

Health Consultation

COX ROAD DUMP SITE

DAYTON, LIBERTY COUNTY, TEXAS

EPA FACILITY ID: TXD987987179

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation 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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HEALTH CONSULTATION

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EPA FACILITY ID: TXD987987179

Prepared by:

Texas Department of State Health Services
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry



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Purpose and Statement of Issues

The Texas Department of State Health Services (DSHS) evaluated the potential for contaminants from the Cox Road Dump Site to pose a public health hazard to people living nearby. This was done in response to a request from the US Environmental Protection Agency (EPA)/Region 6. In response to community concerns received during an August 2003 public meeting, EPA collected source area samples from the site. EPA also collected surface water and sediment samples from drainage ditches to assess whether contaminants from the Cox Road Dump Site have migrated offsite. Soil samples were collected from residential yards and the Texas Commission on Environmental Quality (TCEQ) tested public water supplies and residential water wells in the vicinity (Note: Appendix A lists abbreviations and acronyms used in this report).

Background

Site Description and History

The Cox Road Dump Site (also known as Liberty Waste Disposal Landfill [1]) is an 80-acre, abandoned industrial waste dump/landfill that was capped during the early 1980s [2]. The property is located in Liberty County southwest of Dayton, Texas. It is one mile north of Farm to Market Road (FM) 1413 along the west side of Cox Road (Figure 1). A county ditch cuts north-south through the site and carries runoff southward and away from the site. The runoff enters the “Big Ditch” along FM 1413 south of the site and is carried east-southeast to the west prong of the Old River, a distance of approximately 2 miles [3]. The site has limited public access. Although a gate and warning signs have been installed on the east side of the property along Cox Road, the property is still accessible for people to walk onto the Cox Road Dump Site.

The preliminary assessment of the Cox Road Dump Site prepared in June 1990 by EPA’s contractor Ecology and Environment described the surrounding area as being prone to flooding and mainly used for oil fields [4]. Oily liquid waste and black sludge were evident at the site, however, because there were no drinking water wells near the site and because very few people lived in the area, additional follow-up on this site was not conducted [4].

In November and December 2002, TCEQ conducted a case development investigation to completely review the management of solid wastes at the Cox Road Dump Site [2]. During site visits, TCEQ took photographs documenting exposed sludge/waste on the surface, distressed vegetation, rusted drums, and jars of oily liquid/material [2]. Oily sludge collected from the site on November 15, 2002 had total petroleum hydrocarbon levels of 30,400 to 892,000 mg/kg. Other analytes detected were benzoic acid, acetone, 2-hexanone, 4-methyl-2-pentanone, methylethylketone, and phenol [2]. During a site visit on December 17, 2002, six soil samples and two surface water samples were collected on the site.

Test results for these samples were compared to Texas Risk Reduction Program (TRRP) Tier 1 soil to groundwater contamination protective concentration levels (PCL) for 30 acre source area [2]. Arsenic, barium, lead, and phenol were detected above the TRRP PCL in at least one soil sample. No contaminants of concern were detected above laboratory reporting limits in any of

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the water samples. The TCEQ recommended an environmental risk and health hazard assessment be conducted [2].

On December 13, 2002, TCEQ staff conducted a removal assessment of the site [3]. Erosion of the cap had occurred such that sludge, tar, and jars of waste were visible on the ground throughout the site. It was then noted that since the preliminary assessment conducted in 1990, the surrounding area had grown from being populated by very few people to having a small residential development that had been built within ½ mile west and south of the site. Additionally, some residents of this new development obtained their drinking water from private drinking water wells [3].

In August 2003, TCEQ staff and EPA contractors collected samples as a part of the Integrated Assessment conducted by the EPA at the abandoned Cox Road Dump Site, as well as to determine if contaminants had migrated off the site [5]. Sediment and surface water samples were collected from the county ditch that drained the site. Soil samples were collected from the new residential development and drinking water from area water systems was analyzed [5]. Because these results give an indication of the potential risk to human health, they are the focus of this health consultation.

During community meetings on August 26, 2003 and January 29, 2004, numerous individuals reported to DSHS staff that the area was prone to flooding. This also had been documented in the December 2002 removal assessment in which the TCEQ staff observed that stormwater runoff trenches along the perimeter of the site were overflowing into adjacent drainage ditches [3].

In August 2004, the TCEQ completed a hazard ranking system documentation record [1]. The groundwater pathway and soil exposure pathway were deemed to be pathways of concern. Soil and shallow groundwater samples were collected on site and at one background location [1]. Sampling results for the groundwater will be presented in the Public Health Implications section of this consult. There were a number of contaminants in the soil samples with concentrations at levels three times the background, however, these soil samples were collected at depths of more than five feet [1]. Soil samples from depths of 0-1 inch are generally used to determine human health risk because this is the soil with which humans are likely to come into contact. Due to sampling results of on-site groundwater and soil, the TCEQ proposed the Cox Road Dump Site to the Texas Superfund list in February of 2006 [6].

In November 2005, DSHS staff inspected the site for damage due to Hurricane Rita but found no visible hurricane damage. The landscape of the site, however, had changed drastically from pictures taken in 2002. Pictures taken in 2002 showed barren land with exposed soil throughout the site (Figure 2). In 2005, the site was completely overgrown with low vegetation. Areas with exposed sludge material were still present and had a petroleum smell, but vegetation had grown up to the sludge and in some cases was growing out of the sludge (Figure 3).

Environmental Sampling

The environmental data evaluated in this report were collected by TCEQ staff and by EPA-contractors in August of 2003 as a part of the Integrated Assessment [5]. Twelve soil samples

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were collected from the residential areas. Two surface water and twelve sediment samples were collected from the county ditch that drains the site. Five on-site source area samples also were collected at this time. All samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and metals.

To respond to community concerns about the quality of area drinking water, the TCEQ collected and tested drinking water samples in July and August of 2003. Drinking water samples were collected from public water systems¹ and from non-public water systems² as well as from residential water wells³. A total of 14 water systems were tested for VOCs, SVOCs, minerals, metals, and radiochemicals.

For this consultation, DSHS/ATSDR relied on the information provided in the referenced documents and assumed adequate quality assurance/quality control (QA/QC) procedures were followed with regard to data collection, chain-of-custody, laboratory procedures, and data reporting.

Community Health Concerns

During TCEQ's removal assessment of the Cox Road Dump Site in December 2002, residents reported that a child from the nearby residential development had wandered onto the site and the soles of his shoes had deteriorated since he had been at the site [3].

During the public meetings in August 2003 and January 2004 residents reported:

- A nine month old experiencing vomiting and having blood in her stool and urine
- A two year old losing her hair and experiencing illness from boils up and down her back
- People experiencing skin rashes
- Muscle spasms
- "High levels of arsenic in blood and/or urine"
- Concerns about dove hunting across the road from the site – Citizens were concerned that flooding in the area may have led to the hunting area being contaminated and that hunters may be exposed to contaminants in the soil while hunting. They also were concerned that dust from the site may result in contaminants being air-borne and that hunters would be exposed to contaminants from the site in the air. Additionally, citizens were concerned that the doves may have elevated levels of contaminants in their tissues and thus be unsafe for human consumption.

Pathways Analysis

The presence of chemical contaminants in the environment does not always result in exposure to or contact with the chemicals. Because chemicals have the potential to cause adverse health effects only when people actually come into contact with them, it is exposure (the contact that

T1 Cedar Creek, Cedar Estates, Fairfield Estates, Indian Springs, Meadow Glen, Peterson Place, and Whitewing Subdivision

2 City of Dayton Transfer Station, Huntsman Petrochemical, Phoenix Hydrocarbon Plant

3 Two residential wells in the Arrondale Subdivision; two residential wells in the subdivision north of Cox Rd landfill

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people have with the contaminants) that determines the public health implications of chemical contaminants.

To determine whether people are exposed to site-related contaminants, investigators evaluate the environmental and human components leading to human exposure. This analysis consists of evaluating the five elements of an exposure pathway:

- a source of contamination
- transport through an environmental medium
- a point of exposure
- a route through which the contaminant can enter the body
- a population

Exposure pathways can be complete, potential, or eliminated. For a person to be exposed to a contaminant, the exposure pathway must be complete. An exposure pathway is considered complete when all five elements in the pathway are present and exposure has occurred, is occurring, or will occur in the future. A potential pathway is missing at least one of the five elements but could be complete in the future. An eliminated pathway is missing one or more elements and will never be completed.

Soil

The site is generally inaccessible. Although there have been anecdotal reports of past trespassing on the site, due to the remoteness of the site adults are not likely to routinely frequent the site, or allow children to play on the site. Exposure to on-site soil is a potential exposure pathway because although a point of exposure is currently missing, the pathway may be complete in the future. A worst-case scenario analysis was used to calculate estimated exposure doses and to determine the potential health effects associated exposure to contaminants in on-site soil.

Exposure to residential soil is a potential exposure pathway because although transport of contaminants from the site to residential soil is currently missing, the pathway may be complete in the future. Estimated exposure doses were calculated as necessary to determine the potential health effects associated with exposure to contaminants in residential soil.

Sediment

It is not likely that children or adults will have contact with ditch sediment. Exposure to ditch sediment is a potential exposure pathway because although a point of exposure is currently missing, the pathway may be complete in the future. A worst-case scenario analysis was used to calculate estimated exposure doses and to determine the potential health effects associated with exposure to contaminants in ditch sediment.

Surface Water

It is not likely that children or adults will have contact with ditch surface water. Exposure to ditch surface water is a potential exposure pathway because although a point of exposure is currently missing, the pathway may be complete in the future. A worst-case scenario analysis was used to calculate estimated exposure doses and to determine the potential health effects associated with exposure to contaminants in ditch surface water.

Groundwater

Public water systems as well as private wells are present in the area. The hydrogeologic setting for the Cox Road Dump Site was described in the Integrated Assessment [5]. Potable groundwater in the area is pumped from the Chicot and Evangeline aquifers. The Chicot aquifer is approximately 175 to 400 feet below ground surface and extends to 400 to 1,900 feet below ground surface. The Evangeline aquifer underlies the Chicot aquifer and extends to approximately 1,000 to 5,900 feet below ground surface. The Chicot-Evangeline aquifer system is overlain by the Beaumont Formation, a clayey soil formation approximately 100 feet thick in this area. Shallow groundwater is not anticipated to be connected to deeper groundwater and contaminants are not likely to pass through the Beaumont Formation and enter the deeper, usable groundwater [5]. Therefore, shallow groundwater has been eliminated as a pathway of concern.

Potable groundwater is a potential exposure pathway because although transport of contaminants from the site to potable (deep) groundwater is currently missing, the pathway may be complete in the future. Estimated exposure doses were calculated as necessary to determine the potential health effects associated with exposure to contaminants in drinking water.

Biota

Residents were concerned about the potential to be exposed to site contaminants by eating doves that may have elevated levels of contamination. No biota data are available for the site, however, it is considered unlikely that doves feed in the contaminated areas on the site to result in elevated levels of contaminants.

Air

Exposure to site contaminants via inhalation of air is considered a potential pathway due to the lack of data. Transport through an environmental media to air is unknown.

Discussion

The presence of chemical contaminants in the environment does not always result in exposure to or contact with the chemicals. Chemicals have the potential to cause adverse health effects only when people actually come into contact with them through a complete exposure pathway. Pathway analysis of the Cox Road Dump Site indicated that there are no complete exposure pathways for residents in the surrounding neighborhoods to be exposed to site contaminants. There are, however, several potential exposure pathways that may be complete if residents wander onto the site or if contaminants migrate off the site over time. In this health consultation, a worst-case scenario analysis was used to calculate estimated exposure doses and to determine the potential health effects associated with exposure to contaminants if these potential exposure pathways are completed.

To assess the potential health risks that may be associated with the contaminants found in the various media (residential soil, sediment and surface water from the ditch along the site, waste from the site, and drinking water), we compared each contaminant detected with its health-based assessment comparison (HAC) value for non-cancer and cancer endpoints. These values are guidelines that specify levels of chemicals in specific environmental media (soil, air, and water) that are considered safe for human contact with respect to identified human endpoints. Non-



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cancer screening values are generally based on ATSDR's minimal risk levels (MRLs)⁴ and EPA's reference doses (RfDs)⁵. Both of these are based on the assumption that there is an identifiable exposure threshold (both for the individual and for populations) below which there are no observable adverse effects. Thus, MRLs and RfDs are estimates of daily exposures to contaminants that are unlikely to cause adverse non-cancer health effects even if exposure occurs for a lifetime. The cancer risk comparison values used in this consultation are based on EPA's chemical-specific cancer slope factors (CSFs)⁶.

Exceeding either a non-cancer or a cancer screening value does not necessarily mean that the contaminant will cause harm; however, it does suggest that potential exposure to the contaminant warrants further consideration. Factors that influence whether exposure to a contaminant could or would result in adverse health effects include: how much of the contaminant an individual is exposed to, how often and how long they are exposed, and the manner in which the contaminant enters or contacts the body. Once exposure occurs, characteristics such as age, sex, nutritional status, genetics, lifestyle, and health status all may influence how well the individual absorbs, distributes, metabolizes, and excretes the contaminant.

We assessed the public health significance of contaminants that exceed screening values by reviewing and integrating relevant toxicological information with plausible exposure scenarios. We used a weight-of-evidence approach to determine the public health significance of the contaminants that exceed the screening values.

For contaminants that warrant further consideration, we use standard assumptions for body weight (15 kg, child; 70 kg, adult) and soil/sediment incidental ingestion rates (200 mg per day, child; 100 mg per day, adult) or water ingestion rates (1 L per day, child; 2 L per day, adult) to determine estimated exposure doses. When possible, for non-cancer endpoints, estimated exposures are compared to known effect levels in humans or to documented No Observed Adverse Effect Levels (NOAEL) and/or Lowest Observed Adverse Effect Levels (LOAEL) in humans or animals.

Soil pica behavior (ingestion of more than 1.0 g⁷ of soil per day) may occur in a sizable portion of children [7]. While an individual child may exhibit pica behavior infrequently, the behavior is not limited to a small subset of the population. It has been estimated that about 62% of children will ingest >1.0 g of soil on 1-2 days/year. Additionally, 42% of children will ingest >5 g of soil and 33% will ingest >10 g of soil on 1-2 days per year. For some contaminants, periodic pica episodes potentially could result in acute intoxication [7].

⁴ An MRL is a contaminant specific exposure dose below those which might cause adverse health effects in the people most sensitive to such chemical-induced effects. MRLs generally are based on the most sensitive chemical-induced end point considered to be of relevance to humans.

⁵ An RfD is an estimate (with a level of uncertainty from 10 to 1000 times below the level of harmful effects) of a daily exposure to the human population (including sensitive groups) that is likely to be without appreciable risk of deleterious effects during a lifetime.

⁶ A CSF is an estimate of excess lifetime risk of one cancer in one million (1×10^{-6}) exposed people and an exposure period of 70 years.

⁷ 1 g is equal to 1,000 mg (about the same size as a pack of artificial sweetener)

Public Health Implications

Most contaminants in all media evaluated were at levels below the detection limit of the analytical instrument. For some contaminants, however, the detection limit exceeded health-based comparison values. For these contaminants, it is not possible to determine the potential for adverse health effects unless further sampling and analysis using more sensitive methods is conducted. Therefore, the focus of this health consultation was on those contaminants in which at least one sample had levels above the detection limit and those contaminants in which the HAC value was exceeded in one or more samples.

Residential Soil

Six surface soil samples from residential yards were collected by TCEQ staff on August 13, 2003. EPA contractors collected an additional six surface soil samples from yards on August 27th and 28th, 2003. Arsenic, aluminum, and vanadium were found above their respective HAC values (Tables 1 and 2). Although arsenic exceeded the cancer risk evaluation guide (CREG) in 11 of the 12 residential soil samples, all soil sample results were within the range of normal background concentrations of arsenic for the area. Thus, we do not expect arsenic in the soil to pose a risk any different than in other areas of this part of the United States [8]. Moreover, the risk of a cancer or non-cancer adverse health effect at normal background levels is low.

Aluminum and vanadium exceeded their respective environmental media evaluation guide (EMEG) for intermediate duration of exposure (15 days to 1 year) for children exhibiting pica behavior. However, concentrations of both of these were within the ranges of normal background levels for this part of the United States [8] and below those levels that have been shown to cause adverse health effects. Thus, we do not expect aluminum and vanadium in the soil to pose an additional health risk to children or adults.

Methyl acetate was present in soil samples at low levels (0.01 mg/kg). Although no comparison values are available to assess the potential for adverse health effects due to exposure to methyl acetate, adverse health effects generally occur after exposure to much higher concentrations. Therefore, exposure to contaminants in the surface soil of residential yards poses no apparent public health hazard.

Ditch Sediment

Sediment samples were collected from ditch locations both upstream and downstream of the Cox Road Dump Site. Aluminum, arsenic, cobalt, vanadium, and benzo(a)pyrene were found above their respective HAC values (Table 3). There is no MRL, LOAEL, or NOAEL available for benzo(a)pyrene to compare to estimated exposure doses. Using the maximum concentration of the contaminants in the ditch sediment samples and standard assumptions for body weight and a worst-case scenario for sediment ingestion, children consuming 5 g of sediment daily would be exposed to levels of cobalt well below the intermediate-duration oral MRL (0.01 mg/kg/day) and thus adverse health effects are not likely to occur. Estimated exposure doses for aluminum and vanadium exceeded their respected MRL (2 mg/kg/day and 0.003 mg/kg/day) for children exhibiting pica behavior. However, the exposure doses were well below the NOAEL in animals (62 mg/kg/day for aluminum and 0.3 mg/kg/day for vanadium), thus it is not likely that adverse health effects will occur. Estimated exposure doses for children consuming 5 g of ditch sediment

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at least twice per week exceed the NOAEL for arsenic of 0.0008 mg/kg/day based upon dermal effects in humans exposed to arsenic in well water. The likelihood of such an exposure occurring is remote, thus exposure to contaminants in the ditch sediment poses no apparent public health hazard.

On-site Source Waste

Five on-site source/waste samples were collected and analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Aluminum, arsenic, copper, vanadium, zinc, Aroclor-1242, Aroclor-1254, toluene, and bis(2-ethyl hexyl)phthalate exceeded their respective HAC value (Table 4). Using the maximum concentration of each of these contaminants in the source waste samples and standard assumptions for body weight and a worst-case scenario for source waste ingestion, ingestion of 50 mg of the source could result in non-cancer adverse health effects in children and adults due to elevated levels of Aroclor-1242 and Aroclor-1254. This is based upon the LOAEL of 0.005 mg/kg/day for immunological effects in adult monkeys that were evaluated after 23 and 55 months of exposure to Aroclor 1254 [9]. We do not consider this to be a plausible exposure scenario since adults are not likely to be on the site or allow children to play on the site frequently enough to have contact with the source waste. Chloromethane, chloroethane, methyl acetate, 2-methyl-2-pentanone, and 2-hexanone were contaminants that were above the detection limit in at least 1 source area sample; however, no comparison value is available in order to determine the potential for adverse health effects for these contaminants. Since these contaminants were present on-site, and since it is not likely that children and adults will come into frequent contact with them, on-site source waste poses no apparent public health hazard.

As shown in Tables 1-6, concentrations of some contaminants exceeded the CREG for that contaminant. These contaminants were further evaluated to determine the theoretical excess increased lifetime risk for developing cancer. From the samples analyzed for this health consultation, exposure to concentrations of Aroclor-1242 and Aroclor-1254 from the source waste could result in a moderate to high increased risk for the development of cancer. As mentioned previously, we do not expect children and adults to spend enough time on-site having contact with the source waste for this to be a likely possibility.

Ditch Surface Water

One ditch surface water sample was collected on-site and one surface water sample was collected from the county ditch downstream (south) of the site. Arsenic, iron, and manganese were the only contaminants to exceed their respective HAC values. Using the maximum concentration of each of these contaminants in the ditch surface water samples and standard assumptions for body weight and a worst-case scenario of water ingestion, children consuming 3 L of the ditch surface water daily would be exposed to levels of arsenic well below the NOAEL based on human studies. There is no LOAEL or NOAEL available for iron to compare to estimated exposure doses. Children would have to ingest 2.5 L of ditch surface water at least 6 days a week to be exposed to manganese levels exceeding the chronic oral RfD. Since children are not likely to drink large amounts of water from this ditch, exposure to the ditch surface water is not likely to result in adverse health effects.

Drinking Water

Drinking water was evaluated from 14 water systems in the areas surrounding the Cox Road Dump Site. The TCEQ found that the water was safe for drinking and other household uses. Using health assessment guidelines set forth by ATSDR, fluoride, arsenic, bromoform, bromodichloromethane, and dibromochloromethane exceeded their respective HAC values. Additionally, chloride and iron exceeded EPA's secondary drinking water standards (Tables 6), however, secondary drinking water standards are based upon aesthetic quality of water (taste, odor, staining). Fluoride exceeded the EMEG for chronic duration of exposure (more than 1 year) for children in half of the drinking water samples. Communities routinely fluoridate their water supplies and the optimum range of fluoridation is 700-1,200 µg/L. Three of the drinking water samples were slightly higher than this optimum range, but were less than the maximum amount of fluoride allowed in drinking water by EPA (4,000 µg/L) [10]. Using the maximum concentration of contaminants in the drinking water samples and standard assumptions for body weight and a worst-case scenario for drinking water ingestion, children consuming up to 3 L of the water daily would be exposed to levels well below the NOAEL (based on human studies) for arsenic and to levels well below the respective MRLs for bromoform, bromodichloromethane, and dibromochloromethane. Sulfur dioxide was a tentatively identified compound in some drinking water samples. There are no currently no screening values for sulfur dioxide because data on oral exposure to sulfur dioxide are insufficient and oral exposure is not a clinically relevant route of exposure to sulfur dioxide in humans [11]. Sulfur dioxide is generally present as a gas, and the general public is exposed to sulfur dioxide by breathing contaminated air. Releases of sulfur dioxide to water are not required to be reported to the Toxics Release Inventory, and data on levels of sulfur dioxide measured or estimated in water are not available [11]. Overall, exposure to contaminants in drinking water would not likely result in adverse health effects.

Groundwater

On-site groundwater samples collected and analyzed in August 2004 indicated there were elevated levels of some contaminants. Although the samples showed that groundwater had been affected, these samples were from shallow groundwater monitoring wells (approximately 20 feet below ground surface), and shallow groundwater is not typically used for drinking water. Shallow groundwater is not a reliable source for drinking water since it may not be present during droughts and because it generally has elevated levels of minerals. Deeper wells (at least 50 feet below ground surface) are usually used for drinking water purposes because they are not as likely to go dry during a drought and contaminants are less likely to be present in the water. Shallow groundwater was eliminated as an exposure pathway.

Air

Although quantitative air sampling was not conducted as a part of the Integrated Assessment, limited air monitoring was conducted during site visits and during sample collection. Using field screening equipment, there was no evidence of release of contaminants to air [5].

Community Health Concerns

As mentioned previously, the community had a number of health concerns related to potential exposure to contaminants from the Cox Road Dump Site. Although we did not find levels of contaminants that would result in adverse health effects, or completed exposure pathways to

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contaminated areas, there may be individuals who are more sensitive to chemicals than are the general public. Preventing access to the site might discourage children from wandering onto the site and playing in areas that are contaminated (such as the on-site source waste). It does not appear that contamination has migrated off the site into areas that may be used for dove hunting. Additionally, doves are not likely to feed in the contaminated areas on the site or spend enough time on the Cox Road Dump Site to result in the dove tissues having elevated levels of contaminants.

Child Health Considerations

In communities faced with air, water, or food contamination, children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. Sufficient exposure levels during critical growth stages can sustain permanent damage to the developing body systems of children. Children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health.

We evaluated the likelihood for children living in the vicinity of the Cox Road Dump Site to be exposed to site contaminants at levels of health concern. Currently, children are not likely to be exposed to contaminants from the site both because of its distance from residential areas as well as its limited access to the public. The maximum concentrations of arsenic (a contaminant of particular concern to some community members) measured in residential yard soils were comparable to background levels of arsenic in the area and therefore would not be expected to pose a risk different from other areas. The drainage ditch, debris, and other materials hidden by tall vegetation could pose a physical hazard to small children if they were to trespass on the site; however, the likelihood of this occurring seems low.

Conclusions

1. Results from residential surface soil samples indicated levels of arsenic, aluminum, and vanadium above health-based screening values. However, concentrations of these were within the range of normal background concentrations for this area of the United States. Thus, exposure to contaminants in the surface soil poses **no apparent public health hazard**.
2. Children and adults are not likely to consume ditch sediment and surface water at levels that would result in adverse health effects. Therefore, exposure to contaminants in the ditch sediment and surface water **poses no apparent public health hazard**.
3. Trespassing has occurred in the past but site access is currently somewhat limited. Children and adults are not expected to have sufficient exposures to on-site wastes containing PCBs (Aroclor 1242 and Aroclor 1254) to result in increased risks for non-cancer or cancer adverse health effects. Thus, exposure to contaminants in the on-site source waste **poses no apparent public health hazard**.
4. The shallow groundwater contains elevated levels of contaminants, but there are no known household uses of shallow groundwater in the area. Thus, we expect contaminants in the shallow groundwater to **pose no public health hazard**. Contaminants are not likely to pass through the Beaumont Formation and enter the deeper groundwater used for household purposes. Samples of area drinking water indicated that it is safe for consumption, and household uses such as cooking and bathing.

Recommendations

1. There are concentrations of contaminants in on-site wastes that may result in adverse health effects following prolonged exposure. While adults are not likely to be on the site, or allow children to play on the site, trespassing has occurred in the past and the limited access restrictions are not likely to keep trespassers off the site unless additional actions are implemented. Restrict access to prevent people from wandering or trespassing onto the site.
2. Environmental agencies should continue plans to ensure contaminants do not leave the site and that the public is protected from potential exposure.
3. If warranted, the DSHS and ATSDR will review additional data as it becomes available and work with environmental agencies to address community concerns.



Public Health Action Plan

Actions Completed

1. The TCEQ presented their sampling results to the residents at public meetings in August 2003 and January 2004.
2. The TCEQ also provided results of sampling from private drinking water wells to the residents as it became available.
3. The DSHS further evaluated the data collected from residential surface soil, ditch sediment, on-site source waste, ditch surface water, and drinking water samples collected in 2003 and on-site shallow groundwater samples collected in August 2004.
4. The TCEQ proposed the Cox Road Dump Site to Texas Superfund registry in February 2006.

Actions Planned

1. The DSHS and ATSDR will work with environmental agencies to address community concerns.
2. The DSHS will attend a TCEQ public meeting regarding listing the Cox Road Dump Site as a state superfund site on March 16, 2006.

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Certification

This public health consultation on the Cox Road Dump Site in Dayton, Liberty County, Texas was prepared by the Texas Department of State Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methods and procedures existing when the time the public health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

Technical Project Officer, CAT, SPAB, DHAC, ATSDR

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

Team Lead, CAT, SPAB, DHAC, ATSDR

Appendix A: Acronyms and Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CREG	Cancer Risk Evaluation Guide
CSF	Cancer Slope Factor
DSHS	Texas Department of State Health Services
EMEG	Environmental Media Evaluation Guide
EPA	Environmental Protection Agency
FM	Farm to Market Road
g	gram
HAC	Health Assessment Comparison
kg	kilogram
L	liter
LOAEL	Lowest Observable Adverse Effect Level
LTHA	Lifetime Health Advisory
mg	milligrams
mg/kg	milligrams per kilogram
MRL	Minimal Risk Level
ND	not detected
NOAEL	No Observable Adverse Effect Level
µg/L	micrograms/liter
PCB	polychlorinated biphenyl
PCL	Protective Concentration Level
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RMEG	Reference Dose Media Evaluation Guide
SVOC	semi-volatile organic compounds
TCEQ	Texas Commission on Environmental Quality
TRRP	Texas Risk Reduction Program
VOC	volatile organic compounds

Appendix B: Figures

Figure 1. Aerial view of the Cox Road Dump Site produced by TCEQ [12].



Cox Road Dump Site

Figure 2. Landscape at the Cox Road Dump Site. Picture taken by TCEQ staff on November 15, 2002 [2].



Figure 3. Landscape at the Cox Road Dump Site. Picture taken by DSHS staff on November 29, 2005.



Appendix C: Tables

Table 1. Contaminants that exceeded HAC values in residential soil samples collected 8/13/2003 in the vicinity of the Cox Road Dump Site. All other contaminants were below the detection limit or, if detected, below the HAC value.

Contaminant	Concentration Range (mg/kg)	# Detected/ # Samples Collected	# Samples that exceed HAC value	HAC value (mg/kg)
Arsenic	0.566-1.62 [#]	6/6	6	0.5 (CREG)

[#] Contaminant concentrations are within the ranges of background concentrations for the area [8].

Table 2. Contaminants that exceeded HAC values in residential soil samples collected 8/26-27/2003 in the vicinity of the Cox Road Dump Site. All other contaminants were below the detection limit or, if detected, below the HAC value.

Contaminant	Concentration Range (mg/kg)	# Detected/ # Samples Collected	# Samples that exceed HAC value	HAC value (mg/kg)
Aluminum	3,870-11,700 [#]	6/6	5	4,000 (pica child intermediate EMEG)
Arsenic	ND-6.6 [#]	5/6	5	0.5 (CREG)
Vanadium	12.2-64.3 [#]	6/6	6	6 (pica child intermediate EMEG)

[#] Contaminant concentrations are within the ranges of background concentrations for the area [8].

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Table 3. Contaminants that exceeded HAC values in ditch sediment samples collected 8/26-27/2003 in the vicinity of the Cox Road Dump Site. All other contaminants were below the detection limit or, if detected, below the HAC value.

Contaminant	Concentration Range (mg/kg)	# Detected/ # Samples Collected	# Samples that exceed HAC value	HAC value (mg/kg)
Aluminum	3,410-7,850	12/12	10	4,000 (pica child intermediate EMEG)
Arsenic	ND-9.4	3/12	3	0.5 (CREG)
Cobalt	3-21.5	12/12	2	20 (pica child intermediate EMEG)
Vanadium	12.7-44.6	12/12	12	6 (pica child intermediate EMEG)
Benzo(a)pyrene	ND-0.12	1/12	1	0.1 (CREG)

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Table 4. Contaminants that exceeded HAC values in source area samples collected 8/26/2003 in the vicinity of the Cox Road Dump Site. All other contaminants were below the detection limit or, if detected, below the HAC value.

Contaminant	Concentration Range (mg/kg)	# Detected/ # Samples Collected	# Samples that exceed HAC value	HAC value (mg/kg)
Aluminum	455-12,700	5/5	3	4,000 (pica child intermediate EMEG)
Arsenic	3.2-11.6	5/5	5	0.5 (CREG)
Copper	2.1-56.4	5/5	1	20 (pica child acute/intermediate EMEG)
Vanadium	ND-23.2	4/5	3	6 (pica child intermediate EMEG)
Zinc	119-3220	5/5	3	600 (pica child intermediate EMEG)
Aroclor-1242	ND-5.03	1/5	1	0.4 (CREG-PCBs)
Aroclor-1254	ND-0.767	1/5	1	0.06 (pica child intermediate EMEG) and 0.4 (CREG-PCBs)
Toluene	ND-45.3	3/5	1	40 (pica child intermediate EMEG)
Bis(2-ethyl hexyl)phthalate	ND-308	1/5	1	50 (CREG) and 200 (pica child intermediate EMEG)

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Table 5. Contaminants that exceeded HAC values in ditch surface water samples collected 8/25/2003 in the vicinity of the Cox Road Dump Site. All other contaminants were below the detection limit or, if detected, below the HAC value.

Contaminant	Concentration Range (µg/L)	# Detected/ # Samples Collected	# Samples that exceed HAC value	HAC value (µg/L)
Arsenic	ND-3.1	1/2	1	0.02 (CREG) and 3 (child chronic EMEG/child RMEG)
Iron	ND-684	1/2	1	300 (EPA secondary drinking water standard)
Manganese	14.1 and 358	2/2	1	300 (LTHA)

Table 6. Contaminants that exceeded HAC values in drinking water samples collected 7/10-10/2/2003 in the vicinity of the Cox Road Dump Site. All other contaminants were below the detection limit or, if detected, below the HAC value.

Contaminant	Concentration Range (µg/L)	# Detected/ # Samples Collected	# Samples that exceed HAC value	HAC value (µg/L)
Chloride	30,000-396,000	22/22	1	250,000 (EPA secondary drinking water standard)
Fluoride	100-1,800	22/22	11	500 (child chronic EMEG)
Arsenic	ND-3	2/21	2	0.02 (CREG) and 3 (child chronic EMEG/child RMEG)
Iron	ND-2,820	11/21	1	300 (EPA secondary drinking water standard)
Bromodichloromethane	ND-13	7/24	7	0.6 (CREG)
Dibromochloromethane	ND-11	7/24	7	0.4 (CREG)
Bromoform	ND-4.4	6/24	1	4 (CREG)