Health Consultation

Central Illinois Public Service Company (AMEREN CIPS)

Taylorville, Christian County, Illinois

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

ATSDR or ATSDR's Cooperative Agreement Partners create a health consultation in response to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. A health consultation can be verbal or written. To prevent or mitigate exposures, a consultation may suggest individuals or organizations take specific actions. For example, restricting use of or replacing water supplies, intensifying environmental sampling, restricting site access, or removing the contaminated material.

In addition, consultations may recommend other 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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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Acronyms and Abbreviations

95UCL	95 Percent Upper Confidence Limit
AALM	All-Ages Lead Model
AE	Andrews Engineering
ATSDR	Agency For Toxic Substances and Disease Registry
BaP	Benzo(a)pyrene
bgs	Below Ground Surface
BLL	Blood Lead Level
BTEX	Benzene, Toluene, Ethylbenzene, And Xylene
CIPS	Central Illinois Public Service Company
COC	Contaminant Of Concern
CREG	Cancer Risk Evaluation Guide
CR	Cancer Risk
CTE	Central Tendency Exposure
CV	Comparison Value
EPC	Exposure Point Concentration
EMEG	Environmental Media Evaluation Guide
EPA	United States Environmental Protection Agency
HC	Health Consultation
HQ	Hazard Quotient
IDPH	Illinois Department Of Public Health
IEPA	Illinois Environmental Protection Agency
mg/day	Milligrams Per Day
mg/kg	Milligrams Per Kilogram
mg/kg/day	Milligrams Per Kilogram Per Day
MRL	Minimal Risk Level
NHANES	National Health And Nutrition Examination Survey
NPL	National Priorities List
PAHs	Polycyclic Aromatic Hydrocarbons
PHA	Public Health Assessment
PHAST	Public Health Site Assessment Tool
RME	Reasonable Maximum Exposure
RMEG	Reference Dose Media Evaluation Guide
RSL	Regional Screening Level

UES	United Environmental Services
VOCs	Volatile Organic Compounds
µg/dL	Micrograms Per Deciliter
µg/kg	Micrograms Per Kilogram

1. Summary

The Agency for Toxic Substances and Disease Registry (ATSDR) evaluates community exposures and makes recommendations to prevent harmful exposures to hazardous substances in the environment. As a state partner of ATSDR, the Illinois Department of Public Health (IDPH) assists ATSDR in these efforts by producing public health assessments (PHAs) and health consultations (HCs). In response to a request from the Illinois Environmental Protection Agency (IEPA), IDPH evaluated potential health hazards from exposure to metals and polycyclic aromatic hydrocarbons (PAHs) in soil at Manners Park. Manners Park is located at 18 Manners Park Road in Taylorville, Christian County, Illinois. The park is directly east of the Ameren CIPS Superfund site (the Site).

IDPH evaluated potential public health hazards of contacting (touching) and ingesting (swallowing) contaminants in Manners Park soil. We reached the following conclusions.

Conclusion 1	Exposure to lead at the level found in soil at the Field 1 baseball diamond may have harmed the health of past (prior to 2023) summer league baseball players. Exposure to arsenic in the soil at Field 1 is not expected to have harmed the health of past summer league baseball players.
Basis for Conclusion	Lead exposure modeling showed a 28% (female players) and 33% (male players) probability of exceeding the reference blood lead level of 5 micrograms per deciliter (µg/dL), indicating exposures were likely to have increased blood lead levels, exceeding the reference value. However, exposures were modeled based on the earliest national blood lead data available (1999-2000) to be the most protective. In the United State, blood lead levels have steadily decreased every year, so using more recent national BLLs in the model would have likely presented less risk. Exposure to lead can harm a child's health and cause harmful effects, such as damage to the brain and nervous system, slowed growth and development, learning and behavior problems, and hearing and speech problems. Some other effects of lead exposure can include reduced intelligence, decreased ability to pay attention, and underperformance in school. IDPH estimated exposure doses for past exposures to arsenic and compared them to applicable health guidelines or current risk

	assessment guidance. Maximum doses of arsenic were not likely to cause noncancer or cancer health effects. There is some uncertainty in these conclusions, particularly about lead exposure because the conclusion is based on a small number of samples from Field 1 and it is unclear how often the field was used prior to stoppage of use after the 2022 season.
Next Steps	The level of lead in soil exceeds the United States Environmental Protection Agency (EPA) regional screening level (RSL) in three soil samples by up to 20 times. The samples were collected on or near Field 1. IDPH recommends that the Taylorville Park District conduct additional soil sampling for metals at Field 1. The sampling can help assessors more accurately determine the concentration of lead to which baseball players may have been exposed. IDPH supports Taylorville Park District's continued enrollment in IEPA's Voluntary Site Remediation Program until IEPA determines no further remediation is necessary. In the meantime, the Taylorville Park District is encouraged to ensure the existing fence and gate locks are maintained and working properly.
Conclusion 2	Exposure to lead in soil behind the Dining Hall is not expected to harm the health of renters of the facility in the past, present, or future.
Basis for Conclusion	Lead exposure modeling indicated that past, present, and future exposures to lead at the Dining Hall is very unlikely to have caused or cause blood lead levels to exceed 5 µg/dL because exposure was infrequent. Some uncertainty exists in this conclusion about lead exposure because the conclusion is based on a small number of samples.
Next Steps	IDPH recommends additional soil sampling for metals near the Dining Hall. The sampling would help assessors more accurately determine the concentration of lead to which renters may be exposed. The Taylorville Park District is encouraged to repair and reinforce the snow fencing around this area with "Keep Out" signage to limit exposure to lead as much as possible.
Conclusion 3	Exposure to metals and PAHs in Manners Park soil is not expected to harm the health of park recreators.
Basis for Conclusion	IDPH estimated exposure doses for past, present, and future exposures to arsenic, lead, manganese, and PAHs. IDPH also applied current risk assessment guidance. Exposure to arsenic in

	park soil was not likely to cause noncancer or cancer health effects. Lead exposure modeling indicated that past, present, and future exposures to lead in park soil were very unlikely to cause blood lead levels to exceed 5 µg/dL. Estimated exposure to manganese in soil was more than 20 times lower than the effect level identified in human studies. The lower level indicates that noncancer health effects are unlikely. Estimated cancer risks were below 1E-6 (1 in 1,000,000) for PAH exposure. IDPH considers cancer risks below 1E-6 to be negligible. This indicates that exposures to PAHs will not significantly contribute to cancer risks.
Next Steps	No further action is recommended for other areas of the park besides Field 1 and the Dining Hall. The Taylorville Park District can resume normal use of all baseball diamonds at the park other than Field 1. Additional sampling of Field 1 will allow us to determine its usability in the future.
For More Information	If you have concerns about your health, you should contact your local health care provider. Questions about this report or exposures associated with this site can be directed to the IDPH Toxicology Section at DPH.Tox@illinois.gov or 217-782-5830.

2. Background

2.1 Statement of Issue and Purpose

In Spring of 2024, IEPA requested that IDPH review sampling data for PAHs and metals in Manners Park soil. Community members in Taylorville expressed concerns about possible PAH contamination in the baseball diamonds used by youth summer and recreational league baseball teams. IEPA sampled the soil in the baseball diamonds and throughout the rest of the park. IEPA assessed the soil for metals and PAHs, and in the course of their environmental investigation, discovered lead above EPA's RSL of 200 mg/kg in multiple locations. RSLs are risk-based concentrations derived from EPA toxicity data. RSLs are considered to be levels that protect humans (including sensitive groups) over a lifetime.

This report evaluates the soil sampling data collected by IEPA, environmental contractors UES, and Andrews Engineering. The report describes the potential public health hazards posed by PAHs and metals for those who use the park.

2.2 Site Description and Timeline

The Central Illinois Public Service Company (Ameren CIPS) Superfund Site is approximately 1 acre of industrial land. It is located on the southern edge of Taylorville in Christian County, IL, at 917 South Webster Street. **(Figure 1)**. A manufactured gas plant operated on the Site from 1892 to 1932. The plant used coal to produce a low-quality gas that was used for lighting and heating. As a result, the plant produced coal tar as a byproduct. This compound is comprised of volatile organic compounds (VOCs) such as benzene and PAHs. PAHs include naphthalene and benzo(a)pyrene (BaP). The VOCs and PAHs have contaminated soil and groundwater in the area.

In 1996, IDPH, in collaboration with ATSDR, completed a PHA. The PHA concluded that the Site did not pose a public health hazard. However, in the spring of 2024, IEPA shared new community concerns from the Taylorville Parks District with IDPH. The community was concerned about exposure to soil contaminants in Manners Park and requested an evaluation of potential public health hazards. Manners Park, established in 1913, is located directly to the east of the Site and includes baseball diamonds, a playground, a frisbee golf course, and a dining hall (referred to in this HC as the Dining Hall).

Past activities at the Site and adjoining areas included the following.

- 1985: Contractors attempting to install a private septic line discovered contamination onsite. They found strong odors and discolored soil.
- 1986: Ameren investigated and confirmed the presence of PAHs and gasoline range organic chemicals benzene, toluene, ethylbenzene, and xylene (BTEX) in soil and groundwater on and off the Site. Offsite concentrations of PAHs and BTEX were at or near background levels.

- 1987: Ameren removed all buried tanks and replaced approximately 12,000 cubic yards of soil and sediment on the Site. On-site soils were replaced to a depth of 12 feet.
- 1990: Site listed on EPA's National Priorities List (NPL).
- 1996: In cooperation with ATSDR, IDPH published a PHA concluding that the Site posed no apparent public health hazard because the exposures did not exceed health guidelines. IDPH also determined that cancer risks associated with completed exposure pathways were insignificant. Surface soil samples were not collected on- or off-site, so this pathway was not evaluated. IDPH reasoned that surface soil was most likely uncontaminated prior to the subsurface release in 1985, so exposure to PAHs in surface soil was unlikely.
- 2000: IDPH published a descriptive analysis of county-level neuroblastoma incidence data in its Health and Hazardous Substances Registry Newsletter. Christian County was the only county showing a statistically significant increase in neuroblastoma cases: one case was expected and seven cases were observed from 1986 to 1997. IDPH has not seen an increase in neuroblastoma cases since 1997.
- 2014: Ameren completed a soil vapor investigation at the Site. Five soil vapor monitoring wells were installed on July 29, 2014. The wells were used to evaluate if vapors were present in unsaturated soils on the Site. One well was placed on the north side of the Site, in the general area of where the fuel oil impacts were observed. The nearest residence is north of the Site within 10 feet of the fence line. Most VOCs did not exceed Illinois soil vapor remediation objectives. The VOCs that did exceed the objectives were trichloroethylene and naphthalene.
- August 2023: Ameren initiated an in-situ stabilization pilot study to help them achieve their remediation goals for groundwater contamination.
- October 2023: In late September, residents began to report odors they attributed to the Site. IEPA visited the Site to investigate the odors and detected VOCs as high as 449 parts per billion. These measurements were collected on the Site and at the fence line. The source of the VOCs was not clear, but IEPA requested that Ameren shut down the in-situ stabilization pilot project immediately due to odor concerns.
- January 2024: Ameren ended work at the Site.
- March 2024: The Taylorville Park District Board of Trustees unanimously approved a plan to close certain areas of Manners Park east of the Site. The City of Taylorville also contracted UES to conduct soil and soil vapor sampling at Manners Park. UES was to sample for VOCs and PAHs due to community concerns about soil contamination from the Site. Additionally, the Site had its sixth 5-year review. USEPA and IEPA visited the Site and hosted a public question and answer session in Taylorville.
- May 2024: The community requested IEPA collect additional soil samples from Manners Park. On May 16, IEPA collected 12 surface soil samples throughout the park and had them analyzed for VOCs, PAHs, and metals. The results were shared with IDPH in August 2024.

- October 2024: Anderson Engineering (AE) collected 17 soil samples at Manners Park as part of Taylorville Park District's enrollment in IEPA's Voluntary Site Remediation Program. AE detected lead, which exceeded the EPA regional screening level (RSL) of 200 mg/kg, in one area within the park.

2.3 Site Visits

IDPH performed a site visit in February 2025 and noted that

- Snow fencing was installed near the Dining Hall. However, large portions of the fencing had collapsed and were lying flat on the ground **(Figures A1-A3**, **Appendix A)**. "Keep Out" signage was placed on the snow fencing, but those were lying on the ground as well.
- The fencing at Field 1 next to the Dining Hall had "Keep Out" signage at several points. Gates to the field are chained and locked.
- There was tall, well-maintained fencing around the Site with "No Trespassing" and "Authorized Personnel Only" signage posted at multiple points. There was also a plastic box with Site fact sheets attached to the fence **(Figures A4-A5, Appendix A)**.

3. Community Description and Concerns

People within a 5-mile radius of Taylorville's city center were potentially exposed because anyone in that area can be reasonably expected to visit the park. According to 2020 Census data, this area's population is 12,028 people (US Census Bureau, 2020).

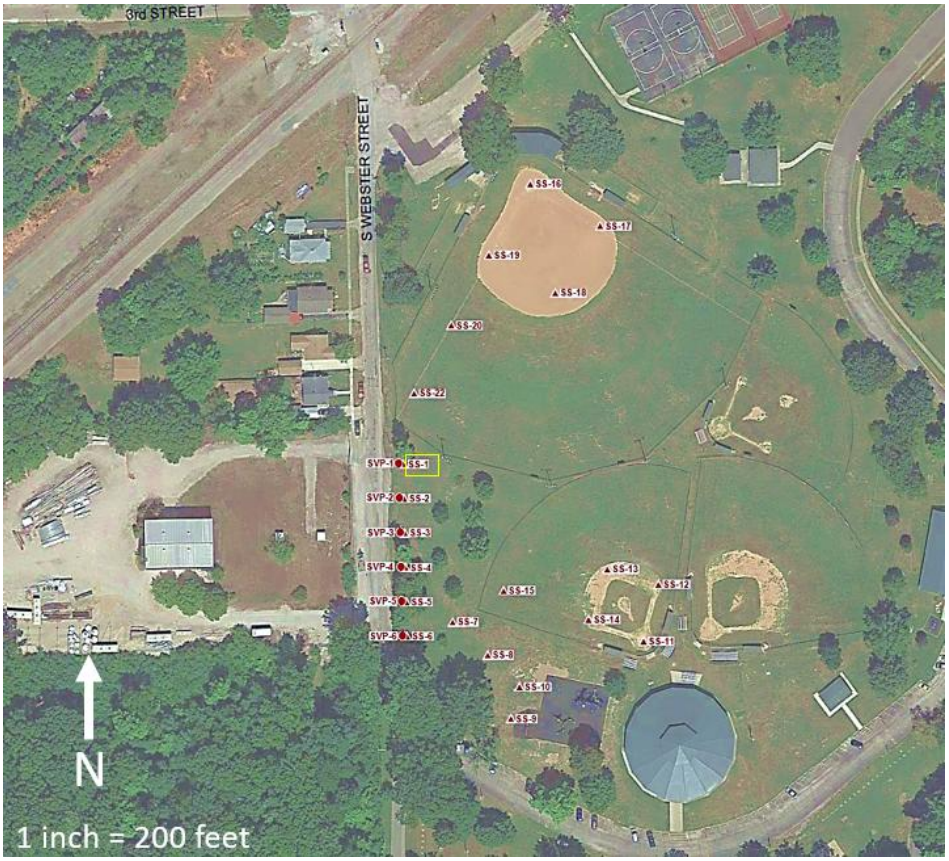
Community members have expressed concerns about the possibility of exposure to PAHs at Manners Park because certain PAHs are known human carcinogens. Residents were specifically concerned about the baseball diamonds used by the town's summer league baseball teams because of their proximity to the Site. These concerns led the Taylorville Park District to cancel all games at Manners Park for the summer league's 2024 season. The City of Taylorville subsequently contracted UES to conduct soil sampling at the park to assess the degree of contamination. Results from this investigation showed that PAH concentrations throughout most of the park were consistent with average background concentrations (IEPA, 2024). The Taylorville Park District shared these findings with community members. Since then, community concerns about this potential health hazard have eased.

4. Sampling Data

Environmental samples were collected at Manners Park during three separate investigations. In March of 2024, UES collected 21 soil samples (0 to 6 inches) from two baseball diamonds and the western edge of the park. UES also collected soil gas samples approximately 9 to 10 feet below ground surface (bgs). These samples were collocated with the soil samples at the western edge of the park nearest to the Site. (**Figure 2**). All the soil samples were analyzed for

PAHs. The highest detection of total PAHs (1.08 milligrams per kilogram (mg/kg)) is indicated by the yellow box in Figure 2.

Figure 2: UES Sampling Locations (UES, 2024)



All soil gas samples from the park were analyzed for VOCs. There were three detections of VOCs (1,3-butadiene, acrylonitrile, and benzene) above applicable comparison values (CVs). Comparison values are chemical concentrations in soil, water, air, or soil gas that are used to select chemicals for further evaluation. The three VOCs that were detected in soil gas above CVs are not expected to impact nearby residences. No impact is expected because all residences are greater than 100 linear feet from the sampling locations (ATSDR, 2016) and area groundwater flows away from nearby residences (Andrews Engineering, 2024). The soil gas data were not assessed further because residential homes are not close to contaminated soil gas and because contaminated groundwater is moving away from the residential homes. Therefore, it's not likely that nearby residents will be exposed to soil gas.

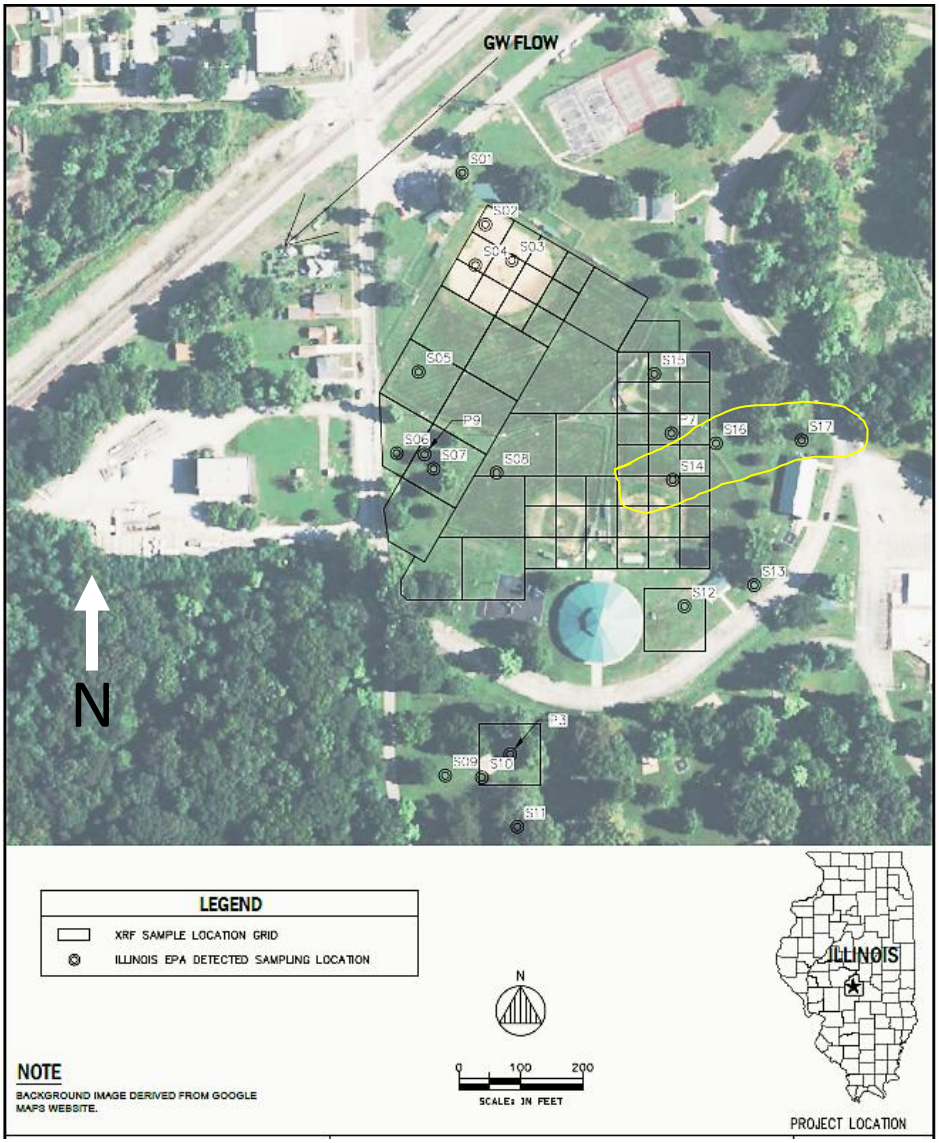
In May of 2024, IEPA collected 12 soil samples from random locations around Manners Park. The samples were analyzed for PAHs, metals, and BTEX **(Figure 3)**. There were no detections of BTEX. PAH detections were near average background levels. Lead was detected at 3,030 mg/kg at sampling point P7. Manganese was detected at 2,060 mg/kg at sampling point P9 (shown in

the yellow boxes in **Figure 3**).

Figure 3: IEPA Sampling Locations (IEPA, 2024)

In October 2024, AE collected 17 soil samples and analyzed them for metals. Sampling locations were selected by screening soil from areas of the park with an x-ray fluorescence analyzer. Samples were collected at locations where detections exceeded IEPA soil remediation objectives for arsenic and lead (AE, personal communication, 2025) **(Figure 4)**. Samples with elevated metals were at sampling points S14, S16, and S17, outlined by yellow in **Figure 4.** Arsenic was detected as high as 74 mg/kg. Lead was detected as high as 6,030 mg/kg. Based on the distribution of detections above CVs at these sampling points and the detection at sampling point P7 (**Figure 3**), there is an area of lead contamination near the Dining Hall that extends into Field 1.

Figure 4: AE Sampling Locations (AE, 2024)



5. Scientific Evaluations

IDPH assesses potential public health hazards from environmental contamination using a method called the ATSDR Public Health Assessment process. In general, this involves the following:

1. Conducting an exposure pathway analysis to see how a person could be exposed to a contaminant
2. Comparing concentrations in different environmental media (drinking water, soil, air, or food) to comparison values (CVs) to identify potential contaminants of concern (COC)
3. Calculating estimated doses based on the concentration of a contaminant and the expected amount of exposure to that contaminant

4. Comparing that estimated dose to health guidelines or applying mathematical risk factors which indicate the potential for certain adverse health effects
5. Conducting an in-depth toxicological analysis when doses exceed guidelines to determine if residents might experience harmful effects
6. Determining whether a public health hazard exists either in the past, present, or future

5.1 Exposure Pathway Analysis

IDPH determines whether people may have come in contact with contaminants by examining *exposure pathways*. An exposure pathway is the route a contaminant takes from its source (where it began) to its end point (where it ends), and how people can contact (or be exposed to) it. An exposure pathway has five elements:

1. A source of contamination
2. Some transport through an environmental medium (air, soil, water, or food)
3. A point of exposure where people could contact the contaminant
4. A route of exposure for the contaminant to be taken in by individuals
5. A potentially exposed population (ATSDR, 2022a)

Exposure pathways can be either completed, potential, or eliminated.

Completed exposure pathways are those pathways where all five elements are present and indicate that exposure to site related contaminants occurred in the past, is now occurring, or will occur in the future. A completed pathway does not mean exposure will lead to harmful health effects. A scientific evaluation is needed to determine whether exposures might result in harmful health effects.

Potential exposure pathways are those for which one or more of the elements are missing, but information is insufficient to eliminate or exclude the element. Potential exposure pathways suggest that exposure to site-related contaminants could have occurred in the past, could be occurring now, or could occur in the future.

Eliminated exposure pathways are missing one or more elements that will never be present. Eliminated exposure pathways indicate that exposure to site-related contaminants has not or will never occur (ATSDR, 2022a).

Source of contamination: No manmade source of PAHs or metals contamination has been identified. PAH concentrations in Manners Park are similar to average background levels in non-metropolitan areas in Illinois (IEPA, 2024). In addition, there are many manmade and natural sources of PAHs in the environment (ATSDR 1995). Their presence in Manners Park soil may not be associated with the Site.

The lead that was detected above CVs were clustered in the area near the Dining Hall and Field 1. The City of Taylorville purchased the land for Manners Park in 1913. Historically, the area in

and around Manners Park has served as a place for recreation. There is no known history of it having been used by industries which would have produced lead-contaminated waste. There is no suspected source of arsenic or manganese. Both occur naturally in the environment and have historically been used in many applications.

Transport through an environmental medium: PAHs, arsenic, lead, and manganese strongly adsorb to soil particles and do not move easily through soil. Therefore, these contaminants are not likely to leach into groundwater.

Point of exposure: Exposure units are a geographically defined point or area where a person is expected to contact a contaminated environmental medium, such as soil, surface water, groundwater, air, or food items (e.g., fruits, vegetables, fish, game).

IDPH has defined three exposure units for this report:

Field 1 – This is a baseball diamond at the southern end of Manners Park. It was used for summer league baseball for ages 9-14. Field 1 is collocated with other nearby soil samples with high levels of lead. Because of this, soil exposures in this area are of particular public health importance.

Dining Hall – This includes the area of grass immediately surrounding the Dining Hall. This facility is rented for large private gatherings throughout the year. Individual exposures to contaminants in this area are expected to be infrequent because of the way the facility is used. This area was considered separately from the rest of the park because it is not expected to be accessed as often as the rest of the park. Most contact with soil in the Dining Hall area is expected to be by those using the Dining Hall during gatherings.

Manners Park – The remaining areas of Manners Park include the frisbee golf course, three other baseball fields, tennis courts, and playground. These areas are considered a distinct exposure unit. Any person could move randomly throughout the park and come into contact with contaminated soil.

Route of exposure: Recreators who are exposed to contaminated soil while playing in the park may ingest contaminants in soil. This can happen when young children put their hands in their mouths or when teens or adults eat or drink without washing their hands.

Potentially exposed populations: Exposed populations include past summer league baseball players, renters of the Dining Hall, and recreators in Manners Park.

The following is a description of exposure pathways we identified at Manners Park.

5.1.1 Completed Pathways

Past incidental ingestion of and skin contact with arsenic and lead in Field 1 soil for summer league baseball players – Arsenic was detected above CVs in a localized area with high lead

levels in soil. This area extends from near the Dining Hall to Field 1. Field 1 was used for summer league baseball for years through the 2022 season. This pathway assesses exposures for summer league baseball players prior to 2023.

Past incidental ingestion of and skin contact with lead at the Dining Hall for renters – The Dining Hall is within an area with high concentrations of lead. People renting the Dining Hall could have been exposed to lead in soil outside of the facility. They may have been directly exposed from being outside or indirectly exposed from soil being tracked into the indoor dining area.

Past, present, and future incidental ingestion of and skin contact with metals and PAHs in Manners Park soil for park recreators – This pathway is considered completed because soil sampling data show concentrations of metals and PAHs throughout the park and people can access most areas of the park regularly.

5.1.2 Potential Pathways

Present and future incidental ingestion of and skin contact with lead at the Dining Hall for renters - There is currently snow fencing installed around the contaminated area, with "Keep Out" signage posted. This is expected to keep renters and their children out of this area while they use the building. The pathway is considered potential because portions of the snow fence have collapsed, the "Keep Out" signs have fallen on the ground, and the contaminated soil is still in place. Therefore, young children may still access the area currently and in the future and be exposed to contaminated soil.

5.1.3 Eliminated Pathways

Present and future incidental ingestion of and skin contact with lead in Field 1 soil for summer league baseball players – Games haven't been played at this field since the end of the 2022 season, per personal communication with the president of the Taylorville Park District Board. The City of Taylorville will not use it for summer league until clean-up has been completed. Because summer league baseball players aren't being exposed, this pathway is considered eliminated at present and in the future.

5.2 Soil Evaluation

After determining exposure pathways, we evaluate the concentrations of potential COCs to which people are exposed. To do so, we screen available data, derive exposure point concentrations (EPCs) for each exposure unit, and then estimate exposure doses based on those EPCs.

5.2.1 Screening Analysis

The maximum concentrations of PAHs and metals from each exposure unit were compared to ATSDR CVs. ATSDR develops different CVs for *noncancer* and *cancer* health effects. When developing noncancer CVs, ATSDR assumes that only noncancer health effects could occur

while using appropriate noncancer health guidelines and standard exposure assumptions. When developing cancer CVs, ATSDR assumes that only cancer health effects could occur while using EPA's cancer risk values. The cancer risk values identify estimated concentrations of cancer-causing contaminants that would be predicted to cause no more than one excess cancer in a million persons exposed during their lifetime (78 years).

IDPH uses the lowest of the two CVs for screening when a contaminant has both a cancer and noncancer CV, with the exception of arsenic because the arsenic CV for cancer is below background levels. Exceeding a CV does not mean a harmful health effect will occur, but it does mean that exposures to the contaminant need to be further evaluated. In addition to ATSDR CVs, IDPH may use non-ATSDR screening levels when ATSDR CVs are not available, or when the other screening levels are more protective than ATSDR CVs.

Contaminants that exceeded CVs (arsenic, lead, and PAHs) are considered potential COCs and are evaluated further. Manganese does not have a CV but was evaluated further because studies have shown that children may experience neurological effects when exposed to manganese in drinking water (ATSDR, 2012). All other contaminants were removed from further consideration. Further information on the CVs and health guidelines used in this report can be found in **Appendix C.**

PAH sampling data are screened for noncancer health effects by individual chemical. The highest detection of benzo(a)pyrene (BaP) was 0.665 mg/kg. This does not exceed the noncancer CV.

When screening for cancer health effects, PAHs are not evaluated individually. In each sample, the concentrations of a specific group of PAHs are adjusted to their equivalent concentration of BaP and all these equivalents are summed. This sum is called a "BaP Equivalent," which is then screened with a CV for BaP Equivalent. The resulting sum is used to estimate exposure doses. Thus, screening results and subsequent exposure dose estimates for PAHs are presented as "BaP Equivalent", but they are referring to exposure to PAHs. **Tables 1 thru 3** summarize the screening results.

Table 1: Metals Soil Sampling Results for Field 1 in Milligrams per Kilogram (mg/kg)

Contaminant	Number of Samples	Maximum Concentration	Comparison Value	Comparison Value Source
Arsenic	2	17	3.1	ATSDR RMEG*
Lead	2	3,030	200	EPA RSL†

*Agency for Toxic Substances and Disease Registry's (ATSDR) Reference Dose Media Evaluation Guide for a chronic child exposure to arsenic in soil.

† United States Environmental Protection Agency's (EPA) Regional Screening Level for lead in soil

Table 2*:* Metals Soil Sampling Results for the Dining Hall in Milligrams per Kilogram (mg/kg)

Contaminant	Number of Samples	Maximum Concentration	Comparison Value	Comparison Value Source
Lead	2	6,030	200	EPA RSL†

† United States Environmental Protection Agency's (EPA) Regional Screening Level for lead in soil.

Table 3: PAH and Metals Soil Sampling Results for the remaining areas of Manners Park in Milligrams per Kilogram (mg/kg)

Contaminant	Number of Samples	Maximum Concentration	Comparison Value	Comparison Value Source
Arsenic	25	17	3.1	ATSDR RMEG*
Lead	25	222	200	EPA RSL†
Manganese	25	2,060	N/A	N/A
BaP Equivalent	32	1.08	0.065	ATSDR CREG ‡

*****Agency for Toxic Substances and Disease Registry's (ATSDR) Reference Dose Media Evaluation Guide for a child's chronic exposure to arsenic in soil.

† United States Environmental Protection Agency's (EPA) Regional Screening Level for lead in soil

‡ ATSDR's Cancer Risk Evaluation Guide for exposure to BaP Equivalent in soil.

5.2.2 Evaluation of Combined Ingestion and Skin Contact

5.2.2.1 Exposure Point Concentrations and Exposure Calculations

ATSDR's Public Health Assessment Guidance Manual instructs that the sample results be used to estimate an EPC for each potential contaminant of concern (COC). Then, the EPC is used to estimate an exposure dose for each potential COC. An EPC is the concentration of a contaminant at a point or over an area to which a person may be exposed. Several different methods can be used to determine the EPC. One method is to determine the upper 95th percent confidence limit (95UCL) of the mean calculated for each contaminant at the Site. Sometimes, the arithmetic mean, the geometric mean, or the maximum detected concentration of the contaminant is a more appropriate value to use for estimating exposure or dose (ATSDR, 2022).

IDPH used the maximum detections of arsenic and lead as the EPC at Field 1 because of the small number of samples. The 95UCL of the mean or arithmetic mean were used for the rest of the exposure units because of a greater number of available samples (ATSDR, 2022).

Table 4: Exposure Point Concentrations (EPCs) for Metals in Field 1 in Milligrams per Kilogram (mg/kg)

Contaminant	EPC Type	EPC
Arsenic	Maximum	17
Lead	Maximum	3,030

Table 5: Exposure Point Concentrations (EPCs) for Metals at the Dining Hall in Milligrams per Kilogram (mg/kg)

Contaminant	EPC Type	EPC
Lead	Arithmetic Mean	3,355

Table 6: Exposure Point Concentrations (EPCs) for Metals and BaP Equivalent in Manners Park in Milligrams per Kilogram (mg/kg)

Contaminant	EPC Type	EPC
Arsenic	95UCL of the Mean	7
Lead	Arithmetic Mean	62
Manganese	95UCL of the Mean	1,318
BaP Equivalent	BaP Equivalent	0.2

IDPH used the ATSDR Public Health Site Assessment Tool (PHAST) to estimate exposure doses of arsenic and BaP equivalents based on the EPC for each exposure. Using average intake rates of soil, a *central tendency exposure* (CTE) value was used to estimate exposure. For above-average intake rates (in the 95th percentile), an intake rate reflecting a *reasonable maximum exposure* (RME) was used. An RME scenario refers to intake rates which are above average but still realistic. Estimated exposure doses are presented in milligrams per chemical, per kilogram of body weight, per day, written as, "mg/kg/day." IDPH used soil-only intake rates in this HC because exposures are occurring at a park. Thus, indoor dust concentrations from being in the person's home can't be estimated and incorporated into ingestion rates as they would be for residential exposures. **Tables 7 and 8** provide the intake rates and body weights for each exposed population group used in this report.

Table 7: Intake Rates and Body Weights for Manners Park Recreators and Dining Hall Renters

Exposed Population Group (Age)	Intake Rate (mg/day)*	Body Weight (kg)
2 to < 6 years	30	17.4
6 to < 11 years	30	31.8
11 to < 16 years	10	56.8
16 to < 21 years	10	71.6
Adult	10	80

* milligrams per day

Table 8: Intake Rates and Body Weights for Field 1 Summer League Baseball Players

Exposed Population Group (Age)	Intake Rate (mg/day)*	Body Weight (kg)
6 to < 11 years	200	31.8
11 to < 16 years	200	56.8

* milligrams per day

IDPH used EPA's All Ages Lead Model (AALM) to assess exposures to lead in soil. The AALM reports the percentage of probability that a person's blood lead level (BLL) will exceed a specified reference BLL based on

- the concentration of lead in various media,

- frequency and duration of exposure,
- the sex of the individual, and
- the baseline blood lead level at the time of exposure.

Baseline BLLs were derived based on sex, age, and the geometric mean BLL from the National Health and Nutrition Examination Survey (NHANES) blood lead data. The BLLs were relative to the estimated time of exposure. IDPH used reference BLLs of 3.5 and 5 µg/dL for this report. Projections which exceeded a 5% chance of exceeding the 5 µg/dL reference BLL were considered a health hazard. However, no safe BLL for lead has been determined; therefore, reducing lead levels in blood as much as possible is a good public health goal.

Past incidental ingestion of and skin contact with arsenic and lead in Field 1 soil for summer league baseball players – Exposures to arsenic and lead in Field 1 soil were estimated based on their respective EPCs for 9-14 year old children (the approximate ages of children that used this field for summer league baseball practices and games). IDPH assumed children would practice or play at Field 1 three days per week, 12 weeks per year, for up to 6 years with RME intake rates (200 mg/day). **Tables 9 and 10** summarize exposures to arsenic and lead in this scenario, respectively.

Table 9: Site-specific Combined Incidental Ingestion and Skin Contact Exposure Doses for Chronic Exposure to Arsenic in Field 1 Soil at 17 mg/kg including Noncancer Hazard Quotients and Cancer Risk Estimates*

Exposure Group	RME Dose (mg/kg/day)	RME Noncancer Hazard Quotient	RME Cancer Risk	Exposure Duration (yrs)
9-10 years	7.3E-6	0.1	6E-6†	2
11-14years	4.3E-6	0.07	7E-6	4
Total Child	-	-	-	6

Source: [IEPA, 2024]
Abbreviations: mg/kg/day = milligram chemical per kilogram body weight per day; mg/kg = milligram chemical per kilogram soil; RME = reasonable maximum exposure (higher); yrs = years
* The calculations in this table were generated using ATSDR's PHAST v2.5.1.0. The noncancer hazard quotients were calculated using the chronic (lifetime) reference dose of 6E-5 mg/kg/day and the cancer risks were calculated using the cancer slope factor of 32 $(mg/kg/day)^{-1}$.
† Indicates that the cancer risk exceeds one extra case in a million people similarly exposed, which ATSDR evaluates further.

Table 10: All Ages Lead Model Results -- Field 1 – Past Summer League Baseball Players*

Exposure Group	Baseline BLL†	EPC (mg/kg)	EPC Type	Projected Average BLL (µg/dL)	Probability of Exceeding 3.5 µg/dL (%)	Probability of Exceeding 5 µg/dL (%)
Summer League Baseball Player (Male)	1.51	3,030	Maximum	4	62	33

Exposure Group	Baseline BLL†	EPC (mg/kg)	EPC Type	Projected Average BLL (µg/dL)	Probability of Exceeding 3.5 µg/dL (%)	Probability of Exceeding 5 µg/dL (%)
Summer League Baseball Player (Female)	1.51	3,030	Maximum	3.8	57	28

Source: [IEPA, 2024]
Abbreviations: EPC = exposure point concentration; mg/kg = milligram chemical per kilogram soil; BLL = blood lead level; µg/dL = microgram chemical per deciliter blood
* The calculations in this table were generated using EPA's All Ages Lead Model v3.0.
† Source: National Health and Nutrition Examination Survey (NHANES) Biomonitoring Data Tables for Environmental Chemicals (Age 6-11 years; 1999-2010)

Past incidental ingestion of and skin contact with lead at the Dining Hall for renters – Exposures in this area would be irregular and infrequent for most people, so an acute exposure scenario was seen as most appropriate. IDPH assumed children as young as 2 years old could play in this area, so these exposures were assessed based on this age to be the most protective. IDPH estimated people could have been exposed to lead at the EPC in this area for a single day in one year. CTE intake rates were assumed for this area because there are no bare patches of dirt where higher contact with soil would be expected. Exposures to other potential COCs were not evaluated because arsenic did not exceed its screening level for acute exposures and samples were not collected for PAHs. **Table 11** summarizes exposures to lead in this scenario.

Table 11: All Ages Lead Model Results – Dining Hall – Past Renters*

Exposure Group	Baseline BLL†	EPC (mg/kg)	EPC Type	Projected Average BLL (µg/dL)	Probability of Exceeding 3.5 µg/dL (%)	Probability of Exceeding 5 µg/dL (%)
Renter (Child, Male)	2.23	3,355	Maximum	2.23	17	4
Renter (Child, Female)	2.23	3,355	Maximum	2.23	17	4
Renter (Adult, Male)	2.01	3,355	Maximum	2.01	12	3
Renter (Adult, Female)	1.37	3,355	Maximum	1.37	2	0.3

Source: [AE, 2024]
Abbreviations: EPC = exposure point concentration; mg/kg = milligram chemical per kilogram soil; BLL = blood lead level; µg/dL = microgram chemical per deciliter blood
* The calculations in this table were generated using EPA's All Ages Lead Model v3.0.
† Source: NHANES Biomonitoring Data Tables for Environmental Chemicals (1999-2010)

Past, present, and future incidental ingestion of and skin contact with metals and PAHs in Manners Park soil for park recreators - Exposures to metals and PAHs throughout Manners Park were estimated for age groups ranging from 2 years to adult (21 years and older) based on the EPC for Manners Park. IDPH assumed someone could be exposed to park soil twice per week, 39 weeks per year, for 33 years. CTE intake rates were assumed because there are no bare patches of dirt in this area where higher contact with soil would be expected. Exposure during

all 52 weeks of the year was not assumed, because there is a chance that the ground will be frozen or covered by ice or snow approximately 3 months of the year. **Tables 12-15** summarize exposures to metals and PAHs in this scenario.

Table 12: Site-specific Combined Incidental Ingestion and Skin Contact Exposure Doses for Chronic Exposure to Arsenic in Manners Park Soil at 7 mg/kg including Noncancer Hazard Quotients and Cancer Risk Estimates*

Exposure Group	CTE Dose (mg/kg/day)	CTE Noncancer Hazard Quotient	CTE Cancer Risk	Exposure Duration (yrs)
2 to < 6 years	2.9E-06	0.05	-	4
6 to < 11 years	1.9E-06	0.03	-	5
11 to < 16 years	1.0E-06	0.02	-	5
16 to < 21 years	8.9E-07	0.02	-	5
Total Child	-	-	1E-5 ‡	19
Adult	3.5E-07	0.006	5E-6 ‡	33

Source: [AE, 2024; IEPA, 2024]
Abbreviations: CTE = central tendency exposure (typical); mg/kg/day = milligram chemical per kilogram body weight per day; mg/kg = milligram chemical per kilogram soil; yrs = years
* The calculations in this table were generated using ATSDR's PHAST v2.5.1.0. The noncancer hazard quotients were calculated using the chronic (lifetime) reference dose of 6E-5 mg/kg/day and the cancer risks were calculated using the cancer slope factor of 32 $(mg/kg/day)^{-1}$.
‡ Indicates that the cancer risk exceeds one extra case in a million people similarly exposed, which ATSDR evaluates further.

Table 13: All Ages Lead Model Results – Manners Park – Recreators*

Population Group	Baseline BLL†	EPC (mg/kg)	EPC Type	Projected Average BLL (µg/dL)	Probability of Exceeding 3.5 µg/dL (%)	Probability of Exceeding 5 µg/dL (%)
Recreator (Child, Male)	2.23	62	Arithmetic Mean	1.16	1	0.1
Recreator (Child, Female)	2.23	62	Arithmetic Mean	1.16	1	0.1
Recreator (Adult, Male)	2.01	62	Arithmetic Mean	2.05	13	3
Recreator (Adult, Female)	1.37	62	Arithmetic Mean	1.37	3	0.4

Source: [AE, 2024; IEPA, 2024]
Abbreviations: EPC = exposure point concentration; mg/kg = milligram chemical per kilogram soil; BLL = blood lead level; µg/dL = microgram chemical per deciliter blood
* The calculations in this table were generated using EPA's All Ages Lead Model v3.0.
† Source: NHANES Biomonitoring Data Tables for Environmental Chemicals (1999-2010)

Table 14: Site-specific Combined Incidental Ingestion and Skin Contact Exposure Doses for Chronic Exposure to Manganese in Manners Park Soil at 1,318 mg/kg.* HQs could not be calculated because health guidelines are not available.

Exposure Group	CTE Dose (mg/kg/day)	Exposure Duration (yrs)
2 to < 6 years	0.0026	4
6 to < 11 years	0.0020	5
11 to < 16 years	0.0014	5
16 to < 21 years	0.0012	5
Total Child	-	21
Adult	0.00041	33

Source: [AE, 2024; IEPA, 2024]
Abbreviations: CTE = central tendency exposure (typical); mg/kg/day = milligram chemical per kilogram body weight per day; mg/kg = milligram chemical per kilogram soil; RME = reasonable maximum exposure (higher); yrs = years
* The calculations in this table were generated using ATSDR's PHAST v2.5.1.0.

Table 15: Site-specific Combined Incidental Ingestion and Skin Contact Exposure Doses for Chronic Exposure to BaP Equivalent in Manners Park Soil at 0.2 mg/kg including Cancer Risk Estimates*

Exposure Group	CTE Dose (mg/kg/day)	CTE Cancer Risk	Exposure Duration (yrs)
2 to < 6 years	2.4E-07	-	4
6 to < 11 years	1.7E-07	-	5
11 to < 16 years	1.1E-07	-	5
16 to < 21 years	1.0E-07	-	5
Total Child	-	2E-7	21
Adult	3.5E-08	3E-8	33

Source: [UES, 2024; IEPA, 2024]
Abbreviations: CTE = central tendency exposure (typical); mg/kg/day = milligram chemical per kilogram body weight per day; mg/kg = milligram chemical per kilogram soil; yrs = years
* The calculations in this table were generated using ATSDR's PHAST v2.5.1.0. The cancer risks were calculated using the cancer slope factor of 1.7 $(mg/kg/day)^{-1}$ and age-dependent adjustment factors.

5.2.2.2 In-Depth Toxicological Effects Analysis

IDPH compares estimated doses to an applicable health guideline, such as a minimum risk level (MRL), developed by ATSDR. ATSDR develops these health guidelines for

- contaminants that are commonly found at hazardous waste sites or
- contaminants with which people may come in frequent contact.

An MRL is an estimate of the daily human exposure to a hazardous substance at or below which the substance is unlikely to pose a measurable risk of adverse noncancer health effects.

MRLs are developed for

- three routes of exposure (ingestion, inhalation, or skin contact) and
- three exposure durations: acute (less than 14 days), intermediate (14 to 364 days), and chronic (365 days or longer).

MRLs are based largely on animal studies and reports of human occupational exposures. The MRLs are derived from levels at which adverse effects have been observed. They are adjusted with a series of uncertainty factors or using statistical models. Observable effect levels include no-observable-adverse-effect levels (NOAELs) and lowest-observable-adverse-effect levels (LOAELs).

The comparison between an estimated exposure dose and an MRL is made using a ratio known as the "hazard quotient" (HQ). The HQ is defined as: HQ = Exposure Dose/MRL. Potential COCs with a hazard quotient exceeding a value of 1 are further evaluated to determine whether those contaminants pose a health threat to potentially exposed populations (ATSDR, 2022). To evaluate lead exposures, IDPH compared estimated BLLs from EPA models to the reference BLL of 5 µg/dL. We also looked at a reference BLL of 3.5 µg/dL. The potential for noncancer health effects based on estimated doses or exposure modeling for each completed and potential exposure pathway is evaluated below.

Past incidental ingestion of and skin contact with arsenic and lead in Field 1 soil for summer league baseball players –The maximum dose of arsenic for this scenario was 7.3E-6 (0.0000073) mg/kg/day for children aged 9-10 years (**Table 9**). This yielded an HQ of 0.12. Because the HQ for the maximum dose is less than 1, IDPH does not consider arsenic exposure at Field 1 to have been harmful to people's health. The estimated exposure is far below ATSDR's noncancer health guideline, thus noncancer effects are not likely.

The AALM projected probabilities that the BLL of a male (33% probability) and female (28% probability) summer league baseball player would exceed 5 µg/dL (**Table 10**). This exceedance increased the likelihood of harmful effects in children who practiced or played at Field 1.

Exposure to lead can harm a child's health and cause well-documented harmful effects. Some of the harmful effects include damage to the brain and nervous system, slowed growth and development, learning and behavior problems, and hearing and speech problems. Lead exposure can also lead to reduced intelligence, decreased ability to pay attention, and underperformance in school.

Past incidental ingestion of and skin contact with lead at the Dining Hall for renters – The AALM projected a 0.3-4% probability of exceeding the reference BLL of 5 µg/dL for Dining Hall renters (**Table 11**). IDPH does not believe past exposure to lead at the Dining Hall was harmful to people's health because the probability of BLLs exceeding 5 µg/dL was very low and did not exceed 5% for any renters.

Past, present, and future incidental ingestion of and skin contact with metals in Manners Park soil for park recreators – The maximum CTE dose for exposure to arsenic was 2.9E-06 mg/kg/day for children aged 2 to less than 6 years (**Table 12**). This yielded an HQ less than one for all age groups. Therefore, arsenic in soil is at background levels and is not harmful to people who use the park.

There are no health guidelines for manganese. Therefore, we compared site doses directly to human studies that showed harmful effects. The maximum CTE dose for exposure to manganese was 0.0026 mg/kg/day for children aged 2 to less than 6 years (**Table 14**). This dose is more than 20 times lower than the LOAEL identified in human studies (ATSDR, 2012). Therefore, IDPH does not believe exposure to manganese in Manners Park soil is harmful to people's health.

The AALM projected a 0.1-3% probability of exceeding the reference BLL of 5 µg/dL for park recreators (**Table 13**). IDPH does not believe past exposure to lead in Manners Park was harmful to people's health because the probability of BLLs exceeding 5 µg/dL did not exceed 5% for any recreators.

Present and future incidental ingestion of and skin contact with lead at the Dining Hall for renters – IDPH does not believe present and future exposures to lead in soil at the Dining Hall are harmful to people's health. This is because past exposures were found to not be a hazard, and baseline BLLs used to evaluate those exposures were higher than what the baseline BLL would be for people now or in the future. Thus, modeling is unnecessary because any exposure modeling would result in probabilities lower than those already calculated.

IDPH used EPA's cancer toxicity values to estimate cancer risks (CRs). CR values include EPA's oral cancer slope factors (CSFs). These values are multiplied by a dose to determine the amount of increased CR per unit of contaminant ingested or inhaled. IDPH generally considers CRs less than 1E-6 as negligible. CRs above 1E-6 are to be further evaluated, and CRs above 1E-4 (1 in 10,000) are usually considered significant increases in CR.

Past incidental ingestion of and skin contact with arsenic in Field 1 soil for summer league baseball players – The maximum CR was from total childhood exposure and was 7E-6 (7 in 1,000,000) (**Table 9**). This CR means that if 1,000,000 children played baseball on Field 1 for 6

years, no more than 7 cases of cancer might be expected over their lifetime. This CR exceeds 1E-6. However, because the EPC of 17 mg/kg is near the soil background of 11.3 mg/kg arsenic (IEPA, 2024), exposures are not expected to significantly contribute to overall CRs. Therefore, IDPH does not believe exposure to arsenic at Field 1 increased the risk of cancer for summer league baseball players.

Past, present, and future incidental ingestion of and skin contact with metals and PAHs in Manners Park soil for park recreators – The maximum estimated CTE CR for exposure to arsenic at 7 mg/kg in soil was 5E-6 (5 in 1,000,000) for adults (Table 10). The maximum CR for total childhood exposure was 1E-5 (1 in 100,000). These CRs exceed 1E-6. However, because the EPC of 7 mg/kg is below the background of 11.3 mg/kg (IEPA, 2024), exposures are not expected to significantly contribute to overall CRs.

Based on exposure to BaP equivalents, the maximum CR for total childhood exposure was 2E-7 (2 in 10,000,000). The estimated cancer risk for adults is lower. Therefore, IDPH believes that the cancer risk from exposures to PAHs in Manners Park soil is negligible.

5.3 Summary of Limitations and Uncertainties

A significant limitation in this HC is the number of soil samples collected from Field 1 and near the Dining Hall because it presents uncertainty about the actual concentration of contaminant to which someone was exposed. Additionally, because multiple fields are available in the park, there is uncertainty about how often Field 1 was used for summer league baseball prior to stoppage of use after the 2022 season ended. For arsenic, the maximum concentration was used to estimate exposure at the Dining Hall because only two soil samples were available. A 95UCL of the mean or arithmetic mean with a greater number of samples is preferred to evaluate exposures because they represent a more accurate concentration of contaminant to which people may be exposed. Therefore, there is uncertainty about the reliability of the past, current, and future exposure estimates for these areas.

6. Conclusions

Based on the above information, IDPH reached three conclusions regarding exposure to metals and PAHs in Manners Park:

1. *Exposure to the levels of lead in soil at the Field 1 baseball diamond may have harmed the health of past (prior to 2023) summer league baseball players. Exposure to arsenic in the soil at Field 1 is not expected to have harmed the health of past summer league baseball players.*

Lead exposure modeling showed a 28% (female players) and 33% (male players) probability of exceeding the reference blood lead level of 5 micrograms per deciliter (µg/dL), indicating exposures were likely to have increased blood lead levels, exceeding the reference value. However, exposures were modeled based on the earliest blood lead data available (1999-2000) to be the most protective. In the United States, blood lead levels have steadily decreased every year, so using more recent national BLLs in the model would have likely presented less risk.

Exposure to lead can harm a child's health and cause well-documented harmful effects, such as damage to the brain and nervous system, slowed growth and development, learning and behavior problems, and hearing and speech problems. Lead exposure can also lead to reduced intelligence, decreased ability to pay attention, and underperformance in school.

IDPH estimated exposure doses for past exposures to arsenic and compared them to applicable health guidelines or current risk assessment guidance. Maximum doses of arsenic were not likely to cause associated noncancer or cancer health effects.

Some uncertainty exists in these conclusions, particularly about lead exposure. This is because the conclusion is based on a small number of samples from Field 1 and there is uncertainty about how often the field was used prior to stoppage of use after the 2022 season.

2. *Exposure to lead in soil at the Dining Hall is not expected to harm the health of renters of the facility in the past, present, or future.*

   Lead exposure modeling indicated that past, present, and future exposures to lead at the Dining Hall is very unlikely to have caused or cause exceedances of the reference blood lead level of 5 micrograms per deciliter (µg/dL).

3. *Exposure to metals and PAHs in Manners Park soil is not expected to harm the health of park recreators.*

   IDPH estimated exposure doses for past, present, and future exposures to arsenic, lead, manganese, and PAHs and compared them to applicable health guidelines or current risk assessment guidance.

   IDPH estimated exposure doses for past, present, and future exposures to arsenic, lead, manganese, and PAHs. IDPH also applied current risk assessment guidance. Exposure to arsenic in park soil was not likely to cause noncancer or cancer health effects. Lead exposure modeling indicated that past, present, and future exposures to lead in park soil

were very unlikely to have caused or cause blood lead levels to exceed 5 micrograms per deciliter (µg/dL).
Estimated exposure to manganese in soil was more than 20 times lower than the effect level identified in human studies. The lower level indicates that noncancer health effects are unlikely.

Estimated cancer risks were below 1E-6 (1 in 1,000,000) for PAH exposure. IDPH considers cancer risks below 1E-6 to be negligible. This indicates that exposures to PAHs will not significantly contribute to cancer risks.

7. Recommendations and Public Health Action Plan

IDPH recommends additional soil sampling for metals at Field 1 and near the Dining Hall. The additional sampling will help assessors more accurately determine the concentrations of arsenic and lead to which summer league baseball players and renters may have been exposed. IDPH also recommends that the Taylorville Park District repair and reinforce the snow fencing around this area with "Keep Out" signage. In the meantime, the Taylorville Park District is encouraged to limit movement through this area, ensure the existing fence and gate locks for Field 1 are maintained and working properly, and complete remediation to reduce lead exposures as much as possible. The Taylorville Park District can resume normal use of all other baseball diamonds at the park.

IDPH will hold a public availability session upon release of this report to address further community concerns about exposure to contaminants in Manners Park soil.

8. Report Preparation

The Illinois Department of Public Health (IDPH) prepared this Health Consultation for the Ameren CIPS site, located in Taylorville, Christian County, Illinois. This publication was made possible by a cooperative agreement CDC-RFA-TS-23-0001 with the federal Agency for Toxic Substances and Disease Registry (ATSDR). IDPH 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 the IDPH.

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Appendix A: Brief Summary of ATSDR's Public Health Assessment (PHA) Process

ATSDR follows the PHA process to find out

- Whether people living near a hazardous waste site are being exposed to toxic substances
- Whether that exposure is harmful
- What must be done to stop or reduce exposure

The PHA process is a step-by-step approach:

- ATSDR establishes communication mechanisms, including engaging communities at the beginning of site activities and involves them throughout the process to respond to their health concerns. ATSDR collects many different kinds of site information.
- ATSDR obtains, compiles, and evaluates the usability and quality of environmental and biological sampling data (and sometimes modeling data) to examine environmental contamination at a site.
- ATSDR conducts four main, sequential scientific evaluations.
    - Exposure pathways evaluation to identify past, present, and future site-specific exposure situations, and categorize them as completed, potential, or eliminated
    - Screening analysis to compare the available sampling data to media-specific environmental screening levels (ATSDR comparison values [CVs] and non-ATSDR screening levels); this identifies potential contaminants of concern that require further evaluation for completed and potential exposure pathways
    - Exposure Point Concentrations (EPCs) and exposure calculations for contaminants that require further evaluation in completed and potential exposure pathways; It involves calculating EPCs, using the estimated EPCs to perform exposure calculations, and determining which site-specific scenarios requires an in-depth toxicological effects analysis
    - In-depth toxicological effects evaluation, if necessary, based on the three previous scientific evaluations; this step looks more closely at contaminant-specific information in the context of site exposures. This evaluation can also help determine if there is potential for noncancer or cancer health effects.
- ATSDR summarizes findings and next steps, while acknowledging uncertainties and limitations.
- ATSDR provides recommendations to site-related entities, partner agencies, and communities to prevent and minimize harmful exposures.

The sequence of steps can differ based on site-specific factors. For instance, health assessors might define an exposure unit before or after the screening analysis. Readers can refer to ATSDR's Public Health Assessment Guidance Manual for all information related to the PHA process.

Appendix B: Site Visit Photos

Figure A1: Front of the Dining Hall

(IDPH Staff photo. Used with permission)

Figure A2: Collapsed Snow Fencing North of the Dining Hall

(IDPH Staff photo. Used with permission)

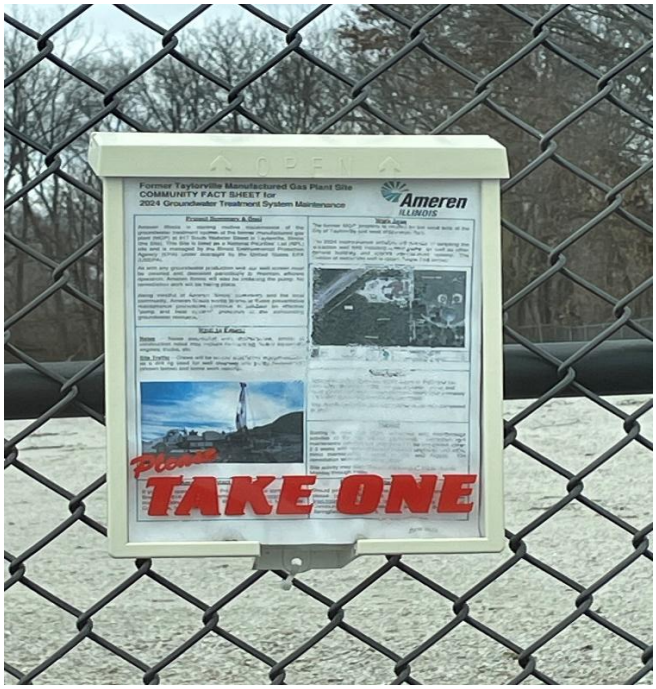
Figure A3: "Keep Out" Signage on the Ground

(IDPH Staff photo. Used with permission)

Figure A4: Fencing and Signage at Ameren CIPS Site

(IDPH Staff photo. Used with permission)

Figure A5: Box attached to fence with site fact sheets at the Ameren CIPS Site



(IDPH Staff photo. Used with permission)

Appendix C: Glossary of Terms

The glossary in this appendix defines the various terms that were used in this Health Consultation. This glossary defines words used by ATSDR and IDPH in communications with the public. It is not a complete dictionary of environmental health terms. For additional questions or comments, call 1-800-CDC-INFO.

Absorption
The process of taking in a substance. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

Acute (duration of exposure)
Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].

Agency for Toxic Substances and Disease Registry (ATSDR)
A federal public health agency in Atlanta, Georgia, with 10 regional offices in the United States. ATSDR serves the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent adverse exposures and diseases from toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces laws to protect the environment and human health.

Analyte
A substance measured in the laboratory. A chemical for which a sample (such as water, air, or blood) is tested in a laboratory. For example, if the analyte is mercury, the laboratory test will determine the amount of mercury in the sample.

Cancer
Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.

Cancer risk (CR)
A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.

Carcinogen
A substance that causes cancer.

Central tendency exposure (CTE)
Refers to individuals who have average or typical exposure to a contaminant. For instance, at an example site where children < 21 years old are exposed to a chemical via incidental surface water ingestion, the estimated CTE lifetime cancer risk is 1.6E-06 – based on the average swimming ingestion intake rate of 0.049 liter per hour (L/hour) and exposure duration of 12 years. This can be compared to a reasonable maximum exposure (RME) lifetime cancer risk for the same population of 5.4E-05, which is based on the 95th percentile swimming ingestion intake rate of 0.12 L/hour and exposure duration of 33 years.

Chronic exposure
Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

Community
People who may be directly affected by site contamination because they currently live near the site or have lived near the site in the past. Community members may include, for example, residents, members of local action groups, local officials, tribal members, health professionals, and local media. The community is at the heart of all public health process activities.

Community water supply
A community water supply is a public water system that supplies water to the same population year-round.

Comparison value (CV)
Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause adverse health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway
All five elements of a pathway are present: contaminant source, environmental fate and transport, exposure point, exposure route, and potentially exposed population. A completed exposure pathway exists when there is direct evidence or, in the judgment of the health assessor, a strong likelihood that people have in the past, are presently, or could in the future come into contact with site-related contaminants.

Concentration
The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

Contaminant
A substance that is either present in an environment where it does not belong or is present at levels that might cause adverse health effects.

Dose
The amount of a substance to which a person is exposed over some time period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. An "exposure dose" is how much of a substance is encountered in the environment. An "absorbed dose" is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs. Doses that are below noncancer health guidelines are not likely to result in harmful noncancer effects. Doses above a noncancer health guideline requires further evaluation to determine if harmful effects might be possible.

Effect
Any change in physiologic function or cellular structure as a result of an exposure to an environmental contaminant.

Eliminated exposure pathway
At least one of the five elements of a pathway is not present and either will never be present or is extremely unlikely to ever be present: contaminant source, environmental fate and transport, exposure point, exposure route, and potentially exposed population. Health assessors classify an exposure pathway as eliminated after determining that exposure has not occurred in the past, is not occurring currently, and is extremely unlikely to occur in the future.

Environmental media
Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

EPA (U.S. Environmental Protection Agency)
The primary federal agency responsible for environmental issues, including research, monitoring, enforcement, and cleanup functions. ATSDR (using its public health assessment process) and EPA (using its risk assessment process) evaluate spills or releases of hazardous substances in the environment at Superfund sites to protect public health.

Exposure
Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

Exposure pathway
The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed).When all five parts are present, the exposure pathway is termed a completed exposure pathway.

Exposure point concentration (EPC)
A representative contaminant concentration. When appropriate, ATSDR calculates an EPC for each exposure unit or area, individual completed and potential exposure pathway, and exposure duration: acute (0-14 days), intermediate (15-364 days), or chronic (365 or more days) durations.

Exposure unit
A geographically defined point or area where a person is expected to contact an environmental medium, such as soil, surface water, groundwater, air, or food items (e.g., fruits, vegetables, fish, game). Health assessors define exposure units for each potential contaminant of concern identified in a completed exposure pathway or potential exposure pathway.

Groundwater
Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water.

Hazard
A source of potential harm from past, current, or future exposures.

Hazard quotient (HQ)
A calculation to evaluate the potential for noncancer health hazards to occur from exposure to a contaminant with available noncancer health guidelines (MRLs, RfDs, RfCs). Typically, the hazard quotient is obtained by dividing the duration-specific (acute, intermediate, or chronic) exposure dose or concentration by the noncancer health guideline for the same duration for your exposure groups of interest.

Hazardous substance
Potentially adverse substances that have been released or discarded into the environment.

Health assessor
Often the leader of the site team, coordinating the PHA process activities and working with subject matter experts (SMEs) as needed to gather and evaluate data. Usually, they are also responsible for writing the document that summarizes the findings of the PHA process.

Health consultation (HC)
An ATSDR document that presents a review of available information or collection of new data that generally responds to a specific public health issue or question, contaminant, health condition, or technical interpretation. HCs are typically focused on a specific exposure issue.

Health guidelines
Values that serve as the basis for ATSDR's noncancer comparison values. They consist of oral human doses and air concentrations developed from toxicology or epidemiology studies (with safety factors applied) that are protective of human health.

Ingestion
The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see **Route of exposure**].

Limitation
Missing, unknown, or assumed information, as part of the public health assessment process, that can be critical to make a public health call, help you understand what contaminants, and at what concentrations, people could be exposed to, and lend uncertainty to the public health conclusions.

Lowest-observed-adverse-effect level (LOAEL)
The lowest tested dose of a substance that has been reported to cause adverse health effects in people or animals. For example, mice exposed to an air concentration of 250 parts per million (ppm) experienced shallow breathing, and the study reported 250 ppm as a LOAEL.

National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)
EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

National Toxicology Program (NTP)
Part of the Department of Health and Human Services. NTP develops and carries out tests to predict whether a chemical will cause harm to humans.

Point of exposure
The place where someone can come into contact with a substance present in the environment [see exposure pathway].

Population
A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

Potentially exposed population
The fifth part of an exposure pathway. This represents the people who potentially have, do, or could come in contact with environmental contaminants.

Potential contaminant of concern
A label given to a contaminant if its concentration meets or exceed screening levels, or its estimated exposure dose or cancer risk levels exceed acceptable levels. It is important to note that chemicals flagged as potential contaminants of concern do not necessarily pose a health threat. Further evaluation is needed to evaluate contaminants flagged as potential contaminants of concern. For example, trichloroethylene detected in air above the ATSDR comparison value would represent a potential contaminant of concern and require further evaluation.

Prevention
Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

Public health assessment (PHA)
An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health.

Remedial investigation (RI)
The CERCLA process of determining the type and extent of hazardous material contamination at a site. EPA is responsible for conducting RIs at Superfund sites.

Risk
The probability that something will cause injury or harm.

Route of exposure
The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

Reasonable maximum exposure (RME)
Refers to people who are at the high end of the exposure distribution (approximately the 95th percentile), a scenario intended to assess exposures that are higher than average, but still within a realistic exposure range. For instance, at an example site where children < 21 years old are exposed to a chemical via incidental surface water ingestion, the estimated RME lifetime cancer risk is 5.4E-05, which is based on the 95th percentile swimming ingestion intake rate of 0.12 liter per hour (L/hour) and exposure duration of 33 years. This can be compared to the central tendency exposure (CTE) lifetime cancer risk for this population of 1.6E-06 – based on the average swimming ingestion intake rate of 0.049 L/hour and exposure duration of 12 years.

Sample
A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

Sample size
The number of units chosen from a population or an environment.

Source of contamination
The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

Superfund: Referential term used for the Comprehensive Environmental Response, Compensation, and Liability Act, enacted by the U.S. Congress on December 11, 1980; and the sites which fall under its purview. It is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

Superfund Amendments and Reauthorization Act (SARA)
In 1986, SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

Surface soil
Defined by ATSDR as the top 3 inches of soil. Health assessors can use soil sampling results collected from deeper than 3 inches (e.g., EPA commonly collects samples at a depth of 0-6 inches) to evaluate exposures, as long as it is documented.

Toxicological profile
An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine adverse levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.

95UCL
95 percent upper confidence limit of the arithmetic mean. Health assessors use statistical tools such as EPA's ProUCL and R to calculate the 95UCL for the exposure point concentration (EPC).

Appendix D: Technical Information

D.1 ATSDR and non-ATSDR Screening Levels

The screening levels described below were used in preparing this document.

Environmental Media Evaluation Guides (EMEGs) are ATSDR CVs. EMEGs are concentrations of contaminants in a specific medium (e.g., water, soil) that represent estimated contaminant concentrations below which humans exposed during a specific timeframe (acute, intermediate, or chronic) are not expected to experience noncancer health effects. EMEGs are based on ATSDR's oral and inhalation MRLs. When an EMEG is based on an EPA reference dose, ATSDR calls this an RMEG (reference dose media evaluation guide). RMEGs are based on EPA's reference dose or reference concentration.

Reference Dose Media Evaluation Guide (RMEG)s are ATSDR CVs. They are based on non-cancer health effects for chronic exposure duration. RMEGs represent the concentration in a specific medium (e.g., water or soil) at which daily human exposure is unlikely to result in adverse noncarcinogenic effects. ATSDR derives RMEGs from EPA's reference doses (RfDs) and reference concentrations (RfCs). For air, RMEGs are the same as corresponding inhalation RfCs. For drinking water and soil, RMEGs are derived from the corresponding oral RfDs using conservative assumptions of intake rate and body weight.

Cancer Risk Evaluation Guides (CREGs) are ATSDR CVs. They are developed to identify estimated concentrations of cancer-causing contaminants that would be predicted to cause no more than one excess cancer in a million persons exposed during their lifetime (78 years). CREGs for soil are derived using EPA's oral CSFs and default exposure assumptions about soil ingestion in adults and children.

Regional Screening Level (RSLs) are EPA screening level. They are developed using risk assessment guidance from the EPA Superfund program and can be used for Superfund sites. They are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. RSLs are considered by the Agency to be protective for humans (including sensitive groups) over a lifetime; however, RSLs are not always applicable to a particular site and do not address non-human health endpoints, such as ecological impacts. The RSLs contained in the RSL table are generic; they are calculated without site-specific information. They may be re-calculated using site-specific data (EPA, 2025).

D.2 Health Guidelines Used in this Report

Minimal risk level (MRL)

An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of adverse noncancer health effects.

MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs are not used as predictors of adverse health effects and are not intended to define clean-up or action levels [see reference dose].

Cancer Slope Factor (CSF)

Oral CSFs are developed by the U.S. Environmental Protection Agency or others from toxicology or epidemiology studies (with safety factors applied) that are protective of human health. These values are also referred to as cancer potency factors. These cancer risk values are applied to estimated exposure doses to estimate the increase in cancer risk per unit of contaminant to which a person is exposed. They also serve as the basis for ATSDR's cancer comparison values called CREGs (cancer risk evaluation guides).

D.3 Hazard Assessment Equations

Incidental Soil Ingestion Exposure Dose Calculation

$$\mathbf{D_{oral,\ noncancer}} = \frac{\mathbf{C \times IR \times EF \times CF}}{\mathbf{BW}} \qquad \textbf{Equation 1}$$

D = oral dose in mg/kg/day, C = contaminant concentration in soil in mg/kg, IR = age-specific soil intake rate in mg/day, CF = conversion factor for mg to kg, BW = age-specific body weight in kg

Hazard Quotient

$$\mathbf{HQ = D_{noncancer} \div HG} \qquad \textbf{Equation 2}$$

HQ = hazard quotient, $D_{noncancer}$ = dose (mg/kg/day), HG = health guideline (e.g., oral MRL, RfD)

Cancer Risk Equations

$$\mathbf{CR = D_{noncancer} \times CSF \times (ED \div LY)} \qquad \textbf{Equation 3}$$

$$\mathbf{ADAF\text{-}adjusted\ CR = (D_{noncancer} \times CSF) \times (ED \div LY) \times ADAF} \qquad \textbf{Equation 4}$$

Total CR = Sum of the CR for all exposure groups **Equation 5**

CR = cancer risk (unitless), $D_{noncancer}$ = dose, CSF = oral cancer slope factor [$(mg/kg/day)^{-1}$], EF (cancer) = exposure factor (cancer)

calculated as follows: EF (noncancer; unitless) x exposure group specific exposure duration (years) ÷ lifetime of 78 years,
ADAF = age-dependent adjustment factor (unitless), ED = exposure duration (years), LY = lifetime years (78 years)

D.4 Example BaP Equivalent Calculation

To illustrate the general benzo(a)pyrene equivalent (BaP equivalent) computational approach described in Section 3.0, imagine a community surrounding a large facility that historically pressure-treated wood products with a coal-tar solution and creosote oil. Twenty-five discrete surface soil samples were collected throughout the community and analyzed for seven polycyclic aromatic hydrocarbon (PAH) congeners: benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene. PAHs were measured in most samples; however, several PAHs were reported as non-detects. For this example, assume that all non-detects have the same detection limit of 2 µg/kg and that the samples were collected from an area that represents a single exposure unit.

Step 1. Calculate the BaP equivalent for each sample and compare the maximum to the cancer comparison value (CV)

For initial screening and as described in Section 3.1, calculate a BaP equivalent for each environmental sample. Health assessors should do so by first multiplying each congener's concentration by its respective potency equivalency factor (PEF) to obtain congener-specific BaP equivalent concentrations (BECs). They then sum the BECs to obtain the sample BaP equivalent. The text box below shows these calculations for two samples, although in this example health assessors would perform this calculation for all 25 samples collected in the exposure unit.

Table 16: Example BaP Equivalent Calculation – Deriving and Summing Benzo(a)pyrene Equivalent Concentrations (BECs)

PAH Congener	Sample 1 (µg/kg)	Sample 2 (µg/kg)	PEF (unitless)	Sample 1 BEC (µg/kg)	Sample 2 BEC (µg/kg)
Benzo(a)anthracene	40	88	0.1	4.0	8.8
Benzo(a)pyrene	60	147	1	60	147
Benzo(b)fluoranthene	129	210	0.1	12.9	21
Benzo(k)fluoranthene	101	199	0.1	10.1	19.9
Chrysene	43	88	0.01	0.43	0.88
Dibenzo(a,h)anthracene	20	69	2.4	48	166
Indeno(1,2,3-cd)pyrene	<2	66	0.1	0.2	6.6
BaP equivalent (µg-BaP/kg) =				**135.6**	**369.8**

In this example, imagine that the maximum BaP equivalent from across all 25 samples collected in the exposure unit is 369.8 µg-BaP/kg (the value shown in the table above for Sample 2).

Because the maximum BaP equivalent for these samples exceeds the cancer CV for benzo(a)pyrene (65 µg/kg or 0.065 ppm), health assessors must calculate an exposure point concentration (EPC) to further evaluate cancer risk.

Step 2. Calculate a BaP equivalent EPC

Step 2A. Treat each PAH congener as an individual chemical and calculate an EPC for each measured PAH congener from the environmental samples collected within an exposure unit.

For this example, assume that detected observations were sufficient to calculate a 95% upper confidence limit (95UCL) for each of the seven congeners. Following the Agency for Toxic Substances and Disease Registry (ATSDR) Exposure Point Concentration Guidance for Discrete Sampling (ATSDR 2019a), health assessors should calculate 95UCLs and then complete a series of quality control checks to ensure that the 95UCLs are appropriate for use. In this example, assume that the calculated 95UCL for benzo(b)fluoranthene was above the maximum concentration. Consistent with the ATSDR guidance (ATSDR 2019a), the maximum detected concentration would therefore be used as the EPC. The EPCs for six congeners are based on 95UCLs and the EPC for one is the maximum, as shown below.

Table 17: Example BaP Equivalent Calculation – Calculation of a BaP Equivalent EPC

PAH congener	EPC statistic	EPC value (µg/kg)
Benzo(a)anthracene	95UCL	170
Benzo(a)pyrene	95UCL	220
Benzo(b)fluoranthene	Maximum	420
Benzo(k)fluoranthene	95UCL	210
Chrysene	95UCL	220
Dibenzo(a,h)anthracene	95UCL	80
Indeno(1,2,3-cd)pyrene	95UCL	280

Step 2B. Apply California Office of Environmental Health Hazard Assessment (OEHHA) PEFs to each calculated EPC to obtain a BEC for each PAH congener.

Following equations 1 and 2, shown in Section 2.2, each EPC is multiplied by its respective PEF to calculate a congener-specific BEC. Calculations for this example are shown below.

Table 18: Example BaP Equivalent Calculation – Application of California Office of Environmental Health Hazard Assessment (OEHHA) PEFs to each calculated EPC

PAH Congener	EPC value (µg/kg)	PEF (unitless)	BEC (µg/kg)
Benzo(a)anthracene	170	0.1	17

PAH Congener	EPC value (µg/kg)	PEF (unitless)	BEC (µg/kg)
Benzo(a)pyrene	220	1	220
Benzo(b)fluoranthene	420	0.1	42
Benzo(k)fluoranthene	210	0.1	21
Chrysene	220	0.01	2.2
Dibenzo(a,h)anthracene	80	2.4	192
Indeno(1,2,3-cd)pyrene	280	0.1	28

Step 2C. Sum the BECs to determine the total BaP equivalent

In this example, the BaP equivalent EPC is 522.2 µg-BaP/kg. Note that this value is presented in units of µg-BaP/kg, consistent with ATSDR's preferred approach for reporting BaP equivalents.

Step 3. Calculate cancer risk in ATSDR's Public Health Assessment Tool (PHAST) using the BaP equivalent EPC

The health assessor should first calculate a BaP equivalent dose from the BaP equivalent EPC estimated in Step 2 and then use that dose to estimate cancer risk for applicable exposure groups. To do so, ATSDR recommends that health assessors use the agency's PHAST. More specifically, health assessors should open the dose calculator in PHAST, select BaP in the Contaminant field, enter the BaP equivalent EPC in the Concentration field, select the correct units in the Unit field, and then select "other" in the Type field and note "BaP equivalent EPC." PHAST will then provide an estimate of cancer risk using OEHHA's cancer slope factor for BaP (i.e., 1.7 $[mg/kg/day]^{-1}$). Additional information on exposure parameters, dose calculations, and risk calculations can be found in ATSDR's Public Health Assessment Guidance Manual and PHAST.

Note that noncancer health effects should not be evaluated with BaP equivalent values. Instead, each PAH congener should be evaluated separately with available noncancer CVs/health guidelines. Of the PAHs listed in Table 1, PHAST currently includes noncancer CVs or health guidelines for benzo(a)pyrene. PHAST also includes noncancer CVs for naphthalene.