

**Health  
Assessment  
for**

**BROWN WOOD PRESERVING SITE**

**CERCLIS NO. FLD980728935**

**SUWANNEE COUNTY**

**LIVE OAK FLORIDA**

**APRIL 24, 1989**

*Agency for Toxic Substances and Disease Registry  
U.S. Public Health Service*

## THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(i) (7) (A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, this Health Assessment has been conducted. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

HEALTH ASSESSMENT  
BROWN WOOD PRESERVING SITE  
LIVE OAK, SUWANNEE COUNTY, FLORIDA

Prepared by:  
State Health Office  
Florida Department of Health and Rehabilitative Services

Prepared for:  
Agency for Toxic Substances and Disease Registry (ATSDR)

## SUMMARY

The Brown Wood Preserving site is a National Priorities List (NPL) site located at the intersection of Saw Mill Road and Gold Kist Road, west of the city of Live Oak, Suwannee County, Florida. Surface soil and surface water at the disposal lagoon area were contaminated with polynuclear aromatic hydrocarbons (PAHs). Ground water was also tested for PAHs with none found; however, analytical detection limits were greater than appropriate health-based guideline values. The site is located in an area of intermediate karst (sinkhole) development. This area of direct aquifer recharge is surrounded by residences using private potable wells. The exposures of concern for humans include dermal absorption and inhalation of dust from contaminated surface soil. Residents reside 100 feet northwest of the site and may constitute a susceptible population because of their proximity to contaminated soils.

## BACKGROUND

### A. SITE DESCRIPTION

The abandoned Brown Wood Preserving site covers 55 acres west of Live Oak, Florida. From 1946 to 1978, lumber was treated on-site with creosote and pentachlorophenol. Waste water containing creosote was discharged into an open ditch where it flowed about 100 yards into a 5-acre unlined surface impoundment.

The areas surrounding the plant site are considered rural and light agricultural. A construction company and a saw mill were located to the east and west, respectively, of the site. Municipal wells for the City of Live Oak are located less than 2 miles to the east. Domestic potable water in the vicinity of the site is provided by wells into the Floridan Aquifer. According to the Suwannee River Water Management District, two community wells at Wayne Frier's mobile home park and six other private wells are located within one-fourth mile of the site.

The Brown Wood Preserving site (see Figure #1) is located in a rural area and uses of surrounding areas include the following:

1. New residential houses are located 1/3 mile south of the site.
2. Hughes Boat Craft, Bass Auto Sales and a paint and body shop are located across Gold Kist Road, which runs along the eastern boundary of the site.
3. A mobile home park (Wayne Frier's) is located northwest across Saw Mill Road and across a railroad from the site.
4. A private airport and a Suwannee County heavy machinery storage facility are located 1/4 mile west of the site.

5. A small storm water containment pond is located approximately one-fifth mile south of the site.

The Remedial Site Investigation and Feasibility Study (RI/FS) (Fishbeck et al, 1987; Remediation Technologies, 1987) were completed in March and June of 1987, respectively. The Record of Decision (ROD) dated April, 1988 indicated that the choice of "Treatment and Disposal of Sludge" and "Treatment of Contaminated Soil" alternatives were favorable. A removal action was performed at the site, from December 1 through March 15, 1988. Activities included (1) treatment and discharge of lagoon and pit water, (2) demolition, salvage and removal of facilities and process equipment on site, (3) excavation and solidification of sludges, and (4) backfilling of the retort pit. As a result of this removal action, the remaining stockpiled soils on site contain 500 mg/kg or less of carcinogenic PAHs. This soil is ready to undergo biological degradation to bring the level of carcinogenic PAHs in the soil down to 100 mg/kg.

#### B. SITE VISIT

A site visit was conducted on September 22, 1988, by the Florida Department of Health and Rehabilitative Services (HRS) staff. The Brown Wood Preserving site is no longer in operation and all the processing equipment and buildings were apparently removed during the cleanup action. The site was not fenced and site access was not restricted at the time of the site visit. In the southwestern portion of the site (the former demolishing area), two piles of soil 15-20 feet high were poorly covered with a ripped plastic tarp. Three ridges of soils were standing on the edge of the former waste water holding lagoon west of the former demolishing area. The soils in the ridges contained PAHs at about 500 mg/kg PAHs and were awaiting biodegradation treatment. Contaminated water and sediments in the lagoon were removed at the beginning of 1988. However, recent rains had refilled the lagoon and were eroding the soil piles. Erosion was also occurring to surface soil around the old processing area.

Fence construction was started on October 4, 1988, and completed by December 9, 1988. A soil treatment facility was also under construction during this time. A second site visit was conducted in January 19, 1989. New construction at the former Brown Wood Preserving site (see Figure #2) includes the following:

1. Land treatment facility is located on the former operating area of Brown Wood Preserving site.
2. A six foot chain link fence was in place and surrounded the former operating area (southwestern portion of the site). However, the former waste water holding lagoon was not within the fenced area.
3. Inside the fence, the treatment facility includes a soil treatment bed area, a stockpile area, and a man-made retention pond. Perimeter berms of 2.5 ft. to 7 ft. high were constructed around the soil treatment bed and the stockpiled soil area. An above ground water irrigation system is used to hydrate soil when soil tension is

greater than 0.4 bar in the soil treatment bed. Irrigation water is supplied by water from the new retention pond and the former waste water lagoon outside the fence. Additional water may be obtained from the City of Live Oak municipal water supply.

## ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARD

### A. ON-SITE CONTAMINATION

According to analytical results performed during the 1985 RI and the 1986 RI, surface soil, subsoil, and surface waters (disposal lagoon, drainage ditch) were contaminated with carcinogenic PAHs and ground water at the site was found to contain benzene and phenol. Recent ground water testing did not detect the latter two volatile contaminants or carcinogenic PAHs. However, the detection limits for carcinogenic PAHs were above health-based values. Other wood preserving compounds such as pentachlorophenol were also analyzed for but concentrations were below the levels of health concern.

According to data from the RI report, the contaminants of concern and their concentrations are summarized in the following table:

<u>MEDIA</u>	<u>CONTAMINANT</u>	<u>RANGE (UNIT)</u>	
Sub-surface Soil (0 - 1 ft)	PAHs	ND - 11,600	mg/kg
Surface Soil (9 - 11 ft)	PAHs	ND - 118.2	mg/kg
Lagoon Water	Toxaphene	10	ug/L
	PAHs	14	ug/L
Drainage Ditch Water	PAHs	8 - 10	ug/L

Note: PAHs = Benzo[a]anthracene + Benzo[a]pyrene + Benzo[b]fluoranthene + Chrysene + Dibenzo[a,h]anthracene + Indeno[1,2,3-cd]pyrene

Part of the removal action was carried out from February through March, 1988. During this time, water from the pits and lagoon was evacuated, run through a carbon treatment system and discharged to surface soil at the site. Sludges from the pits and lagoon were fixated and disposed of together with the highly contaminated surface soils at a secure landfill in Emelle, Alabama. The concentration of PAHs in the remaining stockpiled

surface soil was reduced to approximately 500 mg/kg. Clean fill materials were used to backfill the retort pit after the excavation was completed.

#### B. OFF-SITE CONTAMINATION

Off-site ground water was tested for metals and extractable organic compounds, (base/neutral and organic acids) in 1981. Metal concentrations were below the maximum contaminant level of concern (MCL) and extractable organic compounds were not detected. Testing done at this time did not detect the presence of creosote-related compounds or pentachlorophenol. In 1985 and 1986, samplings included one off-site monitoring well (MW-5, see Figure 1) and results indicated that ground water was below detection limits for carcinogenic PAHs. However, this study is not satisfactory because the detection limits of carcinogenic PAHs were higher than the health concern levels and testing was not done at a location down gradient from the contaminated area of the site; the off-site monitoring well is located on the east side of Brown Wood Preserving. No off-site soil and surface water analyses were done in the area located south of the site and next to the disposal pond.

#### C. PHYSICAL HAZARDS

All tanks on site were demolished and removed during the Removal Action. Remaining potential hazard at the site is an open lagoon which has collected stormwater from recent rains.

### DEMOGRAPHICS

The 55-acre Brown Wood Preserving site is located at the intersection of Saw Mill Road and Gold Kist Road, approximately two miles west of the City of Live Oak. New residential houses and a trailer park are located south and north, respectively, of the site. There are about 450 residents in Wayne Frier's Trailer Park with about 100 children ranging from infant to high school age.

### EVALUATION

#### A. SITE CHARACTERIZATION (DATA NEEDS AND EVALUATION)

##### 1. Environmental Media

The investigation at the former Brown Wood Preserving site did not characterize the full extent of contamination in on-site soil. However, the information is probably sufficient to conduct remediation of the site.

The RI report indicated that soil samples at the site were collected at depths between 0 and 12 feet. Analytical results of the subsoil (6-12 feet) showed that total concentrations of carcinogenic PAHs were slightly above and below 100 mg/kg. Deeper soil testing should be considered to define the boundary of contamination.

No off-site soil sampling was done during the RI. Ground water testing at MW-5 was the only off-site testing performed and this monitoring well is not located down gradient from the contaminated area (see Figure #1). Therefore, information supplied by the RI was not sufficient to characterize the extent of contamination and to determine the population at risk.

## 2. Demographics and Land Use

No further information is required.

## 3. Quality Assurance/Quality Control (QA/QC)

The Quality Assurance and Quality Control (QA/QC) data that were included in the RI consisted of the results of the analysis of several blank and duplicate samples. No contaminants were detected in the blank samples. The conclusions presented in this health assessment are based on the data contained in the RI. However, quality control of testing for PAHs compounds at Brown Wood Preserving site should be reconsidered to avoid the following problems. The validity of these conclusions is, therefore, dependent on the quality of the data provided.

Data analysis based on RI information indicated that quality control testing for PAHs compounds was flawed and should be reconsidered for additional testing. These inadequacies include:

1. Analyses of ground water and surface water were performed with detection limits of carcinogenic PAHs higher than their suggested health based levels of concern.
2. A large variation of detection limits was found in the analytical results of creosote and related chemicals between soil samples at the same depth level (samples 85-LOFL-SL-051 and 85-LOFL-SL-055; tables 6.1-4 and 6.1-5). A large variation of detection limit for creosote-related chemicals was also seen at varying soil depths. All the detection limits were above the suggested health based levels of concern for total carcinogenic PAHs in soil (100 mg/kg).

## B. ENVIRONMENTAL PATHWAYS

Based on information from the RI (Fishbeck, et al., 1987) and the Live Oak Status Report (Stone, 1985), sources of environmental contaminants are soil and surface water. The primary contaminant of concern in relation to these media are carcinogenic PAHs in soil.

### 1. EXPOSURE TO ON-SITE CONTAMINANTS

#### ON-SITE GROUND WATER

According to the RI report, carcinogenic PAHs, phenol, and pentachlorophenol were not found above detection limits in ground water at the site. Therefore, ground water is not an environmental pathway of concern.



## ON-SITE SOIL

According to the RI, highly contaminated soil was removed at the beginning of 1988. Remaining soils have concentrations of carcinogenic PAHs of approximately 500 mg/kg and are stored in the stockpile area and on top of the soil treatment bed. A perimeter berm was constructed around the stockpile and soil treatment bed to prevent water run-off but will not prevent wind erosion. Because contaminated soils are not covered, wind blown dust could be an environmental pathway for carrying contamination to nearby residents.

## ON-SITE SURFACE WATER AND SEDIMENTS

In 1988, contaminated sediments at the former waste water holding lagoon were trucked to a landfill in Alabama and water was evacuated and treated through a filter system before being discharged on-site to the ground. After the water evacuation, clay was placed as a liner in the lagoon to prevent the migration of lagoon water. The former waste water holding lagoon is now filled with water from run-off and rain.

## 2. EXPOSURE TO OFF-SITE CONTAMINANTS

Because there is no documented contamination of off-site media, this potential exposure cannot be evaluated. However, due to the presence of natural clay at the site and lack of off-site contamination in ground water, potential for off-site migration to ground water is low.

## C. HUMAN EXPOSURE PATHWAYS

Potential exposure routes by which humans may be exposed to contaminants from the Brown Wood Preserving site are:

- Direct dermal contact and ingestion of contaminated soil or dust by on-site workers and children who may use the site as a recreation area. However, recent repairs to the fencing surrounding the site would reduce the likelihood of exposure to the latter susceptible population.
- Inhalation of contaminated dust by workers involved in site remediation and people living in the area.

## PUBLIC HEALTH IMPLICATIONS

PAHs in soil are the contaminants of concern. Populations at potential risk of exposure to known contaminants associated with the site are remedial workers, trespassers and nearby residents.

## 1. EXPOSURE TO ON-SITE CONTAMINANTS

### EXPOSURE TO ON-SITE SOIL

Potential human exposure pathways to on-site soil are ingestion, inhalation of dust, and direct dermal contact. PAHs present in the piles of soil at 500 mg/kg may pose a potential health concern to remediation workers.

Polycyclic aromatic hydrocarbons are compounds which are comprised of three or more fused benzene rings in various configurations and contain only hydrogen and carbon. Formation of these compounds occurs when organic compounds are subjected to high temperatures such as with combustion of fossil fuels and wood. In total there are over 200 types of PAHs that have been identified (Zedeck, 1980).

PAHs have been extensively studied since 1775 when Sir Percival Pott reported an association between scrotal cancer and occupation as a chimney sweep. The responsible compounds eluded researchers until approximately 50 years ago when scientists discovered that PAHs present in the soot and coal were the causative agents (Zedeck, 1980).

These compounds have been found to be absorbed via the gastrointestinal tract, respiratory system and dermal contact. PAHs initially concentrate in the kidney and liver with eventual deposition in tissues high in fat content such as the mammary and adrenal glands. PAHs have been shown to cross the placenta into the fetus and they may also be transferred to the infant during lactation (Zedeck, 1980).

The most worrisome aspect from exposure to PAHs is the ability of many of these compounds to induce malignant cancers. The International Agency for Research on Cancer (IARC) has identified 25 PAHs with evidence to induce cancer in animals. In addition, there are PAHs that act to increase the ability of other carcinogens to induce malignancies. PAHs have been implicated in the induction of lung cancers in cigarette smokers and tar-roofing workers (Weisberger and Williams, 1980).

### EXPOSURE TO ON-SITE SURFACE WATER AND SEDIMENTS

Toxaphene was found in water at an on-site lagoon at 10 ug/L. Potential exposure is via contact with this water. Toxaphene is a chlorinated hydrocarbon insecticide mixture composed of approximately 175 different compounds (Hayes, 1982). It is a suspect human carcinogen. It has been shown to significantly increase the incidence of liver and thyroid cancers in mice and rats, respectively, via the oral route of exposure (EPA, 1985).

In surface water at the low concentrations found, toxaphene's main threat is from bioaccumulation in edible aquatic organisms and eventual ingestion by humans. As with other chlorinated hydrocarbon insecticides, toxaphene exhibits a very high propensity to accumulate in the tissue of aquatic organisms. Fish have been shown to bioaccumulate the insecticide up to 100,000 times greater than that in the water (FDA, 1981). At this time,

this health threat is non-existent due to the lack of fish in the lagoon, however, if the site is developed as a residential area or the lagoon is stocked with fish, this route of exposure may become important.

#### EXPOSURE TO ON-SITE GROUND WATER

Phenol, pentachlorophenol, and PAHs were not found in ground water at the Brown Wood site. Therefore, the current exposure to on-site ground water is not a health threat.

#### EXPOSURE TO ON-SITE AIR

No air quality testing was reported in the RI report. The recent site visit found that stockpiled soil and soil in treatment beds were not covered. The threat of contaminated dust blown by wind is a legitimate concern to residents in Wayne Frier's Trailer Park and to workers in the stores located across Gold Kist Road. However, if the monitoring of soil moisture for biological treatment takes into consideration dust control, airborne exposure to contaminated soil would not be a threat.

#### 2. EXPOSURE TO OFF-SITE CONTAMINANTS

The recent testing of a single off-site monitoring well did not find phenol, carcinogenic PAHs, or pentachlorophenol. However, the detection limits for carcinogenic PAHs were higher than the health concern levels and benzene was not tested, therefore, the potential threat to public health cannot be defined.

#### CONCLUSIONS AND RECOMMENDATIONS

This site is of potential health concern because of the potential risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted in the section, environmental contamination and physical hazard, human exposure to PAHs is probably occurring and has probably occurred in the past via the contaminated soils. According to the Brown Wood Preserving Site in its current state of contamination, the susceptible receptor population are workers involved in on-site remediation and nearby residents.

ATSDR recommends the following:

1. The site should have warning signs posted around the former waste water holding lagoon.

2. A fence should be installed around the former waste water holding lagoon. This lagoon is used to hold water overflow of the treatment bed and stockpile area whenever the retention pond inside the fence is full.
3. Surface water of the former waste water holding lagoon was only tested for carcinogenic PAHs after it was treated through a filter in the beginning of 1988. The lagoon collected water and sediments from contaminated soil piles between April to October of 1988; therefore, surface water testing for carcinogenic PAHs and their related chemicals should be conducted.
4. Additional testing for creosote-related chemicals such as benzene, trichlorophenol, bichlorophenol, and dioxin (TCDD and TCDF are associated with chlorinated biphenyls and chlorinated naphthalenes) should be considered in the soil and ground water monitoring schedule at the site.
5. Testing for carcinogenic PAHs in water should use method EPA-625 or 610 (Detection Limit = 2 ug/L - 5 ug/L) to obtain more sensitive results so health evaluation of population at risk can be made appropriately.
6. In accordance with CERCLA as amended, the Brown Wood Preserving site has been evaluated for appropriate follow-up with respect to health effect studies. Although there are indications that human exposure to on-site/off-site contaminants may be currently occurring and may have occurred in the past. This site is not being considered for follow-up health studies at this time because the information of population at risk is not sufficient to perform a health study.

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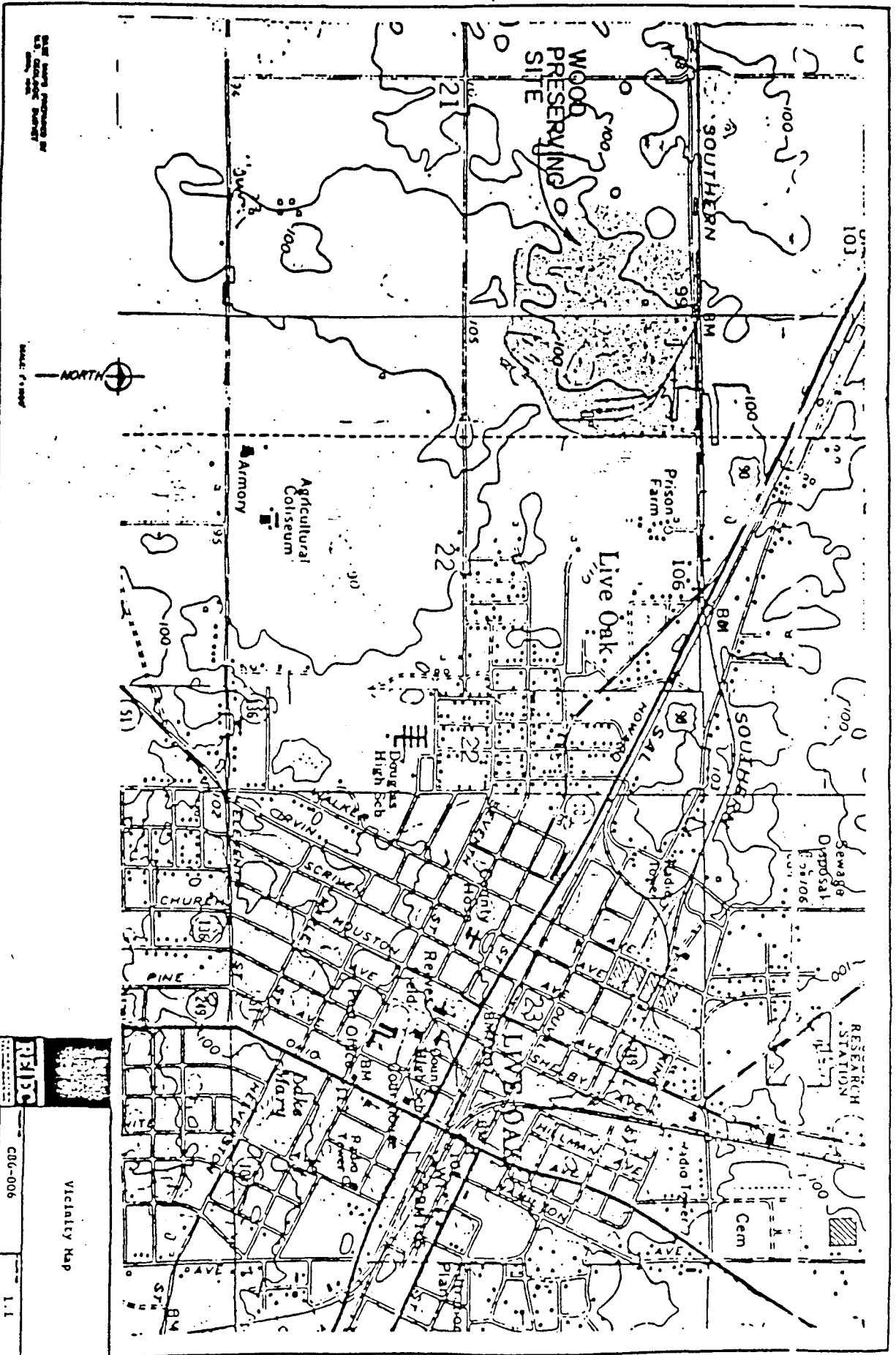
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## APPENDICES

1. Figure #1: Monitoring Well Locations and Potentiometric Surface of the Floridan Aquifer at Brown Wood Preserving Site
2. Figure #2: Schematic of Live Oak Land Treatment Facility.



Map of Live Oak, Texas, prepared by the U.S. Army Corps of Engineers, Fort Belvoir, Illinois

Scale: 1:50,000



C86-006

Vicinity Map

1:1