Public Health Assessment for

KOPPERS COMPANY INC., NPL SITE

TEXARKANA, TEXAS

CERCLIS NO. TXD980623904

APRIL 10, 1989

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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SUMMARY

The Koppers Company, Inc., Site is a National Priorities Lists (NPL) site located in Texarkana, Texas. The site is the former location of a wood treatment facility. A residential subdivision consisting of 79 houses has been constructed on the northern portion of the site. An inactive sand and gravel mining operation occupies the southern portion of the site. The site is contaminated with numerous chemicals from the former wood treatment operations including polyaromatic hydrocarbons (PAH), phenolic compounds, polychlorinated dibenzodioxins (PCDD), and polychlorinated dibenzofurans (PCDF). Previous remedial activity has included reseeding and the installation of sod in highly contaminated residential areas. The primary environmental pathways of potential concern are surface soils and ground water. Long-term exposures to contaminated soils in the residential area pose a potential health risk for ingestion and dermal absorption of soil contaminants. Ground water beneath the site is contaminated and would pose a potential health risk if used for potable purposes.

BACKGROUND

A. SITE DESCRIPTION

The Koppers Company, Inc., Site is an NPL site. The site is located in northeastern Texas within the city limits of Texarkana, Bowie County, about 178 miles east of Dallas and 70 miles northwest of Shreveport, Louisiana. It is about one mile from the Texas-Arkansas state line. The site encompasses about 62 acres. It is bordered by the Texas and Pacific Railroad to the north, Wagner Creek to the southwest, an unnamed tributary to the northwest, Jameson Street to the south, and a drainage ditch to the southeast. See Appendix I for a site map. Wagner Creek, an unnamed tributary, an on-site drainage ditch and gravel pits are the nearest surface water. There is now a large standing body of water in a former borrow pit on site. Several areas along the east and west boundaries of the site are bordered by dense trees. Within the site, there is a housing development and a former sand and gravel operation. One house next to the site was reportedly built on the former plant office foundation. The remainder of the site, which is owned by the Kennedy Sand and Gravel Company, is fenced and posted with warning signs.

In 1920, the National Lumber and Creosote Company built and began operation of a creosote wood treatment facility at the site. The processing operations located at the facility included treating

cylinders, working tanks, drip tracks and a wastewater lagoon. In 1938, the land was acquired by Wood Preserving Corporation. This corporation was eventually acquired by Koppers. The facility was in operation until 1961. The facility was then closed, and the land was sold. In 1964, half of the land was purchased by Carver Terrace, Inc., and homes were constructed on the northern half of the site. The southern half was sold to Kennedy Sand and Gravel Company. They began mining operations in the late 1970's and ceased operations in September 1984.

In 1980, the Texas Department of Natural Resources did the initial site inspection. In January 1981, an Environmental Protection Agency (EPA) Field Investigation Team inspected and photographed the site. In 1985, a soil/sod protective barrier was placed on several residential lots in the Carver Terrace Subdivision. The criteria used to select the locations for remediation were: 1) soil concentrations of B(a)p in excess of 325 mg/kg or 2) visibly oil-stained areas or 3) if most of the residential yards in a block were remediated, the remaining yards were also resoded, even if they did not meet the other criteria. In April 1988, a final Remedial Investigation (RI) report was issued, and in June 1988, the Feasibility Study Report was released by EPA.

B. SITE VISIT

A site visit was conducted by the Agency for Toxic Substances and Disease Registry (ATSDR) headquarters and regional staff on July 20, 1988. The Kennedy Sand and Gravel Company facility was inactive. No evidence of trespassing was observed. The Carver Terrace Subdivision yards were, for the most part, covered with grass. A baseball field, which did not appear to be used, was also covered with grass and weeds. No creosote odor was apparent.

ENVIRONMENTAL CONTAMINATION AND PHYSICAL HAZARDS

A. ON-SITE CONTAMINATION

Air samples were collected over a three day period in November 1985. Both particulate and vapor phases of the samples were analyzed. One round of surface water sampling was performed in January 1986, during normal flow conditions. A second round of surface water sampling was performed in March 1986, after a storm event. A third and fourth round of sampling were performed in the gravel pits in April and June 1986. Three rounds of sediment sampling were performed in conjunction with the surface water sampling, and a fourth round was collected in Wagner Creek, south of the confluence of the drainage ditch and the creek. Soil sampling was performed in three separate rounds during December 1985-January

1986, January-August 1986, and June 1987. All soil samples were analyzed for acid and base neutral compounds, and some were also analyzed for arsenic, chromium, copper, and zinc. PCDDs and PCDFs were detected at low concentrations in soil from the home plate area of the neighborhood baseball field. Three rounds of ground water sampling were performed in June and July 1986, and July 1987. In additional sampling performed in February 1987, soil samples and oil samples from an oil layer discovered in a monitoring well were collected and analyzed for PCDDs and PCDFs. The municipal water supply system in the Carver Terrace Subdivision was sampled in August 1985. It was sampled at residences where the water main enters and exits the subdivision and at five intermediate locations. The samples were analyzed for priority pollutant acid and base neutral fraction compounds and metals. These results were not provided to ATSDR; however, according to the RI report, there was no indication that the municipal system, whose intake on Lake Texarkana is about nine miles from the site, is being adversely affected by the site. Table I lists the on-site contaminants of concern and the media in which they appear.

B. OFF-SITE CONTAMINATION

Three water samples collected at various locations in Wagner Creek adjacent to the site indicated no acid base/neutral organic compounds in first and second round samples. One volatile organic compound (VOC) was detected. No volatile or acid fraction compounds were found in sediments; however, eleven base neutral fraction organics were found. One base neutral compound was found 100 feet upstream of the confluence with drainage ditch and Wagner Creek. At the confluence, seven base neutrals were found. One base neutral was detected at the farthest downstream monitoring point. Table II lists the off-site contaminants of concern and the media in which they appear.

C. PHYSICAL HAZARDS

The water-filled gravel pits on Kennedy Sand and Gravel property pose a potential drowning risk to trespassers on the site. Poisonous snakes, including cottonmouth moccasins and rattlesnakes, are known to inhabit the site.

DEMOGRAPHICS OF POPULATION NEAR SITE

There are 79 single family homes on the Koppers site. There is also a church located on the site. Approximately 33,000 persons reside in Texarkana. A well inventory was conducted by the TDWR. Within a three-mile radius of the site, 83 wells were found in Texas. Ten wells were also found in Arkansas, but beyond a two-mile radius. Three of these wells were used as a source of drinking water supply, and two were used for watering gardens. The Carver Terrace Subdivision is supplied with water by the municipal system whose intake is located on Lake Texarkana, which is nine miles southwest of the Koppers site.

TABLE I: ON-SITE CONTAMINATION

CONTAMINANTS	SUBSURFACE SOIL (mg/kg)	GROUND WATER (ug/l)	AIR (ug/m^3)	SURFACE SOIL (mg/kg)	SEDIMENT (mg/kg)
		(Range detected)			
Acenaphthene	0.5-1800	24-1500000	ND	0.6-290	13-100
Acenaphthylene	0.75-100	22-1000	ND	0.26-200	ND
Anthracene	0.35-2300	18-12000	ND	0.28-170	46
Arsenic	2-104	21	NA/NR	2-19	NA/NR
Benzene	NA/NR	6-950	NA/NR	NA/NR	ND
Benzo(a)anthracene	0.46-530	320-6100	ND	0.2-300	25
Benzo(b)fluoranthene	0.66-160	14-3700	ND	0.41-92	4-120
Benzo(g,h,i)perylene	1.6-64	ND	ND	0.4-120	
Benzo(a)pyrene	0.47-160	1900	ND	0.52-420	ND
Cadmium	10-12	5-480	NA/NR	3	ND
Chlorinated Dibenzodioxins					
hexa-isomer	0.013	NA/NR	NA/NR	0.004	ND
hepta-isomer	0.223	NA/NR	NA/NR	0.065	ND
octa-isomer	0.629	NA/NR	NA/NR	0.2	ND
Chlorinated Dibenzofurans					
penta-isomer	0.0009	NA/NR	NA/NR	0.0003	NA/NR
hexa-isomer	0.04	NA/NR	NA/NR	0.01	NA/NR
hepta-isomer	0.37	NA/NR	NA/NR	0.112	NA/NR
octa-isomer	0.16	NA/NR	NA/NR	0.114	NA/NR
Chrysene	0.51-1100	250-3700	ND	0.32-700	27
Dibenzo(a,h)anthracene	0.86-20	ND	ND	0.4-3.7	
Dibenzofuran	0.33-1200	14-970000	NA/NR	0.55-1.4	69-88
2,4-Dimethylphenol	ND	25-1200	0.67-3.2	ND	NA/NR
2,4-Dinitrophenol	NA/NR	NA/NR	2-8	NA/NR	NA/NR
Ethylbenzene	NA/NR	12-2100	NA/NR	NA/NR	1.3-5.4
Fluoranthene	0.73-2500	0.017-1500	ND	0.33-140	100-520
Fluorene	0.49-2000	11-1200000	ND	0.47-220	100-120
Indeno(1,2,3-cd)pyrene	1.5-60	ND	ND	8.2-240	ND
2-Methylnaphthalene	0.65-2200	18-1100000	NA/NR	0.46-14	100-170
Naphthalene	0.47-4500	30-5500000	ND	0.49-240000	400000
Pentachlorophenol	4	2200	1.1-6.3	16-28	ND
Phenanthrene	0.46-420	10-5500000	ND	0.22-330	280-310
Phenol	ND	360	1.2-2.1	ND	ND
Pyrene	0.59-1600	14-1300000	ND	0.39-1300	97-370
Styrene	NA/NR	15-66	NA/NR	NA/NR	120
Toluene	NA/NR	6-2200	NA/NR	NA/NR	0.5-2.9
Total Xylenes	NA/NR	11-3500	NA/NR	NA/NR	3.6-5.6

* where only one number appears the contaminant was detected only once at the indicated concentration

ND=Not Detected
NA/NR=Not Analyzed, Not Reported or Sample Unusable
mg/kg=milligrams per kilogram
ug/kg=micrograms per kilogram
ug/m^3=micrograms per cubic meter
ug/l=micrograms per liter

TABLE II: OFF-SITE CONTAMINATION

CONTAMINANTS	SUBSURFACE SOIL (mg/kg) (Range detected*)	GROUND WATER (ug/l)	SEDIMENT (mg/kg)
Acenaphthene	31	30	0.83-19
Anthracene	0.5-18	ND	0.55-10
Arsenic	NA/NR	13-47	NA/NR
Benzo(a)anthracene	ND	ND	1.1
Benzo(b)fluoranthene	800	ND	7.6-7.9
Cadmium	NA/NR	10-63	NA/NR
Chrysene	0.47-16	ND	17
Dibenzofuran	21	17	ND
Fluoranthene	0.4-27	ND	3.6-5.7
Fluorene	0.44-35	ND	0.88-15
2-Methylnaphthalene	29-55	ND	27
Naphthalene	19-56	ND	67
Nickel	NA/NR	33-3400	NA/NR
Phenanthrene	0.83-100	ND	2-32
Pyrene	0.48-32	ND	26-4.9

* where only one number appears the contaminant was detected only once at the indicated concentration

ND=Not Detected
NA/NR=Not Analyzed, Not Reported or Sample Unusable
mg/kg=milligrams per kilogram
ug/l=micrograms per liter

EVALUATION

A. SITE CHARACTERIZATION (DATA NEEDS AND EVALUATION)

1. Environmental Media

There were three drilling programs for soils. The first went to 10 feet, and there were 134 holes drilled. The second went from 10 to 104 feet, and 71 holes were drilled. In addition, 15 monitoring wells and 18 piezometers were installed during this drilling program. Round three was done to explore the lateral and vertical extent of soil contamination. During this round, there were 28 borings, 8 wells and 4 additional piezometers installed. A total of 134 subsurface soil samples were analyzed. In addition to the 15 existing monitoring wells on site, there were 23 wells installed on site and off site and sampled during the RI. Water levels were measured nine times during the RI. The domestic wells southwest of the site were measured for water levels and once determined to be hydraulically upgradient were not sampled for contaminants. Since many factors can influence the direction of ground water flow, a confirmatory test should be performed to be certain these wells are not contaminated.

Thirty-nine surface water samples and 28 sediment samples were collected. Surface water samples were taken at 13 locations during four rounds of sampling. The sediments were sampled in 14 locations during four rounds. Air monitoring was performed at three locations on the site to obtain upwind (background) and downwind samples. A total of nine air samples were collected and analyzed. Additional field work included aquifer testing, geotechnical analysis, and a test pit investigation of a former wastewater lagoon. With the exception of the lack of sampling for contaminants of the domestic wells and the depth of these wells, the environmental information collected at the Koppers site was adequate to generally define potential exposure pathways at the site.

2. Demographics and Land Use

While information regarding the number of houses on the site was provided, very little information regarding the population near the site was provided to ATSDR. In addition, it is not clear to what extent hunting, gathering of consumable wild plants, gardening, farming, or raising of livestock take place on or near the site. Precise information on the local residential population, age, sex, socioeconomic status, and ethnic background would have been advantageous in determining potentially exposed populations.

3. Quality Assurance and Quality Control

ATSDR was provided with QA/QC documentation for the monitoring data at Koppers. The analyses which did not meet accuracy and precision standards were already flagged as unusable. Therefore, these results were not used in the preparation of this Health Assessment.

The conclusions presented in this Health Assessment are based on the data contained in the RI/FS report. The validity of these conclusions is, therefore, dependent on the accuracy and reliability of the data provided.

B. ENVIRONMENTAL PATHWAYS

Monitoring and analyses performed during the RI revealed contamination in air, soils, surface water sediments and ground water. The extent and types of contamination were quite varied, though some correlation of contaminants between media did exist. The most concentrated contaminants were found in the area of the Kennedy Sand and Gravel Company. However, contamination was also detected in the Carver Terrace Subdivision.

Soil sampling and analyses revealed contamination of the surface and subsurface soils. Contamination was found in all areas of the site. However, in the residential areas much of the surface contamination has been covered by sod. Most of this contamination occurred in the 0-4 foot depths. Concentrations substantially higher than background were found for PAHs, pentachlorophenol (PCP), and other phenols. The presence of these compounds in soil, in particular in subsurface soil, can serve as a reservoir for future ground water contamination. In addition, the presence of these compounds in surface soil makes it possible for the contaminants to be transported by the wind or surface water runoff.

Contamination was also present in the surface waters and sediments of the drainage ditch, Wagner Creek, the unnamed tributary, and in the gravel pits. PAHs and metal concentrations above background were detected in several of the surface water and sediment samples taken during the RI. The site is located in the Sulphur River Drainage basin. The main surface water near the site consists of Wagner Creek which flows to Day Creek which flows to the Sulphur River. Wagner Creek is fed by the unnamed tributary and drainage ditch on-site. The presence of contamination in on-site surface waters may facilitate transport of contaminants off site.

There are three ground water flow zones immediately beneath the site. The topmost is a shallow, unconfined aquifer located in the surficial sand and gravel deposits with a maximum depth of 24 feet. The second is a leaking confining zone, approximately 25 feet thick, composed of alternating layers of sand, silty sand and clay. Beneath the confining zone is the third flow zone, a semi-confined aquifer with a geological matrix composed of thin carbonaceous deposits, lignite, and very thick clay deposits.

Ground water in the shallow, unconfined aquifer on site discharges to the site drainage ditch and Wagner Creek. Off-site ground water to the east discharges to the site drainage. Off-site ground water to the west discharges to Wagner Creek. It appears that ground water in the leaky confining zone from both the site and areas off site to the west discharge to Wagner Creek. Flow direction in the semi-confined aquifer has not been clearly established. Vertical flow gradients in all aquifers are for the most part upward.

Apparently, three nearby residential wells tap the shallow aquifer for a water supply. However, these wells are reportedly upgradient of the site. Information on the depths of other local wells is inconclusive. It is not known how many local wells use the shallow zone, semi-confined aquifer or if they tap even deeper aquifer systems.

High levels of PAHs were found in the monitoring wells on-site in the shallow aquifer. Some contamination was found in the leaky confining zone under the Kennedy Sand and Gravel property. No contamination in the lower aquifer was detected. The potential for movement of these contaminants increases greatly once they are in the ground water. Since some of the ground water on-site appears to be discharging to surface water on-site, this may facilitate the movement of contaminants off-site.

On-site air monitoring, which was conducted on 3 consecutive days, detected several phenolic compounds. Several other compounds (such as benzene, xylene, styrene, etc.) were present in environmental media at the site but were not analyzed for in the air. No off-site air monitoring was performed.

No monitoring was conducted during the Koppers RI to define possible contamination of consumable plants and animals in the vicinity of the site. Therefore, a determination cannot be made regarding whether contaminated biota could be an environmental pathway. Fish electroshocking and counting was done to determine the types and number of fish found in Wagner Creek. The sampling discovered only 2 fish (catfish) of edible size out of the 6099 observed.

C. HUMAN EXPOSURE PATHWAYS

The contamination of the environmental media previously identified constitute the following potential human exposure pathways:

1. Ingestion, inhalation, and dermal absorption of contaminated soils. Since off-site as well as on-site soils showed contamination, this pathway could be of importance to anyone living near the site as well as on-site. Site access is partially limited by a fence in the area of Kennedy Sand and

Gravel, so this may prevent some exposures to the contaminated soils. In addition, the placement of sod on some residential lots should decrease exposure to contaminated soils.

2. Ingestion and dermal absorption of contaminated ground water. The shallow aquifer and the leaky confining zone in the area have both shown contamination. The RI report indicates that the only three wells in the area used as potable water supply are upgradient of the site. However, because many factors influence the direction of ground water flow and because the wells are very close to the site and have not been tested for contaminants, this will be considered a potential human exposure pathway.

3. Ingestion and dermal absorption of contaminated surface water and sediments. It is unlikely that Wagner Creek would be used as a water recreational area since it is relatively shallow, turbid, and inhabited with poisonous snakes (water moccasins). Since sediments are contaminated and ground water appears to discharge to surface water, it is possible that this mechanism may serve to transport contamination off site. It is unlikely that Wagner Creek would be used as a water recreational area since it is relatively shallow, turbid, and inhabited with poisonous snakes (water moccasins).

4. Ingestion of contaminated biota. No biota were analyzed for chemical contamination. Consumption of contaminated biota could be a human exposure pathway if levels of contamination were of concern to public health.

The reported levels of air contaminants were not of public health concern.

PUBLIC HEALTH IMPLICATIONS

High concentrations of PAHs were detected in surface soil samples from residential yards in the Carver Terrace Subdivision, from the Mt. Zion Missionary Baptist Church yard, and from vacant lots in the subdivision. High concentrations of PAHs were also detected in surface soil from an off-site residential yard and from Kennedy Sand and Gravel Company property.

Skin exposure to PAHs such as anthracene, acridine, or phenanthrene, followed by exposure to sunlight, can produce phototoxic effects such as erythema, urticaria, and burning and itching of the skin. These dermal reactions will usually disappear when contact with the irritant or sensitizer is eliminated.

Exposure to PAHs is also of concern because of the carcinogenicity of some PAHs and PAH mixtures. High concentrations of several carcinogenic PAHs, including benzo(a)pyrene (B(a)p) and benzo(a)anthracene, were detected in surface soil samples from the Carver Terrace Subdivision. In laboratory experiments, PAHs are potent inducers of skin cancer when applied dermally to mice and rats. In addition, PAHs are carcinogenic in animals when ingested, injected, or instilled intratracheally.

Studies of human exposure to PAHs have been conducted among coke plant workers and coal gas production workers. Epidemiological studies of these workers have revealed an association between occupational exposure to combustion products containing PAHs and cancer of the lung, pancreas, kidney, bladder, and skin. Interpretation of these studies is confounded by simultaneous exposure to other combustion products, as well as by additional chemical carcinogenic exposure from cigarette smoking.

Small quantities of PAH-contaminated soil can be ingested by adults during outdoor work activities or by children during play. An additional, potential source of PAHs is the consumption of home-grown vegetables which may contain small quantities of PAHs that have adhered to the surface of the plants or have been taken up from the soil. The health risks associated with exposure to PAHs in soil would vary according to the localized soil concentration of PAHs, the frequency of contact with the contaminated soil, and the type of activity. However, there would be a significant health concern for frequent, long-term contact with the maximum soil concentrations of carcinogenic PAHs that were detected in the Carver Terrace Subdivision.

PAHs can also be absorbed through intact human skin. Human skin is capable of activating PAHs to chemically-reactive intermediates that may be involved in chemical carcinogenesis. The quantity of PAHs absorbed would depend on the area and anatomical location of the exposed skin, the contact time, the dermal permeability of the individual PAHs, etc. Since these parameters are not known, it is not possible to quantify the risks associated with dermally-absorbed PAHs. However, the PAHs absorbed by this pathway could contribute, in an additive fashion, to the risks resulting from the oral ingestion of PAHs.

In 1985 and 1986, several highly contaminated areas in the subdivision were covered with sod or covered with dirt and seeded. The criteria used to select the locations for remediation were: 1) soil concentrations of B(a)p in excess of 325 mg/kg or 2) visibly oil-stained areas or 3) if most of the residential yards in a block were remediated, the remaining yards were also resoded, even if they did not meet the other criteria.

Although some areas with high PAH concentrations were covered during remedial activities, other contaminated areas remain. The remedial action level of 325 mg/kg of B(a)p in residential soil is not sufficiently protective of public health. The excess cancer risk associated with long-term exposure to soil containing this concentration of B(a)p (325 mg/kg), plus other PAHs with carcinogenic initiating and promoting activity, poses a significant health risk.

Since soil contaminant concentrations vary widely throughout the subdivision, it is not possible to estimate potential impacts on public health in those areas where there is no soil sampling data. Thorough monitoring of surface soils in all residential areas is needed in order to identify locations with elevated concentrations of PAHs or other contaminants.

Soil samples from the subdivision were also analyzed for polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF). Of the numerous PCDD and PCDF congeners, 2,3,7,8-tetrachlorodibenzodioxin (TCDD) is the most toxic. Human exposure exposure to TCDD has resulted in an acne-like skin condition called chloracne. In addition, animal experiments have demonstrated that TCDD is a tumor promoter and can cause reproductive failures, developmental toxicity, and impairment of the immune system. It has been suggested that other PCDD and PCDF congeners have toxicities similar to TCDD, although their toxic potencies are relatively less; however, there is little experimental animal data to verify this proposition.

Relatively low concentrations of several PCDDs and PCDFs were detected in soil samples from the Carver Terrace Subdivision. No TCDD was detected, and the only congeners detected were penta, hexa, hepta, and octa species. Based on the data provided to ATSDR, the concentrations of PCDDs and PCDFs in residential soils would not be expected to result in significant adverse public health effects.

During the Remedial Investigation, numerous soil borings were conducted on Kennedy Sand and Gravel property. Analyses of soil samples from these borings detected high concentrations of PAHs in subsurface and surface (0-2 feet) samples. High concentrations of PAHs were also detected in sediment samples from the on-site drainage ditch located south of the former lagoon area. As previously discussed, human contact with soils and sediments containing high concentrations of PAHs could pose significant health concerns for long-term exposure by ingestion and dermal contact. However, the Kennedy Sand and Gravel site is currently inactive and is fenced and posted with warning signs.

No significant contamination of water from Wagner Creek was detected. Sediment samples from several locations in the creek contained low concentrations of PAHs (<1 mg/kg). Higher concentrations of PAHs (<3.6 mg/kg) were detected in Wagner Creek sediment at a point below the confluence of the on-site drainage ditch. It is unlikely that Wagner Creek would be used as a water recreational area since it is relatively shallow, turbid, and inhabited with poisonous snakes (water moccasins). Although occasional human contact with water or sediment from the creek may occur, the reported contaminant concentrations would not be expected to result in a significant impact on human health.

A sampling of fish from Wagner Creek found only 2 fish (catfish) of edible size out of the 6099 observed. Therefore, it is not likely that there is significant consumption of fish from Wagner Creek. However, several contaminants were found in on-site soils that have a significant potential for bioconcentration (e.g., PCDDs, PCDFs, and pentachlorophenol). If fish from Wagner Creek were consumed, the potential exists for exposure to site-related contaminants at levels of public health concern

In 1985, air at the site was monitored for phenols and PAHs. Although low concentrations of the phenolic compounds, pentachlorophenol, 2,4-dinitrophenol, and phenol, were detected, the reported air concentrations of these chemicals would not be expected to pose a significant public health risk. Several other compounds (such as benzene, xylene, styrene, etc.) were present in environmental media at the site but were not analyzed for in the air. Therefore, it cannot be determined whether other site contaminants pose a risk for inhalation exposures. In addition, if remedial activity at the site involves the excavation of buried wastes, appropriate measures should be implemented to prevent the release of contaminants to the ambient air.

The shallow, unconfined aquifer underlying the site is contaminated with high concentrations of PAHs, pentachlorophenol, aromatic hydrocarbons, and other chemicals. Use of this aquifer for potable purposes would pose a significant risk for adverse health effects. However, the Carver Terrace Subdivision is serviced by municipal water which has been tested in the subdivision and shown to be free of contamination. It was reported that there were some private wells located southwest of the site, but the wells have apparently not been tested for contamination. This information would be needed in order to conclusively determine whether use of this groundwater poses a health risk.

CONCLUSIONS AND RECOMMENDATIONS

Based on the information reviewed, ATSDR has concluded that 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 Public Health Implications section, significant human exposures may be occurring via the ingestion and dermal absorption of PAHs in surface soils. Future consumption of contaminants in ground water poses another exposure pathway of potential concern.

In order to protect public health, ATSDR recommends the following:

1) Continue to restrict access to Kennedy Sand and Gravel property in order to prevent human exposure to contaminants in soil and other environmental media until remediation of the site is complete.

2) Soil samples should be collected from all residential lots, play areas, vacant lots, and other areas with unrestricted access. These samples should be analyzed for carcinogenic and non-carcinogenic PAHs. Particular attention should be placed on those areas where former wood treatment activities would have enhanced the potential for soil contamination. Appropriate remediation should be implemented in those areas containing unacceptably high concentrations of contamination.

3) Based on an extensive fish sampling study, there does not appear to be a significant game fish population in Wagner Creek. However, contaminants which have a high bioaccumulative potential were detected on the site. It is therefore recommended that if fish and other biota from Wagner Creek are being consumed, they should tested to determine whether they contain significant levels of contamination.

4) Provide adequate personal protective equipment, as required by the Occupational Safety and Health Administration (OSHA), to remedial workers who may be exposed to on-site contamination. Require remedial workers to follow all applicable OSHA regulations and National Institute for Occupational Safety and Health recommendations. Conduct real-time air monitoring during remedial activities to ensure that workers and nearby residents are not exposed to unacceptable levels of chemicals released to the air during the excavation of contaminated materials.

5). Because of the potential for off-site migration of contaminated ground water, it is recommended that residents in potentially-impacted areas use the available municipal water supply. If private wells are used as a potable water supply, the wells should be monitored for chemical contamination.

In accordance with CERCLA as amended, the Koppers Texarkana site has been evaluated for appropriate follow-up with respect to health effects studies. Since exposure to site contaminants may be occurring via direct contact, this site is being considered for a possible health study. Once the site is discussed with the ATSDR Regional Representative and the Texas health officials, and is reviewed with laboratory experts to determine if a laboratory test is available, the Epidemiology and Medicine Branch will make recommendations about a possible study.

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REFERENCES

1. Final Remedial Investigation Report, Koppers Texarkana Site, Volumes I-IV, ERT, A Resource Engineering Company, April 1988.

APPENDICES

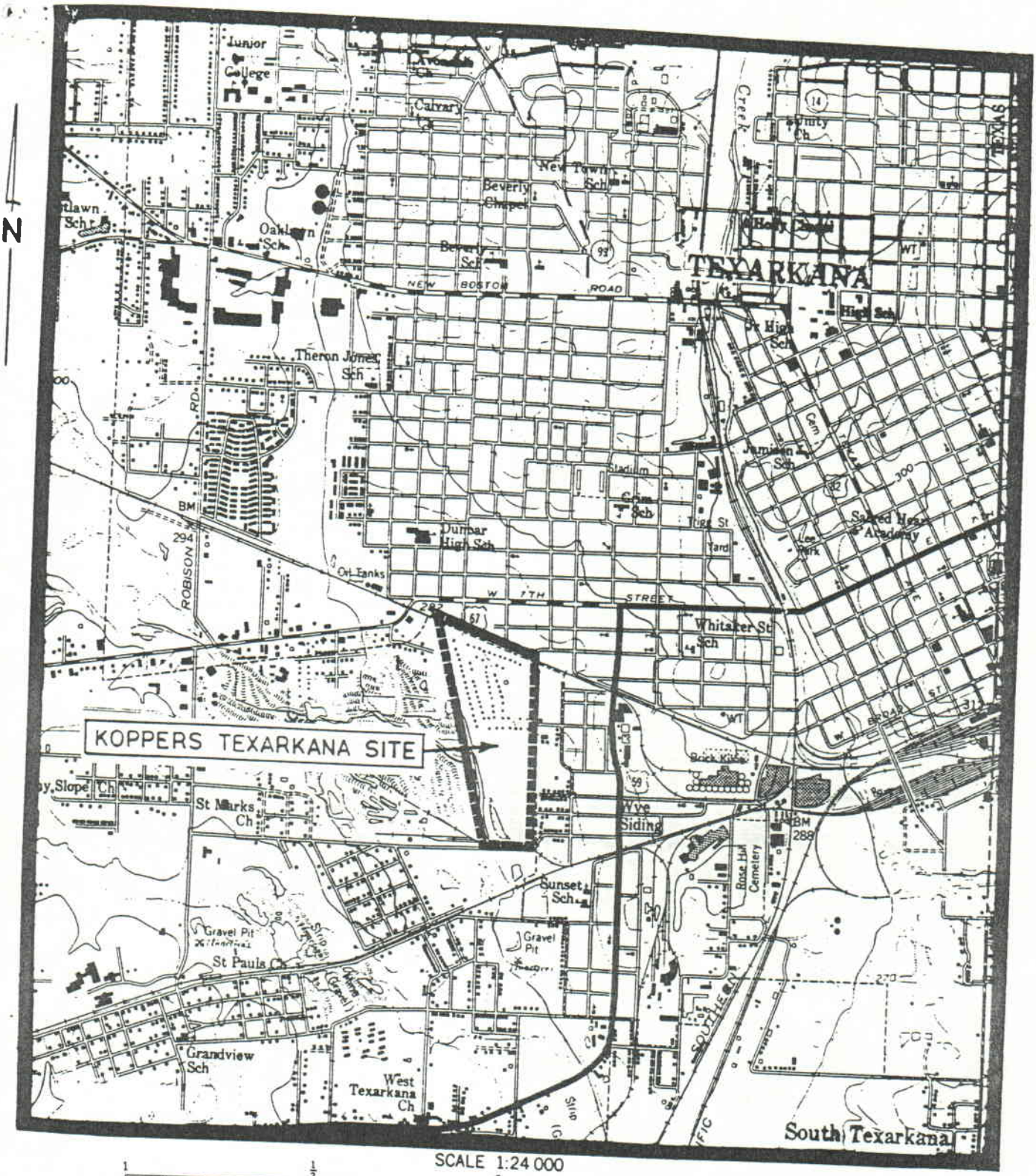

FIGURE 1-2: Location of Koppers Texarkana Site within Texarkana 7.5 Minute Quadrangle.