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Health Assessment for

INTERIM

DUBOSE OIL PRODUCTS COMPANY

CANTONMENT, ESCAMBIA COUNTY, FLORIDA

CERCLIS NO. FLD000833368

DECEMBER 23, 1991

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

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, risks assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, this Health Assessment has been conducted using available data. Additional Health Assessments may be conducted for this site as more information becomes available.

The conclusions and recommendations presented in this Health Assessment are the result of site specific analyses and are not to be cited or quoted for other evaluations or Health Assessments.

INTERIM HEALTH ASSESSMENT

DUBOSE OIL PRODUCTS COMPANY

NATIONAL PRIORITIES LIST SITE

CANTONMENT, ESCAMBIA COUNTY, FLORIDA

CERCLIS NO. FLD000833368

Prepared by

Florida Department of Health and Rehabilitative Services

Under Cooperative Agreement with the

Agency for Toxic Substances and Disease Registry

SUMMARY

The Dubose Oil Products Company National Priorities List (NPL) site is located near Cantonment in Escambia County, Florida. Carcinogenic polynuclear aromatic hydrocarbons (PAHs) in sediments and soil on site are primary sources for potential exposure, especially to trespassers, remediation workers, and possibly to site residents. One soil sample also contained elevated levels of polychlorinated biphenyls (PCBs). 1,1-Dichloroethene and trichloroethene were found in the on-site perched shallow water table aquifer at levels likely to be of health concern for potable water; however, this aquifer is not a potable water source. The shallow ground water could be restricted from entering the regional source of potable water, the Sand-and-Gravel Aquifer, by a clay layer which may maintain a hydrogeologic separation of the two aquifers. The clay layer averages 40 feet thick. Where permeable sediments overlie the clay layer at or above the land surface, seep springs develop above the clay layer, and shallow ground water becomes surface water. Seep springs could provide an avenue for transport of contaminated water to surface water. Because of the possibility of human exposure to contaminated soil and sediments, this site is determined to be a public health hazard.

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

The Dubose Oil Products Company site occupies approximately 20 acres of land in Escambia County, about 2 miles west of Cantonment, Florida (Appendices, Figure 1). The site consists of an open-sided barn (labeled Hog Barn, Appendices, Figure 2), a soil containment vault, a sump catchment pond (Southwest Sump), two surface water ponds (the Leachate Pond and North Pond), and a ravine where vault soil was excavated.

The site operated between 1979 and 1981 as a waste storage, treatment, recycling, and disposal facility for handling waste oils, petroleum refining wastes, wood treatment processing wastes, paint wastes, spent solvents, and spent iron and steel acid "pickle" liquors. Most of the waste handling occurred in and on the north and west sides of the barn. The materials were transported to the site in tanker trailers and 55-gallon drums. Drum contents were stored in a treatment tank prior to processing. Empty drums were stored in a drum storage area and reusable drums were sold to Mitchell Steel Drum Company of Mobile, Alabama. Drums damaged during handling operations were crushed and stacked for possible resale as scrap metal. A number of buried crushed drums were removed from a heavily eroded area just west of the facility equipment area.

The facility used batch thermal treatment, a 12-hour period of steam heating, to treat the wastes. Waste oils and solvents were filtered and heated with acid "pickle" liquors which acted as a mixing agent for the oils and solvents. Soda ash was added during the last 30 minutes of heating to neutralize the acid "pickle" liquor. The pickle liquor was separated from the mixture and stored tanks for subsequent off-site transport. The remaining "usable solvent blended fuel oil" was stored in tanks. Another tank was used for rock salt filtration treatment of waste diesel fuel.

The site was discovered to be operating without a permit during a routine inspection in March 1982 by the Florida Department of Environmental Regulation (DER). DER investigators detected contaminated springs and seeps on site as a result of a sampling visit in April and May 1982. Soil, sediment, surface water and ground water contamination were discovered as the result of DER investigations in October 1983. DER personnel (and their contractor personnel) conducted an emergency response from November 1984 to May 1985 during which they installed a lined and covered vault to contain 38,000 cubic yards of contaminated soils. The Hypalon^{tm} vault liner is 36 mils thick and the cover is polyvinyl chloride (PVC) 30 mil thick. The vault is equipped with a leachate collection and treatment system. Since May 1985, an average of 6,000 gallons of leachate has been pumped weekly from the vault. The leachate is filtered through activated carbon and sand, then discharged to the North Pond. Drums were also excavated and removed as part of the emergency response (Technos, 1983).

Court injunctions originating in November 1984 against the site owner failed to initiate further site remediation actions. For this reason, potential

responsible parties (PRPs) were identified. A steering committee of PRPs entered into an agreement with DER to conduct a Remedial Investigation and Feasibility Study (RI/FS) in accordance with the U.S. Environmental Protection Agency (EPA) guidelines. A RI work plan was developed in 1988 (Geraghty and Miller, 1986). This work plan incorporated EPA Region IV standard protocols and EPA contract laboratory procedures (CLP).

A two-stage field investigation began in February 1988 and was completed in October 1988 (Engineering - Science, 1988). The resulting final RI was released in April 1989 (Engineering - Science, 1989). Results of site testing indicate low to undetectable levels of volatile and semi-volatile organic compounds in soils, sediments, ground water and surface water outside the vault; levels of organic contaminants (volatiles, semi-volatiles and phenols) inside the vault are 100 to 1,000 times greater. Published information and results of bench-scale treatability studies completed as part of the RI indicate that all contaminants detected at the site are degradable given proper time and environmental conditions (Engineering - Science, 1989).

B. SITE VISIT

The health effects reviewer for the Department of Health and Rehabilitative Services (HRS), project managers from DER and EPA, and the DER on-scene coordinator visited the site September 12, 1989. A follow-up site visit was conducted by Escambia County Department of Health staff in March 1991. The road that provides access to the Dubose property is fenced and gated, and the southern portion of the property is fenced. Mr. and Mrs. Dubose, their adult children, and five grandchildren reside in four houses and a trailer located on the southern portion of the property. The homes are separated from the former waste oil treatment area by a cow pasture and an aviary building which houses doves. The access road is posted at three locations: the property entrance, the well filter location, and an area south of the dove barn which is south of the hog barn.

Livestock are fenced off from the former waste treatment area. On the day of the site visit, the DER contractor was re-grading the area around the hog barn with heavy machinery. Apparently, severe erosion problems have been caused by the removal of contaminated soil and relocation of these soils into the vault. These problems were to be corrected by resloping the land and planting grass. Because the gate was open on the day of the visit, tame peacocks from the southern portion of the Dubose property were foraging on the south end of the former waste treatment area.

The north and west sides of the Dubose property are heavily forested but are not fenced. Site access through these areas would be feasible only by foot. However, if the planted pine trees are harvested sometime in the future, the area may become accessible to vehicles.

According to HRS Escambia County Public Health Unit staff, there are two private wells in the area, one on site and one off site. The only one being used as a potable source is located on site. A filter and holding tank are part of the well system. This well is used by Mr. and Mrs. Dubose, their adult children, and grandchildren. An on-site well water sample analyzed for

gasoline components showed no compounds above detection levels, and a later sample analyzed for purgeables did not detect any positively identifiable extractables. The well is scheduled for ongoing quarterly monitoring.

C. DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

The site is located in a rural area. Land use is predominantly agricultural, although low density housing developments border the eastern boundary of the site. Residences in the area are served by Farm Hill Utilities, a community water supply with wells located approximately 2 miles east of the Dubose property. Tree farms lie west of the site, while pasture land and undeveloped forest areas lie to the north and south. The northern edge of the site is a low-lying area which forms the headwaters of Jacks Branch, one of four tributaries to the Perdido River.

The site is situated in a recharge area of the regional Sand-and-Gravel Aquifer of the Florida panhandle. The regional aquifer is a sequence of sand, gravel and clay approximately 500 feet thick beneath the site. At this location, the regional aquifer is underlain by 550 feet of sandy clay. The regional aquifer is overlain by a locally continuous 30-50 foot thick clay unit which acts to semi-confine the site on a seasonal basis (Musgrove and others, 1965). The surficial sands above the clay layer contain a perched water table. Aquifer testing indicated that the perched water table and regional aquifer are poorly connected: results of permeability measurements of the clay layer suggest that contaminants in the perched water table may take approximately seventeen years to reach the regional aquifer (Engineering - Science, 1989). Gradients in the shallow water table aquifer are northerly and gradients with regional aquifer are westerly.

The residents nearest the areas of contamination are located on the Dubose property, 540 feet south of the vault. Aerial photographs from 1980 (Engineering - Science, 1989) show that eleven residences are located within a 0.25 mile of the vault, and 35 residences are within a 0.50 mile of the site. The town of Cantonment, population 3,500, is centered two miles due east of the site. Land use in Cantonment is residential, commercial and industrial.

D. HEALTH OUTCOME DATA

Based on the evaluations performed as part of this health assessment, there are indications that humans may have been exposed to site-related contaminants. No follow-up health actions have been proposed by the ATSDR Health Activities Recommendation Panel (HARP) since Escambia County health officials have already informed site residents of the health hazards associated with the site, a periodic monitoring program of the on-site well has been established, and the potentially exposed population have no health concerns. Therefore, an evaluation of health outcome data for the site area is not indicated at this time. However, if health outcome data become available it will be evaluated in future health assessments of the site.

COMMUNITY HEALTH CONCERNS

Escambia County Department of Health and Rehabilitative Services representatives are concerned about future contamination of the nearest private wells although these wells are apparently hydrogeologically upgradient of the contaminated ground water plume. The well on the Dubose property is the closest well to the contaminated ground water plume; it is sampled several times each year. Other more distant wells have also been sampled in the past. No ground water contamination has been detected in private wells.

County residents have also expressed concern about groundwater contamination. It was surmised on-site residents might not express health concerns because they are site owners, or are members of the site owner's family; therefore; site residents were contacted to see if they had any health concerns or problems. Although the on-site residents again indicated they had no site-related health concerns, staff from the Escambia County Department of Health informed them of the health hazards associated with site-related contaminants.

Access to the contaminated areas of the site should continue to be restricted to protect public health. Contaminated areas include sediments and water in the three ponds and the soil beneath and around the hog barn.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

To identify possible facilities that could contribute to the ground water, surface water, soil, and sediment contamination near the Dubose Oil site, Florida HRS searched the 1987, 1988, and 1989 Toxic Release Inventory (TRI). TRI is developed by the EPA from chemical release information provided by certain industries. Although TRI did list several facilities within the Dubose Oil site zip code area which released various compounds, these releases are not expected to have impacted the immediate site area.

A. ON-SITE CONTAMINATION

Air, ground water, surface water, surface soil, subsurface soil, and pond sediments were sampled for purgeable organic compounds, extractable organic compounds (including pesticides), metals (including mercury) and cyanide (Engineering - Science, 1989) to determine the location and quantity of on-site contamination. Carcinogenic PAHs are the contaminants of concern in soil and sediments, while halogenated non-aromatic volatiles are the contaminants of concern in ground water. Media, contaminants, and levels of contaminants present at levels of concern are listed in Table 1. Contaminants present at lower levels and sampling areas and procedures are discussed in the On-Site Media Characterization Section.

TABLE 1
ON-SITE CONTAMINATION

MEDIA	CONTAMINANT	RANGE			
Ground Water (Shallow Aquifer)	1,1-Dichloroethene	15	-	25	µg/L
	Trichloroethene			**8	µg/L
Surface Soil	TCPAHs***	J164	-	J1,703	µg/kg
	PCB-1260			**1,700	µg/kg
Surface Sediment	TCPAHs***	J43	-	J1,350	µg/kg
				1,700	µg/kg
Subsurface Soil	TCPAHs***	J130	-	J29,800	µg/kg
Subsurface Sediment	TCPAHs***	J120	-	J360	µg/kg
Vault Soil	TCPAHs***	J*380	-	E27,190	µg/kg
	N-nitroso-di-n-propylamine			**2,200	µg/kg

J - Estimated Value
E - The value of one of the PAHs was estimated due to interference.
* - The duplicate analysis is not within control limits.
** - The substance was only detected at levels of concern in one sample.
*** - Total Carcinogenic PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene.

ON-SITE MEDIA CHARACTERIZATION

1. Ground Water - Wells sampled for the RI included nine deep wells completed in the regional Sand-and-Gravel Aquifer and 12 shallow wells completed in the perched water table aquifer. Volatile organic compounds (VOCs) were detected at very low levels in three of the deep wells, but VOCs were confirmed in only one of the repeat samples. Of the 12 shallow well samples, seven had detectable concentrations of VOCs, but only two contained compounds at levels exceeding the EPA's Maximum Concentration Level (MCL) drinking water standards. However, this perched water table aquifer is not being used as a potable water source. The wells containing contaminants of concern are located near the former drum burial area, and directly north of the vault (Figure 2).

2. Surface and Subsurface Soil - Shallow soil borings were composited from 87 locations. During the first sampling stage, exploratory borings were made at 62 locations. These borings were terminated at an average depth of 4 feet. Soils were analyzed from the screened intervals of the monitoring wells. If field screening (head space screening with an organic vapor analyzer [OVA]) indicated the soils contained elevated

contaminant levels, samples were collected. During the second stage of field work, 25 borings from 4 to 25 foot depths were completed to determine the extent of vertical contamination in the areas of soil contamination detected in stage one.

Six locations contained detectable levels of volatile and semi-volatile organic compounds. These areas are west and south of the hog barn, berms surrounding the vault, and the area north of the North Pond. Only in the berms and in a small area south of the hog barn are levels of total organics greater than 5 mg/kg. One of 84 soil samples analyzed contained PCBs (1.7 mg/kg).

3. Vault Soil - Variations in contaminant concentrations with respect to vault location were expected because soils with varying contaminant concentrations were placed in the vault. To determine median concentrations, 12 vault test borings were composited. For each boring, the upper 20 feet was sampled using a hand auger: the lower 10-15 feet was sampled using a hollow stem auger and split spoon technique. Analytical results indicate contaminant concentrations increase with vault depth. The highest concentrations of volatile and semi-volatile compounds are present at 25-30 feet below the top of the vault.

4. Surface and Subsurface Sediment - Six samples from the upper 3 inches and six samples from the lower 1 foot of sediments were composited from the three on-site ponds. A stainless steel hand auger was used. The composited samples were analyzed for the full target contamination list, excluding volatile organic compounds. Volatile organic compound samples were taken from discrete samples obtained from two sampling stations in each pond.

   Sampling showed the northern two-thirds of the North Ponds's sediments are contaminated. Although there is vertical variation, most contaminants are concentrated in the upper 6 feet. In the Leachate Pond semi-volatile contaminants were detected to a depth of 8 feet. The Southwest Sump is apparently free of contaminants at depths greater than 1 foot below the pond bottom. Sediment contaminants were greatest in the southwest sump and decreased to the lowest levels in the tributary to Jack's Branch.

5. Surface Water - Six surface water samples were composited from three on-site ponds using a Kemmerer sampler. Surface waters are apparently free of contaminants at detectable levels except for low levels of halogenated non-aromatic volatiles detected in the leachate Pond and Southwest Sump.

6. Air - Air samples for semi-volatile organic compounds and total suspended particulates were collected at six locations on site. The northern sampling location was considered upwind based on a review of the meteorological data collected at Pensacola Airport. The high volume air samplers were located downwind of the pond. Air sampling showed average particulate levels to be at 61.5 $\mu g/m^3$, below the National

Quality Standard of 150 $\mu g/m^3$ for a 24-hour period. VOCs were not detected in the sorbent tube air samples.

B. OFF-SITE CONTAMINATION

For surface water and sediments, one sample location was chosen on the Jacks Branch tributary and two sample locations on Jacks Branch. A similar seep stream west of the site was sampled as background. Water samples did not contain any target list compounds at detectable levels. Contaminants from shallow sediments (0.0-0.25 feet) on Jacks Branch included higher levels of total PAHs and total phenols than contaminants from North Pond sediments which empties into Jacks Branch, although these were not at levels of concern for human health. No contaminants were detected in the three monitoring wells and three piezometers located off site. Analyses of soils, sediments, surface water and ground water sampled off site indicated that contaminants are not migrating off site at levels of concern for human health.

C. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Most of the chemical analyses performed during the RI were done according to CLP methods. About 10% of the CLP analyses were reported with complete data packages that included results of quality control analyses and instrument calibrations and sample results. The remainder of the analytical results were reported with matrix spike and surrogate recovery information as required by the Quality Assurance Project Plan (Engineering - Science, 1988). In the RI, summary tables indicate those samples that were out of specification; samples not listed were within CLP specifications for QA/QC compliance. Laboratory blanks were contaminated with the same common laboratory solvents detected in field samples suggesting that these low levels of contaminants were likely laboratory artifacts. Analyses of rinsate samples indicate most rinsates were below detection limits for organics and metals.

Ground water contaminant detection limits, especially for the deeper monitoring wells completed in the regional Sand-and-Gravel aquifer did not address the state and federal MCLs for drinking water. Specifically, ground water analyses for selenium, benzene, carbon tetrachloride, 1,2-dichloroethane, cis-1,3-dichloropropene, 1,1,2,2-tetrachlorethane, tetrachloroethene, 1,1,2-trichloroethane, vinyl chloride, the carcinogenic PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene); 2,4-dinitrotoluene, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, n-nitroso-diphenylamine, 2,4,6-trichlorophenol, PCB-1254 and PCB-1260 in ground water should have had lower detection limits than those used in the RI. Tests for the carcinogenic PAHs in the soil should also have had lower detection limits. The EPA cancer potency factor (CPF) for PAHs in soil is 100 ppb and the detection limit used for these analyses in the RI was 350 ppb.

D. PHYSICAL AND OTHER HAZARDS

Three open ponds, large abandoned oil tanks and stacks of contaminated waste drums are considered potential physical hazards at the site for trespassers and remediation workers.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

A potential exists for volatile and phenolic contaminants to leak out of the vault through the Hypalon^{tm} liner and into the perched water table. Contaminants in the perched table aquifer could then be transported to on-site ponds and to the Jacks Branch tributary. At present, migration of significant levels of volatiles into the perched water table or in surface water is not evident. Phenolic compounds including pentachlorophenol present in the berm and vault soils (but not at levels of concern for long-term adverse health effects [Engineering - Science, 1989]) could potentially reach Jacks Branch after leaching from berm soils or in leachate escaping the vault because they are moderately soluble, have low to medium sorption capabilities, and are not highly volatile.

Sediment transport may also influence migration of some phenolic contaminants because of their adsorptive properties. Overland migration of sediments and soils during rainfall events or via North Pond discharges could occur. Pond sediments could be resuspended and discharged from the North Pond during wind conditions in which the bottom sediments were churned, or during heavy rainfall events. Washout of contaminated soil surrounding the vault could also occur during heavy rains.

B. HUMAN EXPOSURE PATHWAYS

Dermal exposure to surface soils and surface sediments on site and ingestion of on-site surface soils and sediment were identified as potential human exposure pathways. Because the soil and subsurface soil contain contaminants at levels of concern for long-term exposure, ground water is also a potential exposure route because soil acts as a reservoir for ground water contaminants. The population at exposure risk includes site residents, remediation workers, and trespassers on the site.

PUBLIC HEALTH IMPLICATIONS

A. TOXICOLOGICAL IMPLICATIONS

Contaminants at levels of concern for long-term exposure include carcinogenic PAHs in soil and sediments, and 1,1-dichloroethene and trichloroethene in ground water. PCB-1260 (in one surface soil sample) and N-nitroso-di-n-propylamine (in one vault soil sample) were also detected at unacceptable levels for long-term exposure.

Carcinogenic PAHs have been detected on site in soil and subsurface soil at levels several orders of magnitude greater than are acceptable for daily lifelong exposure. Because PAHs are readily absorbed via the gastrointestinal tract, respiratory system, and the skin, exposure to soil and inhalation of dust on the site should be avoided. Once inside the body, PAHs initially concentrate in the kidney and liver and are later stored in fat. Inhalation of PAHs have been implicated in the induction of lung cancers in cigarette smokers and tar-roofing workers (Weisberger and Williams, 1980).

PCBs have been detected at levels of 1.7 mg/kg in one soil sample, more than an order of magnitude greater than the acceptable intake level. Rather than posing an exposure risk to specific compounds, finding PCB-1260 in one surface soil and n-nitroso-di-n-propylamine in one vault soil indicates waste oil can and often does contain exotic, toxic, lipid soluble substances which will be stored in the body. Like PAHs, PCBs are also readily absorbed from the gastrointestinal tract, respiratory system and skin, and are stored in fat (Gosselin and others, 1984). Care should be taken to avoid long-term exposure to lipid stored contaminants, even at relatively low levels, because they do not readily leave the body.

In the RI calculations for contaminated soil intake, it was assumed that children would be the trespassers exposed (Engineering - Science, 1989). Exposure was estimated to occur during seven events per year because children residing near the site have been told not to play at the site and are assumed to have adequate parental supervision. Using the methodology employed in estimating these intakes discussed in Exposure Assessment Guidance Documents (USEPA, 1987), the risks for non-carcinogenic effects were calculated to be insignificant and the risk from potential carcinogens would fall within EPA's acceptable target range of 1 in 10,000 to 1 in 10 million excess cancers in the potentially exposed populations. These values were calculated for seven days of exposure per year assuming the ingestion of 100 mg of soil per visit. Only oral exposures could be calculated for the carcinogenic compounds because route-specific chronic daily intake amounts were not available. However, these assumptions may not fit the actual exposure profiles, especially if access to the area of soil remediation is not restricted, or if remediation workers are exposed to wind or dusty conditions. In addition, 1 in 10,000 excess cancer risk may not be an acceptable risk when the exposed population includes sensitive members like children.

There is no immediate route for exposure to contaminated ground water from the perched aquifer. The Dubose site residents share a single potable well and a residence west of the site has a well that is not used as the source of water for the residence. Both wells are completed into the Sand-and-Gravel Aquifer. Recent analyses (June and October 1989) of samples from these wells for total volatile aromatics (benzene, toluene, ethylbenzene, total xylenes and chlorobenzene) and purgeable aromatics showed no confirmed contaminants above detection levels. The Escambia County Public Health Unit has agreed to sample the Dubose well quarterly for purgeables (which include the contaminants 1,1-dichloroethene and trichloroethene previously detected in the perched aquifer) to ensure the acceptable potable water quality.

B. HEALTH OUTCOME DATA

No adverse health affects have been attributed to the site by on-site or off-site residents, and off-site receptor populations are not known to have been exposed to contaminants from the site via ground water or sediments.

CONCLUSIONS

Based on the information reviewed, the Dubose Oil Products Company site is concluded to be a public health hazard. On-site residents, on-site workers, and site trespassers may be exposed to hazardous substances at concentrations that may result in adverse human health effects. As noted in the Human Pathways Exposures section above, human exposure to carcinogenic PAHs and PCBs may occur via contact with contaminated soil or sediments.

RECOMMENDATIONS

1. As stated in the Community Health Concerns section, access to the contaminated areas of the site should continue to be restricted. The contaminated areas include the areas of heaviest soil contamination, the hog barn, the vault, the three ponds and the future area of soil remediation.

2. Continue to conduct quarterly sampling of on-site ground water.

3. The integrity of the PVC liner should be addressed especially because of the possibility that contaminants may migrate into the shallow ground water. RI data show that during two sampling episodes in June and September 1988, the level of the perched, ground water aquifer was elevated above the bottom of the vault. Concentrations of contaminants in soils just beneath the PVC liner of the vault are unknown.

4. The results obtained in the bench-scale tests should be confirmed by pilot-scale biological treatment studies.

5. Detection limits for analytes in ground water and soil should be within acceptable state and federal guidelines and standards. Tests for detection of selenium, benzene, carbon tetrachloride, 1,2-dichloroethane, cis-1,3-dichloropropene, 1,1,2,2-tetrachlorethane, tetrachloroethene, 1,1,2-trichloroethane, vinyl chloride, benzo(a)-anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, 2,4-dinitrotoluene, hexachlorobenzene, hexachlorobuta-diene, hexachloroethane, n-nitroso-diphenylamine, 2,4,6-trichloro-phenol, PCB-1254 and PCB-1260 in ground water should have lower detection limits than those used in the RI. Tests for the carcinogenic PAHs in the soil should also have lower detection limits. The EPA cancer potency factor (CPF, USEPA, 1986) for PAHs in soil is 100 ppb and the detection limit used for these analyses in the RI was 350 ppb.

6. The Dubose Oil Products Company site has been evaluated by the Health Activities Recommendation Panel (HARP) for appropriate follow-up health activities. Although there are indications humans may have been exposed to on-site and/or off-site contaminants, this site is not being considered for follow-up activities at this time. Escambia County Department of Health and Rehabilitation Services staff periodically monitor the on-site residential well for site-related contamination and have informed site residents of the health hazards associated with site contaminants. Since site residents are the most likely to be the exposed population, no further follow-up public health action is necessary at this time. However, if data become available suggesting that human exposure to hazardous substances at levels of public health concern is currently occurring or has occurred in the past, ATSDR will reevaluate this site for health follow-up activities.

7. If future ATSDR evaluations indicate that a substantive completed exposure pathway exists or that the community has expressed specific health concerns, then health outcome data bases should be evaluated in future assessments for this site.

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CERTIFICATION

This Health Assessment was prepared by the Florida Health and Rehabilitation Services 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 assessment was initiated.

Technical Project Officer, SPS, RPB, DHAC

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

Director, DHAC, ATSDR

REFERENCES

Engineering - Science, Inc., 1988, Report of Site Data from the Remedial Investigation, Volumes I and II, Dubose Oil Products Site, Cantonment, Florida.

Engineering - Science, Inc., 1989, RI/FS at the Dubose Oil Products Company Site, Cantonment, Florida prepared for the Dubose Oil Products Steering Committee.

Geraghty and Miller, 1986. Final Work Plan and Support Documents, Dubose Oil Products Company Site, Cantonment, Florida.

Gosselin, Robert E., Roger P. Smith, Harold C. Hodge and Jeanette E. Braddock, 1984. Clinical Toxicology of Commercial Products, Williams & Wilkins, Baltimore, London, III-108, PCB II-171.

Musgrove, R.H., Barraclough, J.T., and Grantham, R.G., 1965, Water Resources of Escambia and Santa Rosa Counties, Florida. Florida Bureau of Geology Report of Investigation Number 40, 102 p.

Technos, Inc., 1983. Delineation of buried metal at Dubose Oil Site, Cantonment, Florida, October 1983.

U.S. Environmental Protection Agency, 1986. Superfund Public Health Evaluation Manual: OSWER Directive 9285 4-1, Doc. No. EPA 540 1-86 060.

U.S. Environmental Protection Agency, 1987. Superfund Exposure Assessment Manual, Final Draft, Submitted to the Office of Emergency Remedial Response, Office of Solid Waste and Emergency Response, OSWER Directive 9285.5-1.

Weisberger, J.H. and G.M. Williams, 1980. Chemical Carcinogens in Casarett & Doull's Toxicology, 2nd edition. J. Doull, C.D. Klaassen, and M.O. Amdur, eds. MacMillian Publishing Co., Inc. New York.

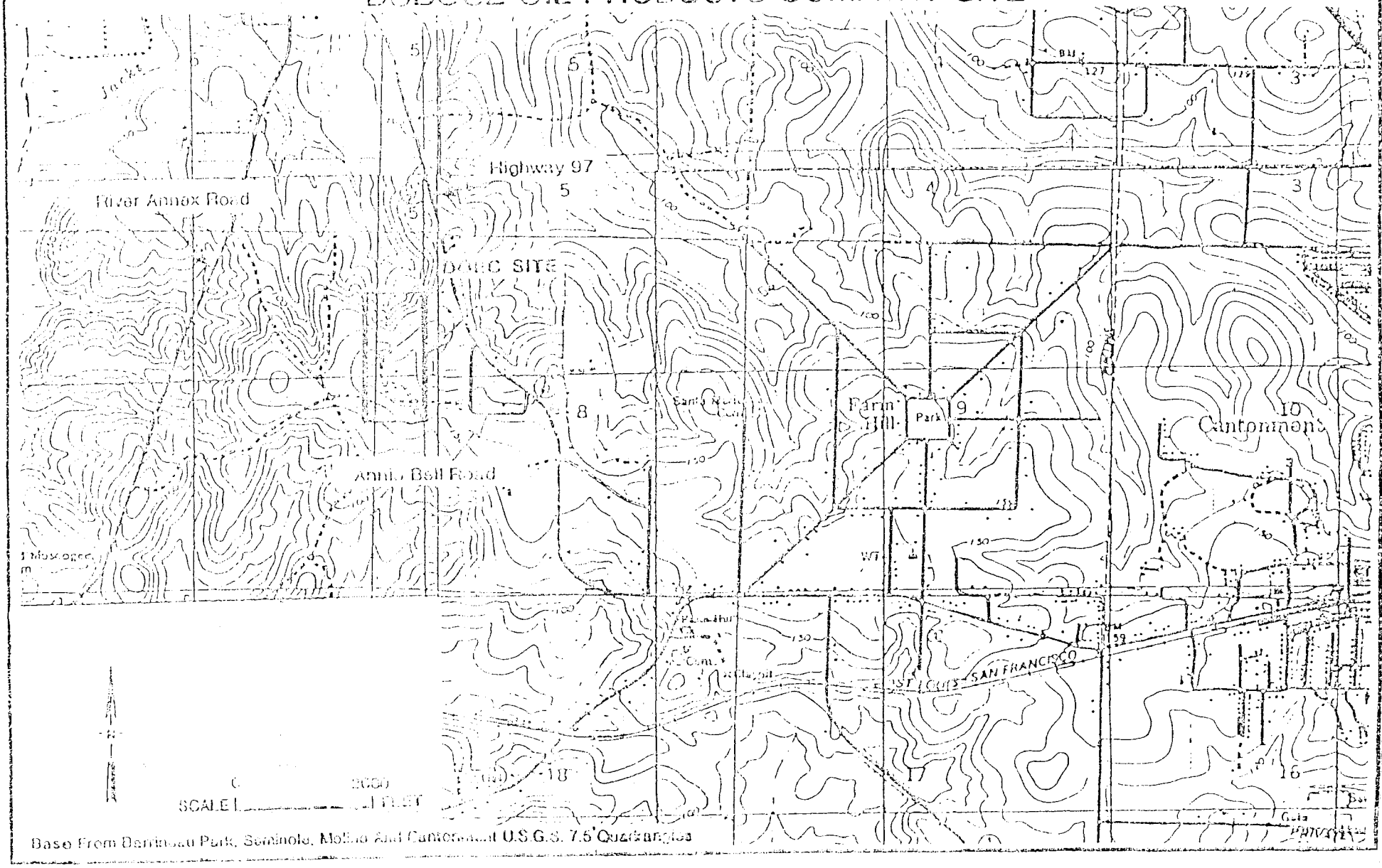
APPENDICES

Figure 1: Area surrounding the Dubose Oil Products Company site.

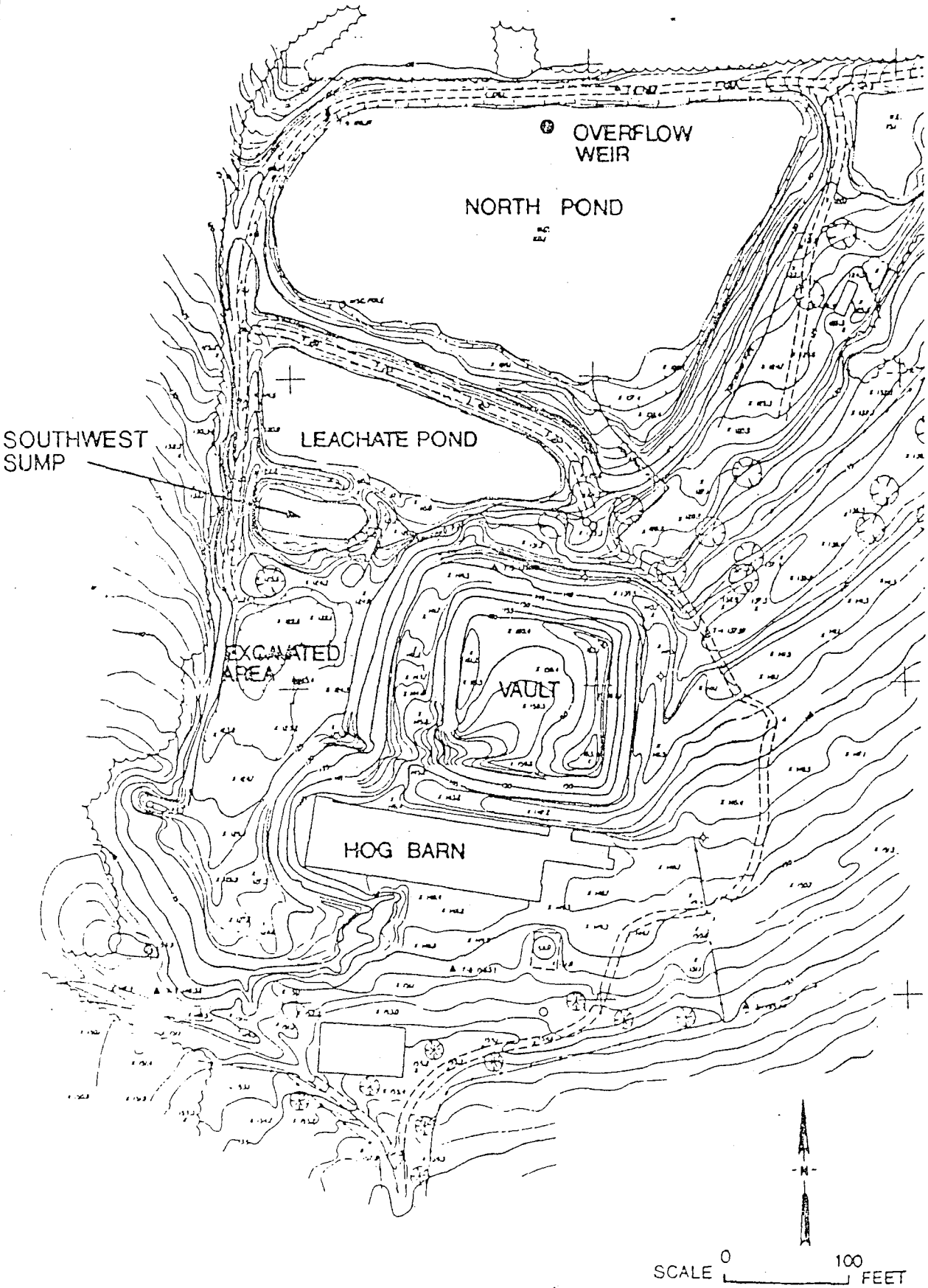
Figure 2: Physical features on the Dubose Oil Products Company site.

SITE LOCATION

DUBOSE OIL PRODUCTS COMPANY SITE



DOPC SURFACE FEATURES
DUBOSE OIL PRODUCTS COMPANY SITE



Base From 1988 Aerial Photography