpotable-water source, such as irrigation or industrial "make up water," would be dependent upon its specific use. Remediation proposed for this site (aeration of the contaminated groundwater followed by either discharge to the regional wastewater treatment system or to a nearby drainage canal) will result in acceptable groundwater concentrations of the chlorinated and nonchlorinated VOCs.
2. New wells installed in the area currently contaminated or likely to become contaminated in the near future may result in an unacceptable risk of adverse health effects if exposure occurs.
3. Use of water from nearby existing wells that may become contaminated in the future may pose an unacceptable risk of adverse health effects, depending upon the use of the water and the human exposure.

## RECOMMENDATIONS

1. Remediate groundwater both on and off site as soon as possible in order to reduce the potential for adverse health effects from exposure to high concentrations of chlorinated and nonchlorinated VOCs. (Construction of a groundwater treatment system is underway.)
2. Prohibit the installation of new wells in the area currently contaminated or likely to become contaminated until the scheduled remediation is completed.
3. Restrict the use of water from nearby existing wells that may become contaminated before the groundwater remediation is complete. Restrict use of contaminated groundwater to those uses where there is no human exposure. Sample those wells annually to determine if they are contaminated.
4. The data and information developed in the City Chemical Company Public Health Assessment have been evaluated by the ATSDR Health Activities Recommendation Panel (HARP) for follow-up health actions. No follow-up health activities are indicated at this time because there is no evidence that people have been exposed to contaminants associated with the site. If information becomes available indicating exposure to contaminants at levels of concern exist, ATSDR will evaluate that information to determine what actions, if any, are necessary.

## PUBLIC HEALTH ACTION PLAN

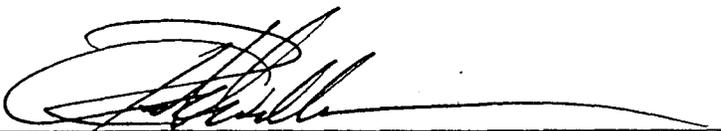
The U.S. Environmental Protection Agency is already carrying out recommendation #1; design and construction of the groundwater cleanup system is underway.

CERTIFICATION

This Public Health Assessment has been prepared by the State of Florida, Department of Health and Rehabilitative Services, Office of Toxicology and Hazard Assessment 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 public health assessment was initiated.

  
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Technical Project Officer, SPS, RPB, DHAC

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

  
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Director, DHAC, ATSDR

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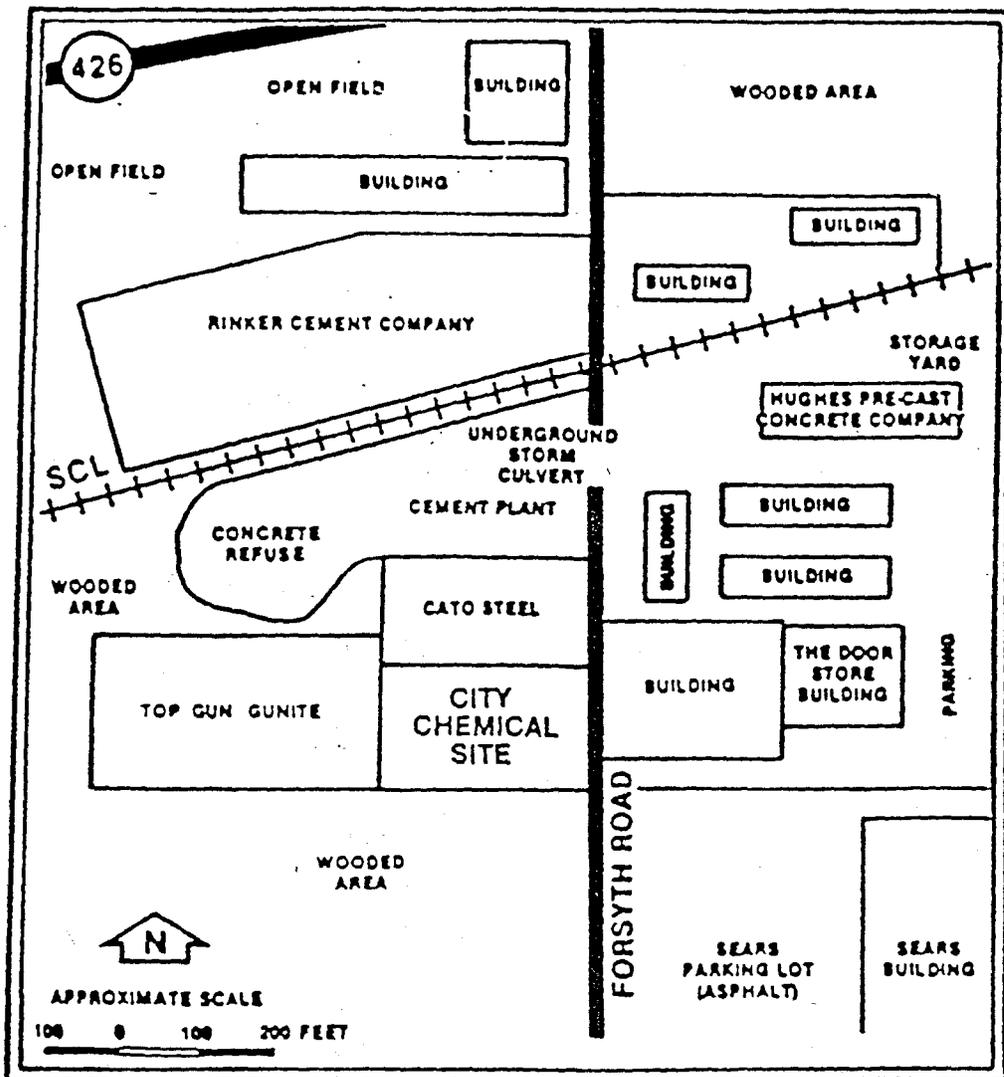
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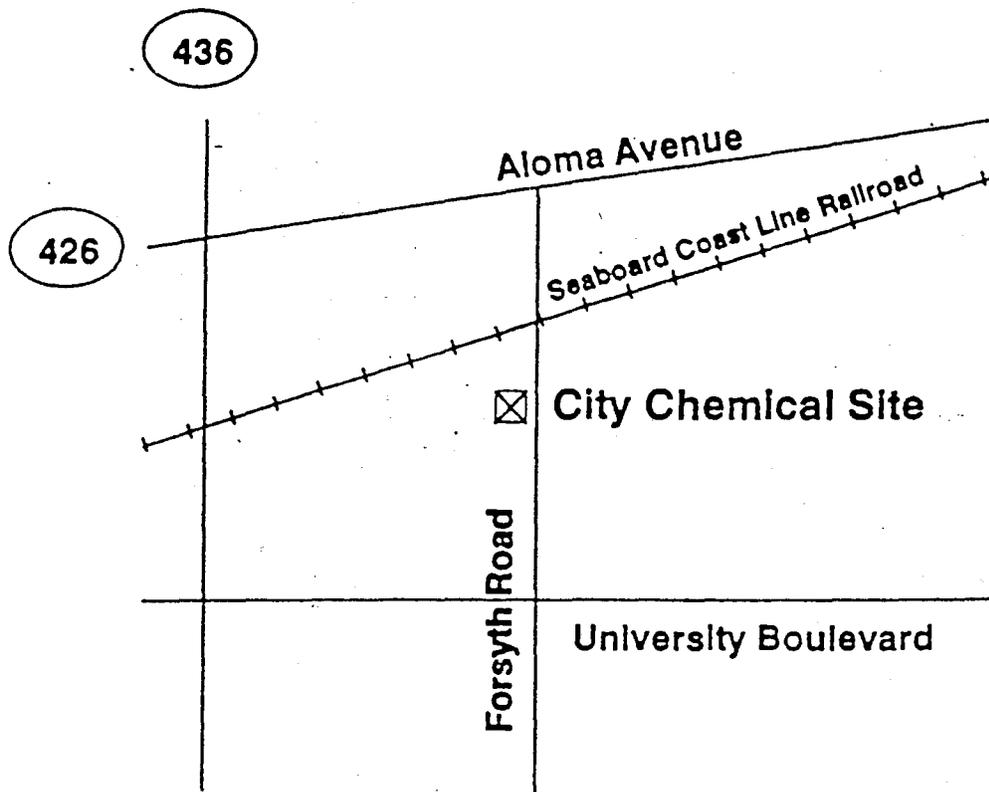
APPENDIX

# SITE LOCATION MAP



SOURCE: ESE, 1984

# VICINITY MAP



← Winter Park  
approximately 1 mile

↙ Orlando  
approximately 2 miles