Health Consultation

PUBLIC COMMENT RELEASE

Neighborhood Investigation

RIVERSIDE AGRICULTURAL PARK PETITION
RIVERSIDE, CALIFORNIA

Prepared by the
California Department of Public Health

JULY 25, 2019

COMMENT PERIOD ENDS: SEPTEMBER 23, 2019

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 document is being released for a 60-day public comment period. Subsequent to the public comment period, ATSDR or ATSDR's Cooperative Agreement Partner will address all public comment and revise or append the document as appropriate. The health consultation will then be reissued.

You may contact ATSDR toll free at
1-800-CDC-INFO
or
visit our home page at: https://www.atsdr.cdc.gov

HEALTH CONSULTATION

Public Comment Release

Neighborhood Investigation

RIVERSIDE AGRICULTURAL PARK PETITION
RIVERSIDE, CALIFORNIA

Prepared by the
California Department of Public Health
Site Assessment Section
under a Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
Division of Community Heath Investigations
Atlanta, Georgia 30333

This health consultation will be available in both English and Spanish on the Environmental Health Investigations Branch website (https://cdph.ca.gov/RiversideHC) and at the public libraries in the City of Riverside.

If you have any questions or would like to receive a hard copy by mail, please contact Nancy Villaseñor at (510) 620-5845.

Please submit written comments to the following address:

Nancy Villaseñor/CDPH/EHIB
850 Marina Bay Pkwy,
Bldg. P, 3rd Floor
Richmond, CA 94804

Table of Contents

List of Figures

List of Tables

Abbreviations and Acronyms

ATSDR: Agency for Toxic Substances and Disease Registry
CDPH: California Department of Public Health
CREG: cancer risk evaluation guide
DTSC: (California) Department of Toxic Substances Control
MRL: minimal risk level
n.d.: not dated
ND: not detected
PCBs: polychlorinated biphenyls
SAS: Site Assessment Section
EPA: U.S. Environmental Protection Agency

Summary

INTRODUCTION	In October 2016, the federal Agency for Toxic Substances and Disease Registry (ATSDR) accepted a petition from the city of Riverside, California, to investigate residents' health concerns regarding potential exposure to contaminants found at Riverside Agricultural Park (Ag Park), specifically polychlorinated biphenyls (PCBs). The Site Assessment Section (SAS) of the California Department of Public Health (CDPH) conducted this investigation under a Cooperative Agreement between ATSDR and CDPH. The goal of this report is to provide information necessary to make informed health-based decisions. CDPH worked with Riverside, ATSDR, the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), the Riverside Ag Park Off-Site Community Work Group, the Center for Community Action and Environmental Justice (CCAEJ), the Ag Park Family, and individual community members. This Health Consultation (HC) summarizes the public health assessment activities in response to this petition. CDPH reached two conclusions about the potential health impact of PCBs found in neighborhood surface soil:
CONCLUSION 1	**CDPH concludes that exposures to PCBs in surface soil at 24 out of 25 residential parcels, Rutland Park, and the right-of-way west of Ag Park are not expected to harm people's health.**
BASIS FOR CONCLUSION 1	CDPH evaluated the health risk at the residential parcels, Rutland Park, and the right-of-way. Exposure to PCB levels found in surface soil are below levels expected to cause cancer or other harmful health effects.
NEXT STEPS FOR CONCLUSION 1	CDPH recommends that community members in the Ag Park neighborhood who are interested in learning more about PCBs review the information in CDPH's patient information package and ATSDR's PCB fact sheet.
CONCLUSION 2	**CDPH concludes that PCBs in surface soil in one residential parcel could harm people's health if the exposure lasts for two decades or more.**
BASIS FOR CONCLUSION 2	CDPH evaluated the health risk at Parcel A, based on limited soil sampling. Exposure to the highest PCBs level found in surface soil is

	associated with an elevated cancer risk for children and a low cancer risk for adults if the exposure lasts for two decades or more.
NEXT STEPS FOR CONCLUSION 2	CDPH recommends that the City of Riverside and DTSC continue to work together to further investigate parcel A and take measures to reduce exposure to PCBs.
LIMITATIONS	We based this investigation on the data we received from DTSC and on information from community groups and individuals. The investigation of the neighborhood was limited to 25 residential parcels next to Ag Park, Rutland Park, and a city-owned right-of-way along the western boundary of Ag Park. These parcels are located in areas where dust from Ag Park would most likely have settled and where the community indicated interest. CDPH evaluated only surface soil samples (0-6 inches depth) for this investigation because exposure to deeper soils (2.5 feet depth) is not likely for regular residential or recreational use.
FOR MORE INFORMATION	If you have questions about this Health Consultation, you may contact Dr. Gabriele Windgasse, CDPH, at Gabriele.Windgasse@cdph.ca.gov or (510) 620-3610. You can also call ATSDR at 1-800-CDC-INFO and ask for information on the "Riverside Agricultural Park Petition: Neighborhood Investigation."

Background/Statement of Issues

The City of Riverside Asked for an Investigation

On March 25, 2016, the city of Riverside, California, petitioned the federal Agency for Toxic Substances and Disease Registry (ATSDR) on behalf of concerned residents who live adjacent to Riverside Agricultural Park (Ag Park) site. The petition requested that ATSDR investigate residents' health concerns regarding potential exposure to contaminants found at Ag Park, specifically polychlorinated biphenyls (PCBs). On October 10, 2016, ATSDR accepted the petition and asked the Site Assessment Section (SAS) of the California Department of Public Health (CDPH) to conduct the investigation, under a Cooperative Agreement between ATSDR and CDPH.

Figure 1 Riverside Agricultural Park, Riverside, CA

To complete the investigation, CDPH worked with Riverside, ATSDR, the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), the Riverside Ag Park Off-Site Community Work Group, the Center for Community Action and Environmental Justice (CCAEJ), the Ag Park Family, and individual community members. This Health Consultation (HC) summarizes the public health assessment activities in response to this petition.

On December 15, 2016, ATSDR received a second petition regarding Ag Park. CCAEJ requested that ATSDR evaluate exposures to chemicals for people who visited the Ag Park site in the past. ATSDR accepted this petition in March 2017, and CDPH will write a separate HC for this request.

In our investigations, we look at how contamination may affect the health of a community, but we cannot predict who will get sick, who will develop cancer, or whether an individual health concern is related to a specific exposure from this site. If necessary, our health investigations result in recommendations for agencies, organizations, and community members to reduce exposures to toxic substances. We do not give medical advice, but we have developed a Patient Information Package for the Ag Park community that has information for individuals and health care providers.

The Ag Park Site has been used for several activities in the past

Ag Park is a 62-acre area bordered by the Santa Ana River to the north and residential housing to the west, south, and east (see Figure 1). From 1942 to 1947, Ag Park was part of Camp Anza, a World War II staging ground for the U.S. Army. From 1942 to 1965, a sewage treatment plant operated at the site, accepting commercial, industrial, and residential sewage. Riverside, which has owned the property since 1962, decommissioned the sewage treatment plant in 1965. Between 1981 and 1986, the city permitted several three-day (Friday through Sunday) livestock shows at Ag Park. Between August 1997 and January 2002, the city permitted the construction and use of a bicycle and motocross track at the park (Geomatrix 2006). Several longtime residents indicated that prior to 2003, nearby residents used the park for recreation. Specifically, children played there after school, during the summer, and on weekends, and people walked across the site to get to the Santa Ana River.

In 2003, the city began earthwork and grading activities at Ag Park to prepare it for future residential development. In July 2003, a contractor accidentally ruptured an old sewage tank during earthmoving activities and spilled sewage sludge on the site. Riverside removed approximately 51,000 gallons of sludge from inside the ruptured digester, and 30 cubic yards of affected soil (Geomatrix 2006). The city also collected samples of the spilled sludge and affected soil and found metals (including lead), solvents, and PCBs.

The discovery of hazardous substances prompted the city to stop development activities, erect additional fencing, and post warning signs along the Ag Park's boundary to restrict public access (August 2003). The broken digester was demolished in July 2004. Since 2004, the California Department of Toxic Substances Control (DTSC) has been the lead agency overseeing multiple investigations and cleanup activities on-site. In 2006, Friends of the Riverside Airport LLC (FRA) purchased the property from the city. This organization is developing the site for residential use.

The Ag Park Neighborhood

The residential neighborhoods within this area lie in three census tracts (410.01, 410.02, and 410.04), with approximately 11,493 persons (US Census Bureau 2017). The racial and ethnic makeup is roughly 70% Hispanic, 19% White, 5% Asian, 4% Black, <1% American Indian and Alaskan Native, <1% Native Hawaiian and Other Pacific Islander, and 1% mixed. Among persons five years and older, an estimated 25% do not speak English very well. Of those who do not speak English very well, 88% are primarily Spanish speakers. The remaining 12% are composed of persons who primarily speak Vietnamese, Tagalog, Thai, Mon-Khmer (Cambodian), Chinese, Arabic, or Pacific Island languages.

Aerial photos taken before 1965 show that all homes were located at least a quarter mile away from the site (University of California at Santa Barbara 1960, 1965). After 1965, homes were built within a quarter mile of the site, including 57 homes along the fence line and 16 across the street from the site.

What Are Polychlorinated Biphenyls (PCBs)?

Polychlorinated biphenyls, or PCBs, are a group of 209 man-made chemicals. Each has its own toxic effects. In the past, PCBs were used to make items including fluorescent lamps, caulking, paints, sealants, and plaster. More than 1 billion pounds of PCBs were sold in the United States before production was stopped in 1979. PCBs do not easily break down in the environment, so they can remain an ongoing concern. PCBs were sold in mixtures called "Aroclors" according to the chemical weight: Aroclor 1016 is the lightest mixture, and Aroclor 1268 is the heaviest. Generally, heavier Aroclors are more toxic. Mostly Aroclor 1248 was detected in low concentrations in Ag Park neighborhood soils.

How Do PCBs Get Into Our Bodies?

PCBs can enter our bodies when we breathe air or dust contaminated with PCBs (inhalation), touch contaminated soil (skin), or swallow contaminated soil (ingestion). For example, when children play in soil contaminated with PCBs and then put their hands or objects into their mouths, they can ingest PCB's. Over time, our bodies store PCBs in the liver, fatty tissue, and breast milk. Therefore, PCB concentrations are typically higher in older persons than in younger people. We all have PCBs in our bodies from our diet. Sport fish, fatty meats, and dairy products can contain PCBs.

Community Health and Exposure Concerns

Exposure Concerns

The Ag Park community voiced many health and exposure concerns. The primary concern was exposure to windblown dust from Ag Park onto their backyards, homes, or vehicles, especially during strong Santa Ana winds. Some residents expressed concern that contaminated dust and soil could get inside their homes through open windows, HVAC (heating, ventilation, and air-conditioning) system, and from foot traffic in and out of the home. In addition, community members were concerned that windblown dust from the site could contaminate their homegrown vegetables, herbs, and fruit.

Some residents were concerned about having spent time on the site in the past. One community member stated, "My [children] used to play at the site and would come back home full of mud from the site, only to get skin rashes later on." In a second HC, we will investigate exposures from spending time on the Ag Park site in the past.

Additional concerns from the community included plants and trees dying in their yards, potential exposures to workers conducting cleanup at the site, and potential exposures to future residents of homes planned for the site. PCBs are not easily absorbed by plant roots (ATSDR 2000), so it is unlikely that plants died from PCBs. CDPH and ATSDR did not investigate current or future exposures at the Ag Park site. Workers conducting cleanup or construction on the Ag Park site have received special training and use personal protective equipment as required. Between August 2016 and January 2018, DTSC oversaw the removal of approximately 303,000 tons of soil at Ag Park and collected over 7,200 soil samples (TRC 2018). DTSC agreed with EPA to use the revised EPA Regional Screening Value of 0.23 mg/kg (milligram of PCB per kilogram of

soil) as the cleanup goal for soil between 0 and 10 ft depth (USEPA 2018). This cleanup goal is slightly higher than ATSDR's screening level for PCBs in soil of 0.19 mg/kg (see discussion of soil screening values below). CDPH and ATSDR did not review the sampling results for the Ag Park site, but acknowledge that the screening levels are similar. For soils deeper than a 10-foot depth and soils covered by pavement, DTSC and EPA used a cleanup goal of 1 mg/kg. DTSC and EPA reviewed the sampling results, determined that the cleanup goals were achieved, and that Ag Park is suitable for residential development (unrestricted land use) (DTSC 2018).

Health Concerns

We collected health concerns that community members believe to be related to contamination from Ag Park. We collected these concerns in meetings, phone calls, emails, and comments that concerned community members provided to DTSC. Some residents documented their health issues and concerns on the "Measles Map," which showed locations in the neighborhood of recent deaths, diseases, and other health concerns. Table 1 lists the concerns collected by CDPH.

Table 1. Community Health Concerns

Community Concerns Related to Cancer • Kidney cancer • Prostate cancer • Breast cancer • Cancerous tumors
Community Concerns Related to Noncancer Health Effects • Skin: nail thinning, persistent dermatitis, skin lesions, skin dryness, rashes, facial swelling, hair loss, hives, cysts, blisters, wounds that won't heal • Reproductive/developmental: difficulty conceiving, miscarriages, stillbirth, impaired reproduction, birth defects, developmental delay • Neurological: impeded speech, attention deficit disorder, tremors, loss of coordination, migraines, dizziness, headaches, mental disturbance, muscle twitching, brain fog • Hormonal: Cushing's syndrome, thyroid disease, swollen lymph glands • Immunological: allergies, autoimmune disorders, Hashimoto's disease, Guillain-Barré syndrome • Infections: sore throat, sinusitis, arthritis, leg infection

- Pulmonary: chronic obstructive pulmonary disease, cough, shortness of breath, asthma

- Other concerns: fibromyalgia, bone pain, joint pain, kidney pain, muscle pain, urinary pain, abdominal pain, thoracic pain, chronic fatigue, memory loss, depression, stress, chemical sensitivity, nosebleeds, high blood pressure, high cholesterol, cardiac disease, kidney edema, lumps on body and neck

Some residents also expressed concerns regarding their pets' health, such as tumors, cancers, and Cushing's syndrome. Outdoor and indoor pets (cats and dogs) are exposed to more soil and dusts than humans are, but the evaluation of their exposure is beyond the scope of this health consultation.

We cannot determine if PCBs caused the specific diseases or conditions reported by the community because many other factors play a role. Exposure to PCBs is unlikely to cause all of the reported symptoms and conditions. Unfortunately, most communities are affected by many of the same symptoms/conditions reported by the Ag Park community, including deaths, serious diseases, developmental and reproductive conditions, and more common issues such as allergies, cough, skin lesions, headaches, fatigue, depression, stress, and other concerns.

The self-reported health concerns affect many different organs and cannot easily be explained or analyzed. The causes of diseases or conditions that take a long time to develop (such as cancer) can be particularly difficult to determine. Many factors play a role in the development of the diseases and conditions mentioned by the community: medical history, genetic makeup, and exposures to chemical, physical, and biological agents throughout life.

Health effects also depend on the toxicity and concentration of the contaminant, type of exposure (breathing, touching, or swallowing), how often and for how long the person was exposed, and biological factors unique to the exposed person. Another factor to consider is whether the health conditions were present before or after residents moved to the Ag Park neighborhood.

Only a physician can evaluate an individual's specific health concern. Residents who want to know more about a disease or condition should contact their medical provider.

Toxic Effects of PCBs

Many toxic effects have been associated with PCBs (ATSDR 2000) (ATSDR 2011). Each of the 209 different PCB chemicals has different effects, and health effects from mixtures such as Aroclors are even more difficult to determine. Most of the studies were done on workers who handled PCBs and were highly exposed, or people highly exposed through their diet.

We are all exposed to low concentrations of PCBs from our diet, especially from fish, fatty meats, and dairy products. Some people may also be exposed to PCBs from contact with old electrical equipment, appliances, and fluorescent lamps. People who live near sites contaminated with PCBs can also be exposed through contact with site soils (breathing, touching, or swallowing). A laboratory test can determine which PCBs are present in a person's blood, fatty tissue, and breast milk.

Cancer
The EPA has determined that PCBs probably cause cancer in humans, but the International Agency for Research on Cancer (IARC) has determined that PCBs definitely cause cancer in humans (ATSDR 2011). The types of cancer that have been most commonly associated with high exposures to PCBs are cancer of the liver, gallbladder, bile ducts, intestines, and skin (melanoma). High concentrations of PCBs in pregnant women have been associated with elevated risk for testicular cancer in their sons. PCBs have also been associated with a higher risk for non-Hodgkin's lymphoma and prostate cancer.

Cancer is a common disease, and no level of exposure can be considered safe for carcinogens. The National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program states that the lifetime risk for men and women of being diagnosed with cancer is about 38 cases in 100 people, or 38% (for all cancer sites, diagnosis at some point in life, based on 2013-2015 data). This corresponds to 380,000 cases in 1 million people (National Cancer Institute n.d.). The calculated cancer risk is the theoretical chance of developing cancer from a lifetime of exposure. As a baseline, the "point of departure" risk is one additional cancer case in 1 million people with similar exposures. This point-of-departure risk has been commonly accepted from many agencies.

Noncancer
Health effects other than cancer have been associated with PCBs (ATSDR 2000) (ATSDR 2011). At high exposure levels, health effects can include

- irritation of the lungs and nose,
- stomach pain,
- changes in blood and liver,
- depression,
- fatigue,
- changes in the thyroid, skin, and vision,
- changes to the immune system,
- neurobehavioral changes, and
- reproductive toxicity.

Some studies have shown menstrual disturbances, changes in sperm, and difficulty conceiving children. PCB concentrations in blood have been associated with type 2 diabetes, and neurodegenerative diseases in female workers. PCB exposures have not been associated with Cushing's syndrome, Hashimoto's disease, Guillain-Barré syndrome, or fibromyalgia.

How Can PCBs Affect Children?
Infants can be exposed to PCBs via the mother's womb and breast milk. Exposures to older children are mainly from their diet and environment, such as swallowing contaminated soil or dust (mouthing of hands and dirty objects, eating soil). Children are more vulnerable than adults to the effects of PCBs. Their brain, nervous system, immune system, thyroid, and reproductive organs are still developing. Studies of the children of mothers exposed to PCBs found that some babies had lower birth weight, motor skill/reflex issues, memory and learning issues, lower IQ, vision problems, and immune system effects. Some of these effects persisted for several years. Some of the mothers were also exposed to other chemicals, in addition to PCBs. High

concentrations of PCBs in pregnant women have also been associated with changed hormone levels in newborns, the children's dental development, and impaired sexual maturity. PCBs have not been shown to cause structural birth defects in humans, such as a cleft palate.

Discussion
Investigation of Neighborhood Soils

How Can People Be Exposed to Backyard Soil?

Figure 2 shows how people can come into contact with PCBs in windblown dust.

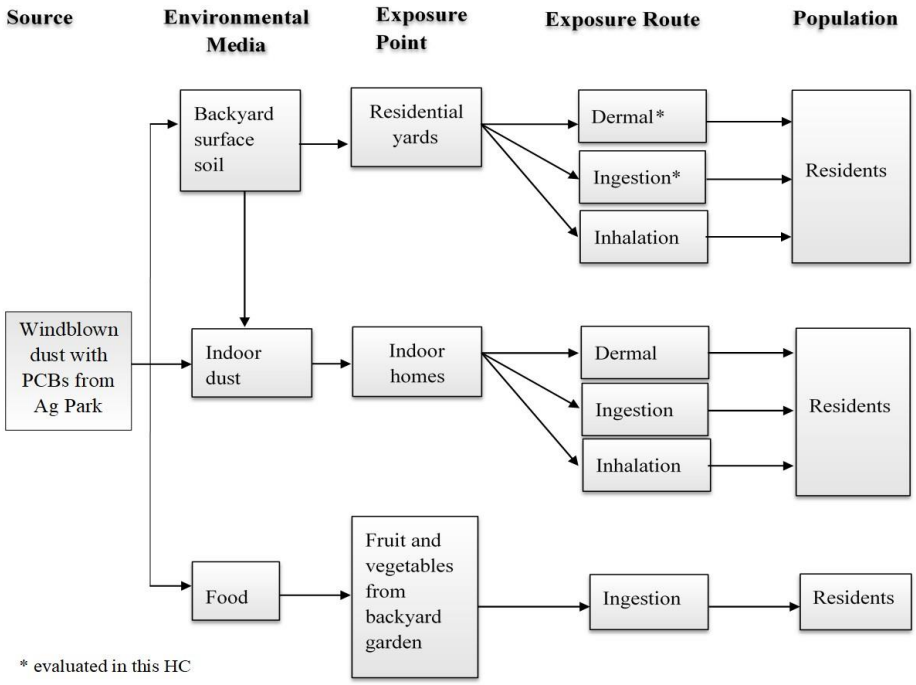


Figure 2 Exposure Pathways

The following are pathways for soil exposures:

- Accidentally swallowing soil (ingestion), for example, when children put dirty hands or objects in their mouth, or drinking/eating/smoking with dirty hands.
- Touching soil with hands or bare feet, arms, or legs (dermal).
- Inhaling backyard soil dust. The dust in the air is a mixture of surface soil from the backyard and windblown dust. The dust concentration also depends on the type of backyard surface/landscaping (bare soil or grass), the activity (sitting quietly, playing ball, or gardening), and the weather conditions (wet, dry, windy).
- Accidentally swallowing indoor dust.
- Touching indoor dust.

- Inhaling indoor dust.
- Eating fruits or vegetables with contaminated soil attached to the surface.

Which Exposure Pathways Did CDPH Evaluate?

We looked at how people could be exposed to PCBs in surface soil from activities in their front or backyard, such as sitting outside, playing, or gardening. We evaluated exposures from accidentally swallowing and touching surface soil contaminated with PCBs.

We did not evaluate the inhalation of backyard soil dust because of the lack of data on backyard conditions, individual activities, and dust samples. We assume that only very small amounts of PCBs will enter the body this way during normal activities. We did not evaluate exposure to subsurface soil because residents are unlikely to come in contact with soil 2.5 feet and deeper below the surface. We did not evaluate exposure to PCBs from homegrown vegetables or fruits because the most likely exposure to PCBs comes from soil that sticks to the vegetable/fruit surface (root, leaf, or fruit), and most residents eat few homegrown fruits. PCBs are bound to soil and not easily absorbed by roots. For example, there is very little accumulation of PCBs in tomatoes (ATSDR 2000). We did not evaluate exposures to indoor dusts because no data were available, and many other PCB sources exist inside homes which can contribute to the PCB concentration in indoor dust.

Evaluation of Exposure Concerns

In this HC, we evaluated potential exposure to PCBs from surface soil at 27 locations:

- 25 residential parcels next to the site,
- Rutland Park, and
- a narrow city-owned right-of-way along the western boundary of Ag Park.

Development of the Soil Sampling Plan

We worked with DTSC, EPA, the Riverside Ag Park Off-Site Community Work Group, CCAEJ, and individual community members to develop a sampling plan to evaluate if PCB-contaminated dust from the Ag Park site reached residential backyards bordering the site. DTSC published the proposed sampling plan for public comment in March 2017 and finalized the plan in June 2017 (DTSC 2017).

Figure 3 Sampling locations in Rutland Park

The plan called for sampling in Rutland Park, located about 100 feet east of Ag Park (compare Figures 1 and 3), 28 residential parcels on three sides of Ag Park (the north side of Ag Park borders the Santa Ana River), and a city-owned right-of-way along the western fence line

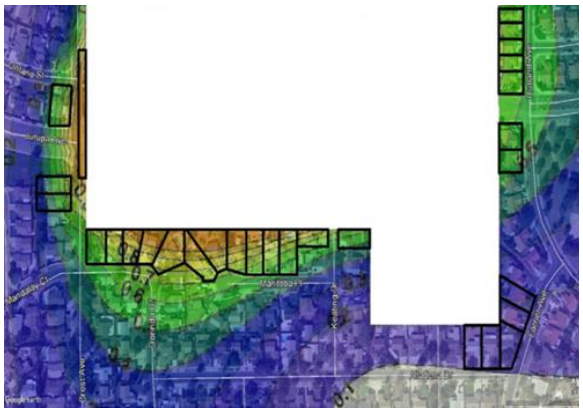


Figure 4 City-owned right-of-way and 28 residential parcels proposed for sampling

(compare Figure 4). The California Air Resources Board assisted DTSC in estimating the spread of dust from the site, based on wind patterns. The areas in orange/yellow on Figure 4 show the predicted highest concentration of dust-borne PCBs, based on air dispersion modeling. The modeling methodology and input data are described in the sampling plan. DTSC sampled four locations per parcel to screen for PCBs.

DTSC was not able to investigate three of the 28 residential parcels because the owners were absent or did not give them access. With the permission of the owners, DTSC collected samples from 25 residential parcels and two public areas. DTSC collected surface soil (depth of 0-6 inches) at four locations on each parcel. These samples were analyzed individually (discrete). In addition, DTSC collected soil at a depth of 2.5 feet on 11 residential parcels, and analyzed all the samples for PCBs at its laboratory. Appendix A shows all sampling results ordered by parcel and PCB concentrations (Aroclor 1248). To assure privacy, we do not identify the location of individual samples or parcels. EPA's laboratory analyzed 13 of these samples (split samples) for PCBs. DTSC's analyses detected only Aroclor 1248 (maximum concentration: 2.14 mg/kg), EPA's analyses detected only Aroclor 1260 (maximum concentration: 0.18 mg/kg). In sample A-1-SS, DTSC detected 1.29 mg/kg Aroclor 1248 but not Aroclor 1260 (less than 0.102 mg/kg). EPA's analysis of A-1-SS (split sample) showed no detection of Aroclor 1248 (less than 0.013 mg/kg), but found 0.18 mg/kg of Aroclor 1260. These analytical differences were not explained. To use health-protective assumptions, we used the maximum concentration of PCBs detected in each parcel (Aroclor 1248).

What Soil Screening Value Did CDPH Use?

To identify which parcel would need further evaluation, we used ATSDR's soil screening value of 0.19 mg/kg (milligram of PCB per kilogram of soil). If more than one Aroclor was detected in one sample analysis, we summed the Aroclors and compared the sum to the health screening value. ATSDR calls this screening value a cancer risk evaluation guide (CREG). It is based on the potential cancer-causing actions of PCBs. This concentration of PCBs in soil is likely to cause one additional cancer case in 1 million people similarly exposed. This commonly accepted threshold for risk management is also called the "point of departure" risk of one case in 1 million. DTSC used a screening value of 0.22 mg/kg, which is similar to the EPA regional screening level (RSL) for Aroclor 1248 of 0.23 mg/kg (USEPA 2018).

PCB levels found were low or not detectable in most soil samples

In December 2017, DTSC notified each of the owners/residents about the soil sampling results, and shared the results with CDPH.

1. No PCBs were found in surface soil at 10 residential parcels and Rutland Park.
2. PCBs were detected at concentrations lower than the screening value (see below) in surface soil at 13 residential parcels.
3. PCBs were detected above the screening value at two residential parcels and at the right-of-way.

PCBs were found below the screening level, or not at all, at 23 out of 25 residences and Rutland Park. At these parcels, exposure to PCB from surface soils is not expected to harm people's health, and tracking soil indoors would not have contributed to the PCBs indoors. CDPH and ATSDR further evaluated exposures at two residential parcels and the right-of-way.

Evaluation of Public Health Concerns for the Three Parcels With PCB Concentrations Above the Screening Value

Residential parcel A, residential parcel B, and the right-of-way had PCB concentrations of Aroclor 1248 in surface soil that exceeded the screening value of 0.19 mg/kg (see Table 2).

Table 2. PCB Concentrations at Three Neighborhood Parcels Exceeded the Screening Value

Parcel	**Concentration of Aroclor 1248 in Surface Soil Samples (mg/kg)**
Parcel A	**2.14** **1.29** 0.09 ND (<0.05)
Parcel B	**0.27** 0.06 ND (<0.05) ND (<0.05)
Right-of-way	**0.52** ND (<0.05) ND (<0.10) ND (<0.10)

Results shown to two significant digits.
ND = not detected.
Bold values are detections that exceeded the ATSDR health screening value (CREG) of 0.19 mg/kg.
< - smaller than.

Residential parcel A had two surface samples that exceeded the screening value. The highest concentration exceeded the screening value by about 11-fold. EPA analyzed soil from the sample with the second-highest PCB concentration (also known as a split sample) and detected low concentrations of Aroclor 1260 (0.18 mg/kg), but not Aroclor 1248. DTSC and Riverside took more soil samples at Parcel A and are cleaning up the site. CDPH provided an individual evaluation to the residents at Parcel A.

Residential parcel B had one surface sample that slightly exceeded the screening level. The city-owned right-of-way had one surface sample that exceeded the screening value by about three-fold.

Estimation of Health Risks from Exposure to PCB in Surface Soil

We evaluated how much exposure to PCBs people could have during normal activities, such as spending time in their backyard, playing, and gardening. We paid special attention to children's exposures because they spend more time outdoors, are more likely to touch soil with their bare feet and hands, and may put hands or dirty objects into their mouth.

Potential Cancer Risks

For parcels where PCBs were not found or were found below the screening value, the potential cancer risk is below the point-of-departure risk management threshold of one case in 1 million people similarly exposed.

For parcels A and B, we calculated the potential cancer risks based on the highest and lowest PCB concentrations found in surface soil, as it is very unlikely that one person will spend their entire time outdoors at the one location where the highest PCB concentration was found. This "risk range" provides a better estimate of the exposure residents may experience.

We used standard health-protective assumptions to describe residential exposures for swallowing soil and contact with skin: include all age groups (birth to 80 years); assume exposures for 365 days/year, 21 years of residence for children, and 33 years of residence for adults; assume that children swallow up to 200 mg of soil per day and adults swallow up to 100 mg of soil per day. For contact with skin, we assumed children are barefoot all the time, and that children and adults wore shorts and T-shirts year-round. Appendix B lists the parameters and equations used.

These assumptions likely overestimate PCB exposures. For instance, most children and adults will swallow less soil per day, will not enter the backyard on some days, and will wear shoes and long pants for part of the year. Given the health-protective assumptions in this HC, the actual cancer risks from touching and swallowing soil are likely to be lower than our estimates (see Table 3).

Table 3. Estimates of Health Risks: Range of Cancer Risk

	Cancer Risk: Children	Cancer Risk: Adults
Parcel A	<1 in 1 million to 11 in 1 million	<1 in 1 million to 3.6 in 1 million
Parcel B	<1 in 1 million to 1.4 in 1 million	<1 in 1 million
Right-of-way	<1 in 1 million	<1 in 1 million

< less than

Parcel A
For children, the potential cancer risk ranges from less than 1 in 1 million to 11 in 1 million. For adults, the potential cancer risk ranges from less than 1 in 1 million to 3.6 in 1 million. Based on the maximum concentration found in surface soil and health-protective assumptions, the cancer risks are elevated for children, and low for adults. These estimates are based on our limited knowledge about the toxicity of different Aroclors (see discussion above), the number of surface soil samples (four per parcel), and our assumptions of typical exposures for residents. We agree with DTSC's decision to investigate this parcel further, and contacted the residents with recommendations how to reduce exposures.

Parcel B
Based on the maximum concentration found in surface soil and health-protective assumptions, the cancer risk is low for children, and less than 1 in 1 million for adults. The cancer risk associated with regular use of this residence is near the point-of-departure risk management threshold of 1 in 1 million. Therefore, CDPH agrees with DTSC that this parcel does not need further evaluation.

Right-of-way
Exposures to soil from this area are much less than from a residential setting. Activities most likely associated with exposures to soil in this area include walking, biking, or similar activities that involve minimal exposures to soil. We used recreational exposure assumptions (wearing shoes, being at the site 4 days per week, 50 weeks per year) for children older than 2 years and adults. For both children and adults, cancer risks were below 1 in 1 million. CDPH agrees with DTSC that this parcel does not need further evaluation.

Potential Noncancer Health Risks
The noncancer health effects are difficult to evaluate since the type of PCB found (mostly Aroclor 1248) is not the same as the PCB used to calculate the screening level for noncancer effects (Aroclor 1254). ATSDR bases the noncancer screening level on the amount or dose of PCBs that is safe for children and adults to swallow every day without developing health effects. This is called the minimal risk level (MRL). The MRL for long-term exposure (chronic) to Aroclor 1254 is 0.02 µg/kg/day (micrograms of PCB swallowed per kilogram of body weight per day) (ATSDR 2000). This dose is based on an animal study in which monkeys exposed to Aroclor 1254 for several years experienced changes to their immune system. The lowest dose that caused an adverse effect was 5 µg/kg/day. ATSDR divided this point-of-departure dose by 300 to account for the uncertainties of using animal data for human exposure to arrive at the MRL of 0.02 µg/kg/day. We calculated the doses from swallowing backyard soil and compared them to the MRL (see Table 4 and Appendix B for calculations). Using the maximum PCB concentration, children's doses on Parcel A exceed the MRL, but are 100 times lower than the point-of-departure dose.

Table 4. Estimates of Health Risks: Range of Noncancer Hazard

	Noncancer Hazard: Children	Noncancer Hazard: Adults
Parcel A	<MRL to 0.05 µg/kg/day	<MRL
Parcel B	<MRL	<MRL
Right-of-way	<MRL	<MRL

Results shown to two significant digits.
< less than.
MRL – Minimal Risk Level. MRL is 0.02 µg/kg/day.

Parcel A
Using the maximum concentration of PCBs found, children under 6 years old would have swallowed more than the MRL. Children under 1 year would have swallowed about 3 times the MRL. The estimated daily doses for both children aged seven to less than 21 and adults were less than the MRL. Using the minimum concentration of PCBs found, all children's and adults' estimated exposure doses were less than the MRL. Again, we based these calculations on health-protective assumptions. We do not expect noncancer health effects from exposure to PCBs.

Parcel B and the Right-of-Way
Children and adults would have swallowed less than the MRL. We do not expect noncancer health effects from this exposure to PCBs.

For Community Members Who Are Still Concerned About Their Health
We have a developed a Patient Information Package in English and Spanish individuals and their doctor on PCBs and environmental exposures. This information is also available on our website: http://cdph.news/SAS and CDPH can provide the packet upon request. For individual testing for PCBs, community members should contact their health care provider. If the provider cannot conduct this test, they can refer patients to the University of California (UC) Irvine Center for Occupational and Environmental Health Clinic at (949) 824-8685.

CDPH's Community Outreach and Education Activities

Listening to the Ag Park Community and Providing Resources
An important part of our public health assessment activities is the collection, documentation, and response to community health and exposure concerns. We visited the site and the neighborhood on several occasions, including meetings with the Riverside Ag Park Off-Site Community Work Group, CCAEJ, DTSC, and individual community members. We also responded to many phone calls and emails from community members with questions regarding health and exposure concerns related to the site.

Community Meeting

On May 9, 2017, CDPH held a community meeting at the Terrace Elementary School. About 40 community members attended. At this meeting, we explained our role at Ag Park:

- overview of our two investigations,
- limitations of our work,
- what PCBs are and how they can enter the body,
- health effects of PCBs,
- difficulty of linking exposures to specific health effects,
- potential PCB exposures at Ag Park,
- how to reduce overall exposures to PCBs, and
- next steps in the HC process.

Community members were able to ask questions and share their health and exposure concerns. We also provided a Patient Information Package and PCB fact sheets in English and Spanish, and we asked for feedback on outreach and education strategies for the community.

Patient Information Package

Community members requested information on PCBs to share with their health care providers. We developed a Patient Information Package that includes a letter to the health care provider, an exposure history form, and a fact sheet on PCBs from ATSDR (in English and Spanish). We distributed 90 copies at the community meeting. After the meeting, we mailed out an informational letter to the community (3,000 recipients) informing them of the availability of the Patient Information Package. To date, we have distributed more than 200 Patient Information Packages to the community. This information is also available on our website: http://cdph.news/SAS.

Outreach to Health Care Providers

Many physicians are not familiar with PCBs and their health effects. Therefore, we reached out to health care providers near Ag Park. On April 20, 2017, we emailed a letter to 15 clinics and hospitals. In the letter, which reached more than 1,500 physicians, we explained the ongoing investigation of PCB exposures at Ag Park and the community concerns associated with the site. The letter also provided educational resources developed by ATSDR on the toxicity of PCBs, taking an environmental exposure history, children's environmental health, and contact information for the Occupational and Environmental Health Clinic at UC Irvine.

Community Education Workshops

In response to requests received from the community, we offered two community education workshops on how to reduce exposures to toxic substances on October 4, 2017, in English and Spanish, at the Terrace Elementary School, with 13 participants. These workshops did not target exposures to PCBs from Ag Park, but focused on practical ways for families to reduce exposures to harmful chemicals at home, at work, and while pursuing hobbies.

Conclusions

CDPH reached the following two conclusions:

1. **CDPH concludes that exposures to PCBs in surface soil at 24 out of 25 residential parcels, Rutland Park, and the right-of-way west of Ag Park are not expected to harm people's health.**

   CDPH evaluated the health risk at the residential parcels, Rutland Park, and the right-of-way. Exposure to PCB levels found in surface soil are below levels expected to cause cancer or other harmful health effects.

2. **CDPH concludes that PCBs in surface soil in one residential parcel could harm people's health if the exposure lasts for two decades or more.**

   CDPH evaluated the health risk at Parcel A, based on limited soil sampling. Exposure to the highest PCBs level found in surface soil is associated with an elevated cancer risk for children and a low cancer risk for adults, if the exposure lasts for two decades or more.

Recommendations

1. Community members in the Ag Park neighborhood who are interested in learning more about PCBs should review the information in CDPH's patient information package and ATSDR's PCB fact sheet.

2. Riverside and DTSC should continue to work together to further investigate parcel A, and take measures to reduce exposure to PCBs.

Public Health Action Plan

Completed activities:
Since CDPH became engaged at Riverside Ag Park in December 2016, we have worked with the city of Riverside, DTSC, EPA, local community groups, and individual community members. We provided information and resources to the community, such as information on PCBs and the Patient Information Package. In response to community interest, we held a community meeting and two community workshops.

Planned activities:
In a second HC, we will evaluate the potential health risks from on-site exposures at Ag Park in the past.

Report Preparation

The California Department of Public Health (CDPH) prepared this Health Consultation for the Riverside Agricultural Park Petition: Neighborhood Investigation in Riverside (Riverside County), California. This publication was made possible by Grant Number 6NU61TS000278-02 under a Cooperative Agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). CDPH evaluated data of known quality using approved methods, policies, and procedures existing at the date of publication. ATSDR reviewed this document and concurs with its findings based on the information presented by CDPH.

California Department of Public Health

Gabriele Windgasse, DrPH, MS
Chief, Site Assessment Section
Environmental Health Investigations Branch

Contributing Authors

Danny Kwon, MPH
Health Assessor, Site Assessment Section
Environmental Health Investigations Branch

Nancy Villaseñor, MS
Health Educator, Site Assessment Section
Environmental Health Investigations Branch

ATSDR Cooperative Agreement Coordinator and Technical Project Officer

Trent LeCoultre
Cooperative Agreement Coordinator
Division of Community Health Investigations

Audra Henry
Technical Project Officer
Division of Community Health Investigations

ATSDR Regional Representatives

Libby Vianu
Regional Director, ATSDR Region 9

References

ATSDR . 2000. *Toxicological Profile for PCBs.* https://www.atsdr.cdc.gov/toxprofiles/tp17.pdf , US Department of health and Human Services.

ATSDR. 2011. *Addendum to Toxicological Profile for PCBs.* https://www.atsdr.cdc.gov/toxprofiles/pcbs_addendum.pdf, Agency for Toxic Substances and Disease Registry. https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=142&tid=26.

DTSC. 2018. "Approval and Certification of Phase 3 Response Plan, Riverside Agricultural Park." Letter. https://www.envirostor.dtsc.ca.gov/public/deliverable_documents/2681507945/Phase%203%20Implementation%20Report%20Approval%20Letter%20July%2016%202018.pdf .

DTSC. June 2017. "Neighborhood Sampling Plan."

Geomatrix. 2006. "Revised RI Report."

National Cancer Institute. n.d. *Surveillance, Epidemiology and End Results Program; Cancer Statistics; Lifetime Risk.* Accessed January 2019. https://surveillance.cancer.gov/statistics/types/lifetime_risk.html.

TRC. 2018. "Phase 3 Response Plan Implementation Report Former Agricultural Park." Irvine, CA. https://www.envirostor.dtsc.ca.gov/public/deliverable_documents/3260775506/Ag%20Park%20Phase%203%20Response%20Plan%20Final%205-14-18%20Text%20Tbls%20Figures.pdf.

University of California at Santa Barbara. 1960, 1965. *Archival Photos.* Riverside.

US Census Bureau. 2017b. *American Community Survey 2011-2015.* Accessed June 19, 2017. https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

—. 2017. *American Fact Finder, https://factfinder.census.gov.* Accessed June 21, 2017.

USEPA. n.d. *Regional Screening Values.* https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables .

Appendix A: Neighborhood Sampling Results

Twenty-five residential parcels, the right-of-way, and Rutland Park were sampled on July 5–29, 2017.
Data sorted according to the highest Aroclor 1248 concentration in surface soil in each parcel.

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
A-1-SS	Surface	ND<0.102	ND<0.102	ND<0.102	ND<0.102	**1.29**	ND<0.102	ND<0.102	ND<0.102	ND<0.102	**1.29**
A-2-SS	Surface	ND<0.207	ND<0.207	ND<0.207	ND<0.207	**2.14**	ND<0.207	ND<0.207	ND<0.207	ND<0.207	**2.14**
A-3-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.091	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.091
A-4-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
A-5-SS EPA (Split of A-1-SS)	Surface	ND<0.013	ND<0.028	ND<0.013	ND<0.013	ND<0.013	ND<0.013	0.18	ND<0.013	ND<0.013	0.18
Right-of-Way-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Right-of-Way-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	**0.529**	ND<0.051	ND<0.051	ND<0.051	ND<0.051	**0.529**
Right-of-Way-3-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.101	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Right-of-Way-4-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.101	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
B-1-SS	Surface	ND<0.101	ND<0.101	ND<0.101	ND<0.101	**0.275**	ND<0.101	ND<0.101	ND<0.101	ND<0.101	**0.275**
B-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.062	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.062
B-3-SS	Surface	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND
B-4-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
C-1-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
C-2-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
C-3-SS	Surface	ND<0.055	ND<0.055	ND<0.055	ND<0.055	0.172	ND<0.055	ND<0.055	ND<0.055	ND<0.055	0.172
C-4-SS	Surface	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND
C-5-SS (Duplicate of C-1-SS)	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
C-2-2.5	2.5 feet	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.109	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND
C-5-SS EPA (Split of C-1-SS)	Surface	ND<0.14	ND<0.29	ND<0.14	ND<0.14	ND<0.14	ND<0.14	0.0082 C1, J	ND<0.14	ND<0.14	0.008
D-1-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.059	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.059
D-2-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
D-3-SS	Surface	ND<0.060	ND<0.060	ND<0.060	ND<0.060	0.091	ND<0.060	ND<0.060	ND<0.060	ND<0.060	0.091
D-4-SS	Surface	ND<0.060	ND<0.060	ND<0.060	ND<0.060	0.082	ND<0.060	ND<0.060	ND<0.060	ND<0.060	0.082
D-5-SS (Duplicate of D-1-SS)	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.154	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.154
E-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.069	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.069
E-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
E-3-SS	Surface	ND<0.057	ND<0.057	ND<0.057	ND<0.057	0.145	ND<0.057	ND<0.057	ND<0.057	ND<0.057	0.145
E-4-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
E-1-2.5	2.5 feet	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND
E-5-SS (Duplicate of E-1-SS)	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.069	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.069
E-6-2.5 (Duplicate of E-1-2.5)	2.5 feet	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND
E-1-SS EPA (Split of E-1-SS)	Surface	ND<0.013	ND<0.028	ND<0.013	ND<0.013	ND<0.013	ND<0.013	0.041 G1, J	ND<0.013	ND<0.013	0.041
E-1-2.5 EPA (Split of E-1-2.5)	2.5 feet	ND<0.015	ND<0.030	ND<0.015	ND<0.015	ND<0.015	ND<0.015	ND<0.015	ND<0.015	ND<0.015	ND
F-1-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.121	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.121
F-2-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.104	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
F-3-SS	Surface	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND
F-4-SS	Surface	ND<0.066	ND<0.066	ND<0.066	ND<0.066	ND<0.066	ND<0.066	ND<0.066	ND<0.066	ND<0.066	ND

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
F-5-SS (Duplicate of F-1-SS)	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.14	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.14
G-1-SS	Surface	ND<0.101	ND<0.101	ND<0.101	ND<0.101	ND<0.101	ND<0.101	ND<0.101	ND<0.101	ND<0.101	ND
G-2-SS	Surface	ND<0.061	ND<0.061	ND<0.061	ND<0.061	0.065	ND<0.061	ND<0.061	ND<0.061	ND<0.061	0.065
G-3-SS	Surface	ND<0.057	ND<0.057	ND<0.057	ND<0.057	0.138	ND<0.057	ND<0.057	ND<0.057	ND<0.057	0.138
G-4-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
H-1-SS	Surface	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.102	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.102
H-2-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.129	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.129
H-3-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
H-4-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
H-5-SS (Duplicate of H-1-SS)	Surface	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.083	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.083
I-1-SS	Surface	ND<0.156	ND<0.156	ND<0.156	ND<0.156	ND<0.156	ND<0.156	ND<0.156	ND<0.156	ND<0.156	ND
I-2-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.125	ND<0.052	ND<0.052	ND<0.052	ND<0.052	0.125
I-3-SS	Surface	ND<0.172	ND<0.172	ND<0.172	ND<0.172	ND<0.172	ND<0.172	ND<0.172	ND<0.172	ND<0.172	ND
I-4-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
I-2-2.5	2.5 feet	ND<0.055	ND<0.055	ND<0.055	ND<0.055	0.171	ND<0.055	ND<0.055	ND<0.055	ND<0.055	0.171
J-1-SS	Surface	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.110	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.110
J-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
J-3-SS	Surface	ND<0.176	ND<0.176	ND<0.176	ND<0.176	ND<0.176	ND<0.176	ND<0.176	ND<0.176	ND<0.176	ND
J-4-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
J-1-2.5	2.5 feet	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.084	ND<0.054	ND<0.054	ND<0.054	ND<0.054	0.084
K-1-SS	Surface	ND<0.105	ND<0.105	ND<0.105	ND<0.105	ND<0.105	ND<0.105	ND<0.105	ND<0.105	ND<0.105	ND
K-2-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.101	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.101
K-3-SS	Surface	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND
K-4-SS	Surface	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
K-5-SS (Duplicate of K-1-SS)	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.066	ND<0.053	ND<0.053	ND<0.053	ND<0.053	0.066
K-5-SS EPA (Split of K-1-SS)	Surface	ND<0.014	ND<0.028	ND<0.014	ND<0.014	ND<0.014	ND<0.014	0.010 C1,J	ND<0.014	ND<0.014	0.010
L-1-SS	Surface	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND
L-2-SS	Surface	ND<0.060	ND<0.060	ND<0.060	ND<0.060	0.1	ND<0.060	ND<0.060	ND<0.060	ND<0.060	0.1
L-3-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
L-4-SS	Surface	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND
M-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
M-2-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
M-3-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.065	ND<0.051	ND<0.051	ND<0.051	ND<0.051	0.065
M-4-SS	Surface	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND
N-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
N-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
N-3-SS	Surface	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND<0.122	ND<0.061	ND<0.061	ND<0.061	ND<0.061	ND
N-4-SS	Surface	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND<0.119	ND<0.060	ND<0.060	ND<0.060	ND<0.060	ND
N-5-2.5	2.5 feet	ND<0.161	ND<0.161	ND<0.161	ND<0.161	**0.246**	ND<0.161	ND<0.161	ND<0.161	ND<0.161	**0.246**
N-5-SS EPA (Split of N-4-SS)	Surface	ND<0.015	ND<0.032	ND<0.015	ND<0.015	ND<0.015	ND<0.015	0.0095 C1, J	ND<0.015	ND<0.015	0.0095
O-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.102	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
O-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.103	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
O-3-SS	Surface	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.107	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND
O-4-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.105	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
O-2-2.5	2.5 feet	ND<0.057	ND<0.057	ND<0.057	ND<0.057	**0.210**	ND<0.057	ND<0.057	ND<0.057	ND<0.057	**0.210**
P-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.102	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
P-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.102	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
P-3-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.104	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
P-4-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.106	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
P-2-2.5	2.5 feet	ND<0.056	ND<0.056	ND<0.056	ND<0.056	0.136	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND
Q-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Q-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Q-3-SS	Surface	ND<0.102	ND<0.102	ND<0.102	ND<0.102	ND<0.102	ND<0.102	ND<0.102	ND<0.102	ND<0.102	ND
Q-4-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
Q-5-SS (Duplicate of Q-1-SS)	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Q-5-SS EPA (Split of Q-1-SS)	Surface	ND<0.013	ND<0.028	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND
Q-1-2.5	2.5 feet	ND<0.056	ND<0.056	ND<0.056	ND<0.056	0.114	ND<0.056	ND<0.056	ND<0.056	ND<0.056	0.114
Q-6-2.5 (Duplicate of Q-1-2.5)	2.5 feet	ND<0.056	ND<0.056	ND<0.056	ND<0.056	0.113	ND<0.056	ND<0.056	ND<0.056	ND<0.056	0.113
Q-6-2.5 EPA (Split of Q-1-2.5)	2.5 feet	ND<0.014	ND<0.030	ND<0.014	ND<0.014	ND<0.014	ND<0.014	0.014 C1, J	ND<0.014	ND<0.014	0.014
R-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
R-1-2.5	2.5 feet	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
R-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.103	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
R-3-SS	Surface	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND
R-4-SS	Surface	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND
S-1-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.104	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
S-2-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.103	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
S-3-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.118	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
S-4-SS	Surface	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.124	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
S-5-SS (Duplicate of S-1-SS)	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.104	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
S-5-SS EPA (Split of S-1-SS)	Surface	ND<0.013	ND<0.028	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND<0.013	ND
T-1-SS	Surface	ND<0.067	ND<0.067	ND<0.067	ND<0.067	ND<0.133	ND<0.067	ND<0.067	ND<0.067	ND<0.067	ND
T-2-SS	Surface	ND<0.065	ND<0.065	ND<0.065	ND<0.065	ND<0.130	ND<0.065	ND<0.065	ND<0.065	ND<0.065	ND
T-3-SS	Surface	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.123	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND
T-4-SS	Surface	ND<0.058	ND<0.058	ND<0.058	ND<0.058	ND<0.116	ND<0.058	ND<0.058	ND<0.058	ND<0.058	ND
T-5-SS (Duplicate of T-1-SS)	Surface	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.135	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND
T-5-SS EPA (Split of T-1-SS)	Surface	ND<0.017	ND<0.035	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND
U-1-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
U-2-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
U-3-SS	Surface	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.110	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND
U-4-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.117	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
V-1-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
V-2-SS	Surface	ND<0.155	ND<0.155	ND<0.155	ND<0.155	ND<0.155	ND<0.155	ND<0.155	ND<0.155	ND<0.155	ND
V-3-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
V-4-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
V-1-2.5	2.5 feet	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND
W-1-SS	Surface	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND<0.052	ND
W-2-SS	Surface	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND<0.055	ND
W-3-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
W-4-SS	Surface	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND<0.056	ND
X-1-SS	Surface	ND<0.058	ND<0.058	ND<0.058	ND<0.058	ND<0.116	ND<0.058	ND<0.058	ND<0.058	ND<0.058	ND

Parcel and Sample ID	Sample Depth	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	Aroclor 1262 (mg/kg)	Aroclor 1268 (mg/kg)	Total PCBs (mg/kg)
X-2-SS	Surface	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND<0.123	ND<0.062	ND<0.062	ND<0.062	ND<0.062	ND
X-3-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.119	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
X-4-SS	Surface	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.118	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND
X-5-SS (Duplicate of X-1-SS)	Surface	ND<0.058	ND<0.058	ND<0.058	ND<0.058	ND<0.117	ND<0.058	ND<0.058	ND<0.058	ND<0.058	ND
X-5-SS EPA (Split of X-1-SS)	Surface	ND<0.015	ND<0.031	ND<0.015	ND<0.015	ND<0.015	ND<0.015	0.012 C1, J	ND<0.015	ND<0.015	0.012
Y-1-SS	Surface	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND<0.057	ND
Y-2-SS	Surface	ND<0.077	ND<0.077	ND<0.077	ND<0.077	ND<0.077	ND<0.077	ND<0.077	ND<0.077	ND<0.077	ND
Y-3-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Y-4-SS	Surface	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND<0.051	ND
Y-5-SS EPA (Split of Y-4-SS)"	Surface	ND<0.013	ND<0.027	ND<0.013	ND<0.013	ND<0.013	ND<0.013	0.0069 C1, J	ND<0.013	ND<0.013	0.0069
Y-1-2.5	2.5 feet	ND<0.163	ND<0.163	ND<0.163	ND<0.163	ND<0.057	ND<0.163	ND<0.057	ND<0.163	ND<0.163	ND
Rutland Park-1-SS	Surface	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND
Rutland Park-2-SS	Surface	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND<0.053	ND
Rutland Park-3-SS	Surface	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND<0.068	ND
Rutland Park-4-SS	Surface	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND<0.054	ND
Rutland Park-5-SS EPA (Split of Rutland Park-1-SS)	Surface	ND<0.017	ND<0.035	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND

ND Not Detected
< less than
C1 The reported concentration for this analyte is below the quantitation limit.
J The reported result for this analyte should be considered an estimated value.
Bold values are detections over screening value of 0.19 mg/kg. (ATSDR CREG)
Grey highlight indicates a subsurface sample collected at 2.5 feet depth.
Yellow highlight indicates samples that were used for further evaluation.

Appendix B: Exposure Parameters and Risk Calculations

CDPH used ATSDR's Public Health Assessment Site Tool (PHAST) to calculate the potential cancer risks from ingestion and dermal contact (Version 3.121.3, accessed January 2019).

Cancer Risk Equation

CR = (D × CSF) × (ED / LY)

CR Cancer Risk, **D** Age Specific Dose (mg/kg/day), **CSF** Cancer Slope Factor ((mg/kg/day)$^{-1}$), **ED** Age Specific Exposure Duration

Non-cancer Hazard Equation (Hazard Quotient)

HQ = (D / MRL or D / RfD)

HQ Hazard Quotient, **D** Exposure Dose (mg/kg/day), **MRL** Minimal Risk Level (mg/kg/day), **RfD** Reference Dose (mg/kg/day)

Parcel A and B: Residential Exposure

Contaminant Information for Parcel A

Contaminant Name	Entered Concentration	Type	Converted Concentration	Dermal Absorption Fraction	GI Absorption Factor (dermal)	Bioavailability Factor
POLYCHLORINATED BIPHENYLS	2.14	Maximum	2.14 mg/kg	0.14	1	1

Contaminant Information for Parcel B

Contaminant Name	Entered Concentration	Type	Converted Concentration	Dermal Absorption Fraction	GI Absorption Factor (dermal)	Bioavailability Factor
POLYCHLORINATED BIPHENYLS	0.275	Maximum	0.275 mg/kg	0.14	1	1

Exposure for 7 days/week, 365 days/year.
Soil adherence factor for children: 0.2 mg/cm^2-event, for adults: 0.07 mg/cm^2-event.

The cancer risk (CR) is derived for both CTE (12 years) and RME (33 years) residential occupancy periods. For children, CRs are derived for a combined child receptor: CTE (12 years) and RME (21 years) at a given residence. For the CTE child CR, the combined child is the sum of the cancer risks for each age group for the first 12 years of exposure only. The RME CR for the combined child is derived by summing all the cancer risks for each age group from birth to < 21 years. The adult CR assumes living at the residence for 12 (CTE) or 33 (RME) years.

Residential Exposure Parameters:

Soil Ingestion Exposure Dose Equation
D = (C * IR * EF * CF) / BW
D = Exposure Dose (mg/kg-day), C = Contaminant Concentration (mg/kg), IR = Intake Rate (mg/day),
EF = Exposure Factor (unitless), CF = Conversion Factor (10-6 kg/mg), BW = Body Weight (kg)

Soil Dermal Absorbed Dose Equation
DAD = (C * EF * CF * AF * ABSd * SA) / BW * ABSGI
DAD = Dermal Absorbed Dose (mg/kg-day), C = Contaminant Concentration (mg/kg), EF = Exposure Factor (unitless), CF = Conversion Factor (10^{-6} kg/mg),
AF = Adherence Factor to Skin (mg/cm^2-event), ABSd = Dermal Absorption Fraction to Skin (unitless), SA = Skin Surface Area Available for Contact (cm^2),
BW = Body Weight (kg), ABSGI = Gastrointestinal Absorption Factor (unitless)

Exposure Group	Body Weight (kg)	Age-Specific Exposure Duration (years)	Intake Rate (mg/day)			Adherence Factor to Skin (mg/cm^2-event)	Combined Skin Surface Area (cm^2)	Notes
			CTE	RME	Custom			
Birth to < 1 year	7.8	1	55	150		0.2	1,772	
1 to < 2 years	11.4	1	90	200		0.2	2,299	
1 to < 2 years (pica)	11.4	NA	5,000	NA		0.2	2,299	
2 to < 6 years	17.4	4	60	200		0.2	2,592	
2 to < 6 years (pica)	17.4	NA	5,000	NA		0.2	2,592	
6 to < 11 years	31.8	5	60	200		0.2	3,824	
11 to < 16 years	56.8	5	30	100		0.2	5,454	
16 to < 21 years	71.6	5	30	100		0.2	6,083	
Adult	80	33	30	100		0.07	6,030	

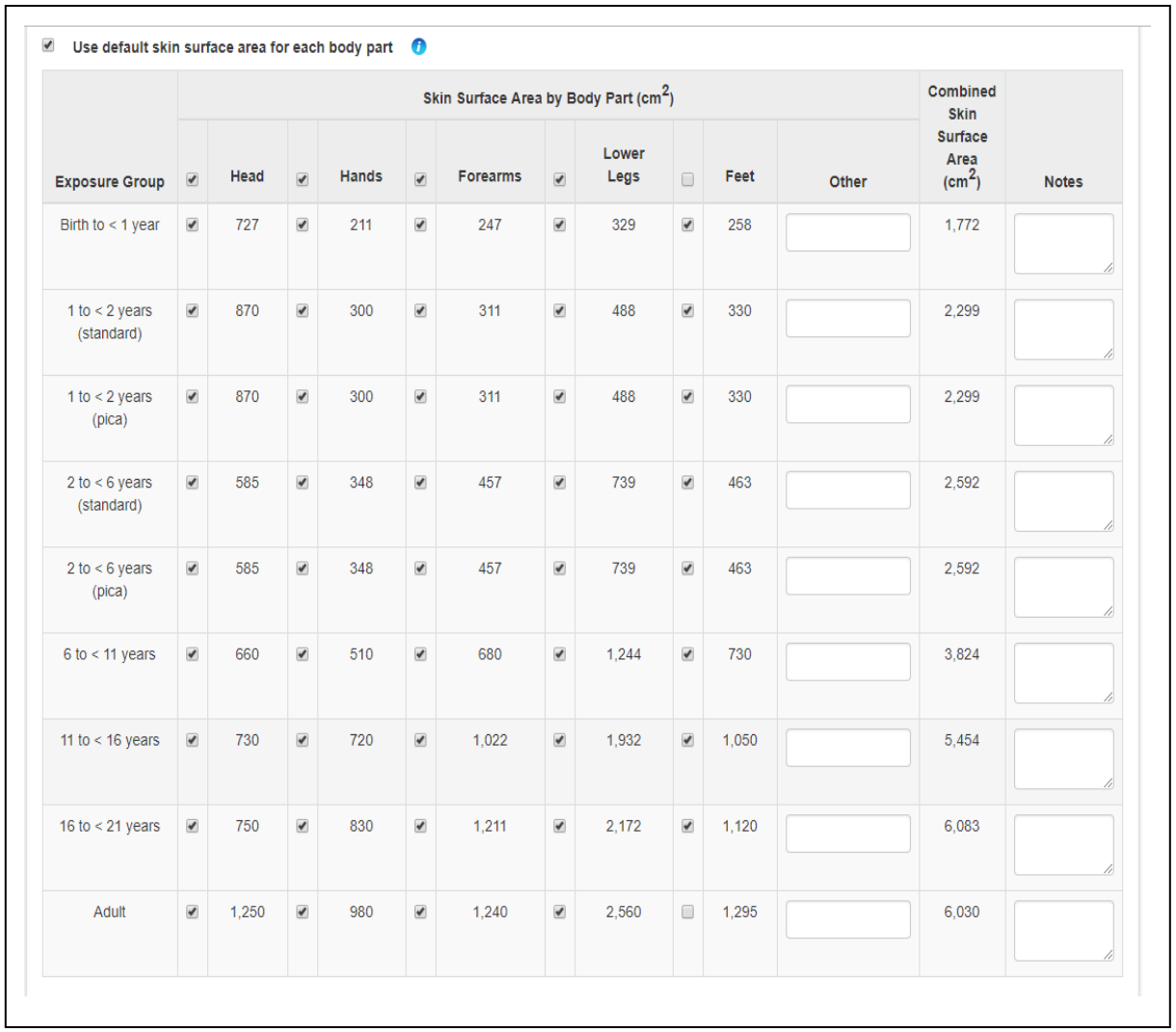
Exposure Factors

Duration	Days	Weeks	Years	Non-Cancer Exposure Factor
Acute				1
Intermediate	7			1
Chronic	7	52.14	33	1
Pica	3			0.43

EF cancer: EF non-cancer x Age-Specific Exposure Duration (years)/78 years

EF dermal: The dermal absorbed dose equation includes a 1 event/day EF parameter.

Residential Skin Surface Areas (assuming shorts and short-sleeved shirts for children and adults, children go barefoot, adults wear shoes)



☑ Use default skin surface area for each body part

Exposure Group	Skin Surface Area by Body Part (cm^2)										Combined Skin Surface Area (cm^2)	Notes
	☑	Head	☑	Hands	☑	Forearms	☑	Lower Legs	☐	Feet	Other		
Birth to < 1 year	☑	727	☑	211	☑	247	☑	329	☑	258		1,772	
1 to < 2 years (standard)	☑	870	☑	300	☑	311	☑	488	☑	330		2,299	
1 to < 2 years (pica)	☑	870	☑	300	☑	311	☑	488	☑	330		2,299	
2 to < 6 years (standard)	☑	585	☑	348	☑	457	☑	739	☑	463		2,592	
2 to < 6 years (pica)	☑	585	☑	348	☑	457	☑	739	☑	463		2,592	
6 to < 11 years	☑	660	☑	510	☑	680	☑	1,244	☑	730		3,824	
11 to < 16 years	☑	730	☑	720	☑	1,022	☑	1,932	☑	1,050		5,454	
16 to < 21 years	☑	750	☑	830	☑	1,211	☑	2,172	☑	1,120		6,083	
Adult	☑	1,250	☑	980	☑	1,240	☑	2,560	☐	1,295		6,030	

Parcel A: chronic exposure, ingestion and dermal, cancer risk for PCBs

Exposure Group	Default Residential Scenario							
	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient		Cancer Risk			
	CTE	RME	CTE	RME	CTE	ED (yrs)	RME	ED (yrs)
POLYCHLORINATED BIPHENYLS (EPC: 2.14 mg/kg; Chronic MRL/RfD: NA; CSF: 2 (mg/kg/day)$^{-1}$)								
Birth to < 1 year	2.9E-05	5.5E-05	NC	NC	4.8E-6	1	1.1E-5	1
1 to < 2 years	2.9E-05	5.0E-05	NC	NC		1		1
2 to < 6 years	1.6E-05	3.4E-05	NC	NC		4		4
6 to < 11 years	1.1E-05	2.1E-05	NC	NC		5		5
11 to < 16 years	6.9E-06	9.5E-06	NC	NC		1		5
16 to < 21 years	6.0E-06	8.1E-06	NC	NC		0		5
Total exposure duration for child cancer risk						12		21
Adult	2.4E-06	4.3E-06	NC	NC	7.3E-7	12	3.6E-6	33

Parcel A: chronic exposure, ingestion and dermal, non-cancer hazard for Aroclor 1254 (as surrogate)

Exposure Group	Default Residential Scenario							
	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient		Cancer Risk			
	CTE	RME	CTE	RME	CTE	ED (yrs)	RME	ED (yrs)
AROCLOR 1254 (EPC: 2.14 mg/kg; Chronic MRL: 2E-05 mg/kg/day; CSF: NA								
Birth to < 1 year	2.9E-05	5.5E-05	1.4	2.7	NC	1	NC	1
1 to < 2 years	2.9E-05	5.0E-05	1.4	2.5		1		1
2 to < 6 years	1.6E-05	3.4E-05	0.82	1.7		4		4
6 to < 11 years	1.1E-05	2.1E-05	0.56	1.0		5		5
11 to < 16 years	6.9E-06	9.5E-06	0.34	0.48		1		5
16 to < 21 years	6.0E-06	8.1E-06	0.30	0.40		0		5
Total exposure duration for child cancer risk						12		21
Adult	2.4E-06	4.3E-06	0.12	0.21	NC	12	NC	33

Parcel B: chronic exposure, ingestion and dermal, cancer risk for PCBs

Exposure Group	Default Residential Scenario							
	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient		Cancer Risk			
	CTE	RME	CTE	RME	CTE	ED (yrs)	RME	ED (yrs)
POLYCHLORINATED BIPHENYLS (EPC: 0.275 mg/kg; Chronic MRL/RfD: NA; CSF: 2 (mg/kg/day)$^{-1}$)								
Birth to < 1 year	3.7E-06	7.0E-06	NC	NC	6.1E-7	1	1.4E-6	1
1 to < 2 years	3.7E-06	6.4E-06	NC	NC		1		1
2 to < 6 years	2.1E-06	4.3E-06	NC	NC		4		4
6 to < 11 years	1.4E-06	2.7E-06	NC	NC		5		5
11 to < 16 years	8.8E-07	1.2E-06	NC	NC		1		5
16 to < 21 years	7.7E-07	1.0E-06	NC	NC		0		5
Total exposure duration for child cancer risk						12		21
Adult	3.1E-07	5.5E-07	NC	NC	9.4E-8	12	4.6E-7	33

Parcel B: chronic exposure, ingestion and dermal, non-cancer hazard for Aroclor 1254 (as surrogate)

Exposure Group	Default Residential Scenario							
	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient		Cancer Risk			
	CTE	RME	CTE	RME	CTE	ED (yrs)	RME	ED (yrs)
AROCLOR 1254 (EPC: 0.275 mg/kg; Chronic MRL: 2E-05 mg/kg/day; CSF: NA								
Birth to < 1 year	3.7E-06	7.0E-06	0.18	0.35	NC	1	NC	1
1 to < 2 years	3.7E-06	6.4E-06	0.19	0.32		1		1
2 to < 6 years	2.1E-06	4.3E-06	0.10	0.22		4		4
6 to < 11 years	1.4E-06	2.7E-06	0.072	0.13		5		5
11 to < 16 years	8.8E-07	1.2E-06	0.044	0.061		1		5
16 to < 21 years	7.7E-07	1.0E-06	0.038	0.052		0		5
Total exposure duration for child cancer risk						12		21
Adult	3.1E-07	5.5E-07	0.015	0.027	NC	12	NC	33

City-owned right-of-way: Recreational Exposure

Contaminant Information

Contaminant Name	Entered Concentration	Type	Converted Concentration	Dermal Absorption Fraction	GI Absorption Factor (dermal)	Bioavailability Factor
POLYCHLORINATED BIPHENYLS	0.529	Maximum	0.529 mg/kg	0.14	1	1

Exposure for 4 days/week, 50 weeks/year, 19 years for children, 33 years for adults.
Soil adherence factor for children (> 2 years): 0.2 mg/cm^2-event, for adults: 0.07 mg/cm^2-event.

Recreational Exposure Parameters

Soil Ingestion Exposure Dose Equation

D = (C * IR * EF * CF) / BW

D = Exposure Dose (mg/kg-day), C = Contaminant Concentration (mg/kg), IR = Intake Rate (mg/day), EF = Exposure Factor (unitless), CF = Conversion Factor (10-6 kg/mg), BW = Body Weight (kg)

Soil Dermal Absorbed Dose Equation

DAD = (C * EF * CF * AF * ABSd * SA) / BW * ABSGI

DAD = Dermal Absorbed Dose (mg/kg-day), C = Contaminant Concentration (mg/kg), EF = Exposure Factor (unitless), CF = Conversion Factor (10^{-6} kg/mg),

AF = Adherence Factor to Skin (mg/cm^2-event), ABSd = Dermal Absorption Fraction to Skin (unitless), SA = Skin Surface Area Available for Contact (cm^2),

BW = Body Weight (kg), ABSGI = Gastrointestinal Absorption Factor (unitless)

Exposure Group	Body Weight (kg)	Age-Specific Exposure Duration (years)	Intake Rate (mg/day)			Adherence Factor to Skin (mg/cm^2-event)	Combined Skin Surface Area (cm^2)	Notes
			CTE	RME	Custom			
2 to < 6 years	17.4	4	60	200		0.2	1,544	
2 to < 6 years (pica)	17.4	NA	5,000	NA		0.2	1,544	
6 to < 11 years	31.8	5	60	200		0.2	2,434	
11 to < 16 years	56.8	5	30	100		0.2	3,674	
16 to < 21 years	71.6	5	30	100		0.2	4,213	
Adult	80	33	30	100		0.07	4,780	

Recreational Skin Surface areas (assuming shorts and short-sleeved shirts for children and adults, children and adults wear shoes)

☐ Use default skin surface area for each body part

Exposure Group	Skin Surface Area by Body Part (cm^2)										Combined Skin Surface Area (cm^2)	Notes
	☐	Head	☑	Hands	☑	Forearms	☑	Lower Legs	☐	Feet	Other		
2 to < 6 years (standard)	☐	585	☑	348	☑	457	☑	739	☐	463		1,544	
2 to < 6 years (pica)	☐	585	☑	348	☑	457	☑	739	☐	463		1,544	
6 to < 11 years	☐	660	☑	510	☑	680	☑	1,244	☐	730		2,434	
11 to < 16 years	☐	730	☑	720	☑	1,022	☑	1,932	☐	1,050		3,674	
16 to < 21 years	☐	750	☑	830	☑	1,211	☑	2,172	☐	1,120		4,213	
Adult	☐	1,250	☑	980	☑	1,240	☑	2,560	☐	1,295		4,780	

Right-of-way: chronic exposure, ingestion and dermal, cancer risk for PCBs

Exposure Group	Site Specific Scenario						
	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient		Cancer Risk		
	CTE	RME	CTE	RME	CTE	RME	ED (yrs)
POLYCHLORINATED BIPHENYLS (EPC: 0.529 mg/kg; Chronic MRL/RfD: NA; CSF: 2 (mg/kg/day)$^{-1}$)							
2 to < 6 years	1.7E-06	4.1E-06	NC	NC	4.9E-7	9.7E-7	4
6 to < 11 years	1.2E-06	2.4E-06	NC	NC			5
11 to < 16 years	6.8E-07	1.0E-06	NC	NC			5
16 to < 21 years	6.0E-07	8.8E-07	NC	NC			5
Total exposure duration for child cancer risk							19
Adult	2.8E-07	5.3E-07	NC	NC	2.4E-7	4.5E-7	33

Right-of-way: chronic exposure, ingestion and dermal, non-cancer hazard for Aroclor 1254 (as surrogate)

Exposure Group	Site Specific Scenario						
	Chronic Dose (mg/kg/day)		Chronic Hazard Quotient		Cancer Risk		
	CTE	RME	CTE	RME	CTE	RME	ED (yrs)
AROCLOR 1254 (EPC: 0.529 mg/kg; Chronic MRL: 2E-05 mg/kg/day; CSF: NA[1])							
2 to < 6 years	1.7E-06	4.1E-06	0.086	0.20	NC	NC	4
6 to < 11 years	1.2E-06	2.4E-06	0.058	0.12			5
11 to < 16 years	6.8E-07	1.0E-06	0.034	0.052			5
16 to < 21 years	6.0E-07	8.8E-07	0.030	0.044			5
Total exposure duration for child cancer risk							19
Adult	2.8E-07	5.3E-07	0.014	0.027	NC	NC	33