Health Consultation

FAIR OAK PARK

MONROE TOWNSHIP, CLERMONT COUNTY, OHIO

SEPTEMBER 30, 2006

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

Health Consultation: A Note of Explanation

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

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

FAIR OAK PARK

MONROE TOWNSHIP, CLERMONT COUNTY, OHIO

Prepared by:

Health Assessment Section
of the Ohio Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

PURPOSE AND STATEMENT OF THE ISSUES

The Health Assessment Section (HAS) of the Ohio Department of Health was asked by the United States Environmental Protection Agency (U.S. EPA) to evaluate site information associated with the Fair Oak Park, Monroe Township, Clermont County, Ohio. Specifically, HAS staff were asked to review and evaluate the results of sampling of surface soils (0 to 6 inches depth) on the athletic fields at the neighborhood park for lead contamination. The neighborhood park presents a special concern because of the large number of children who traditionally utilize the site for sports and recreation. HAS reviewed all the sampling data, toured the site, and met with the Monroe Township trustees. HAS comments and recommendations were forwarded to the US EPA On-Scene Coordinator. The HAS evaluation lead to a US EPA Time Critical Removal Action, consisting of the removal of contaminated soils from the park in August and September 2005.

HISTORY AND BACKGROUND

The Fair Oak Park is a relatively small parcel of land, approximately 14 acres, located along Fair Oak Road in Monroe Township, Clermont County, Ohio (Figure 1). The park is in Amelia, Ohio on the west side of Fair Oak Road, about 1.5 miles west-southwest of the village of Bantam. The site consists of a gravel parking lot, a picnic pavilion, a concession stand, restrooms, two baseball diamonds, and a football field (Figure 2). It is covered with grass except for the two baseball diamonds, the parking lot, and the narrow forested strip on the western edge of the property. In the low, poorly drained areas in the western part of the property, the grass is thin and bare soil is exposed between the tufts of grass. This western portion of the park has poor drainage and often has standing water. The area to the west of the park is agricultural land. Small trees and shrubs mark the boundaries of the site to the north and south. The adjacent property to the south is reported to be a wetland and the properties to the north and east (across the road) are residential. The closest residences are single family homes on large lots immediately east of the park across Fair Oak Road. There is no fence surrounding the site, and access to the site is largely unrestricted.

The land was donated to Monroe Township, the current owners, in June 1979 by the North Monroe Township Civic Association (NMTCA) for development as a neighborhood park. In the 1970's, the NMTCA operated a shooting range at the property which area residents stated was used once a week on Sundays for about 8 to 10 years. This area may also have been used as an informal shooting range prior to the purchase of the property by the NMTCA in the late 1960's. An aerial photo from 1985 indicates that the property was not developed into a neighborhood park until sometime after the photo was taken.

Ohio and US EPA Investigation

In December 2004, the Monroe Township Trustees requested that the Ohio EPA Division of Emergency and Remedial Response conduct soil sampling of the Fair Oak Park property due to concerns about potential lead contamination. Ohio EPA and U.S. EPA collected surface soil samples at the park in March and June of 2005 and had them analyzed for total lead. Soil sampling in the Fair Oak Park indicated that lead contamination was above U.S. EPA removal guidelines (400 ppm) in eight grid locations at the western edge of the park (Table 1). These eight grid locations were identified for removal and offsite disposal of contaminated soils (Figure 2). In May 2005, US EPA Region V approved the action memo for a Time Critical Removal Action at the Fair Oak Park site.

HAS Site Visit

The Health Assessment Section (HAS) visited the site on April 21, 2005, accompanied by U.S. EPA. HAS staff conducted a walk-through of the site, noting presence/absence of exposed dirt, indications of stressed vegetation, and evidence of children playing on the fields. It was noted that in the low areas by the football field, the grass was thin, with bare soil between the tufts of grass. The soil in the infields of the two baseball diamonds had been recently overturned and it was surveyed for lead shot and pieces of clay targets. None were observed.

U.S. EPA and HAS staff participated in a meeting with representatives of Monroe Township. Upon learning that the Fair Oak Park may have soils contaminated with lead, the township has not permitted anyone to use the park for athletic events. They did not have the grass mowed until a few days prior to our visit. We were told that there are some local residents that use the football field for flying of radio-controlled model airplanes, but that area is not regularly used due to persistent wet soil conditions. The football field is poorly graded, interrupted by several swales, and has a meager cover of grass. It was reported that the baseball diamonds are currently not often used. Organized teams are not currently using the diamonds but, township trustees are receiving numerous requests for use of these fields.

U.S. EPA and HAS staff discussed the results of the lead soil sampling investigation, the health risk presented by the lead concentrations in the soil at the site, and some clean-up options for soils above the 400 ppm clean-up level. The elevated lead detections were from sample locations along the western edge of the football field, along the tree-line that marks the edge of the playing area. The lead levels ranged from 418 ppm to 4,940 ppm, with mean levels around 640 ppm. Lead levels in Diamond # 1 (just south of the picnic pavilion) ranged from 8.6 to 23 ppm (equal to background lead levels in soils from SW Ohio). Similar levels were detected in Diamond # 2 (west-northwest of the picnic pavilion) ranging from 7.4 to 57 ppm lead.

The following options were proposed by U.S. EPA: 1) placing a “cap” of 12 inches of clean topsoil over the football field area, re-grading, and reseeding and establishing a grass cover, (covering all areas with lead greater than 400 ppm with one foot of clean soil), or 2) selective removal of the lead “hotspots” soils, including the sample location and the surrounding 40 ft x

40 ft grid down to one foot below ground surface, conducted by the U.S. EPA contractors as part of the limited time-critical removal action and filling the excavations with clean soil. Due to the cost concerns and the potential of the "cap" to adversely affect the already poor drainage of the park, the township representatives expressed a preference that the U.S. EPA carry out the limited soil removal action. In April 2005, Ohio EPA requested the assistance of the U.S. EPA to conduct a time-critical removal action of surface soil with lead concentrations exceeding the removal action level.

US EPA Time-Critical Removal Action

On August 23, 2005 US EPA mobilized its contractors to the Fair Oak Park site. US EPA identified eight grids within the three areas where soil was to be removed. On August 24, 2005 the soil excavation began. The soil was excavated to a depth of 1 foot below ground surface. The excavated soils were stockpiled on-site for loading on trucks for disposal. After excavation of soils was completed, post-excavation composite samples were collected from the floor of the grids. All post excavation samples were below the target clean-up levels of 400 ppm (ranged from 9.4 ppm to 216 ppm) (Table 2). A total of 1,450 tons of soil were excavated and taken by truck to an EPA approved landfill. The excavation areas were filled in with clean soil in September 2005 and then the Monroe Township personnel seeded the areas with grass.

Air samples were collected during the excavation and loading of contaminated soils for disposal. All air samples collected were non-detect for total lead. On September 13, 2005 US EPA met with the Monroe Township trustees to present a summary of site activities.

DISCUSSION

Exposure Pathways

In order for the park visitors to come into contact with the lead in the soils, there must be a *completed exposure pathway*. A completed exposure pathway consists of *five main parts*, all of which must be present for exposure to lead to occur. These include:

A Source of lead in the soils (lead shot);

A method of Environmental Transport which allows the lead to move from the shot in the soil and bring it into contact with the park visitors (surface soils, entrained in dust, etc.);

A Point of Exposure where the park visitors come into direct contact with the lead;

A Route of Exposure which is how the park visitor comes into contact with the lead (eating it, breathing it, touching it); and

A Population at Risk which are the people who could possibly come into physical contact with the lead (people who use the western part of the park where soils are contaminated).

Exposure pathways can also be characterized as to when the exposure occurred or might occur in the *Past, or Present, or Future*.

Physical contact with the lead in and by itself does not necessarily result in adverse health effects. Lead's ability to affect a person's health is also controlled by a number of factors, including:

- How much lead a person is exposed to (the *Dose*)
- How long a person is exposed to the lead (duration of exposure)
- How often a person is exposed to the lead (acute versus chronic).

Other factors affecting the likelihood of the lead causing adverse health effects upon contact include the park visitor's:

- Personal habits
- Diet
- Age and sex
- Current health status
- Past exposure to lead or other metals (occupational, hobbies, etc.)

Lead Toxicity

Children (especially infants and toddlers) are the primary concern when it comes to exposure to lead because their bodies tend to absorb more lead than adults. About 99% of the lead taken into the body of an adult will leave in the body as waste within a couple of weeks, but only about 32% of the lead taken in by children will be eliminated by the body in the same manner (ATSDR, 1999). Children are also more sensitive to the effects of lead exposure than are adults. Even at low levels, lead can affect a child's mental and physical development, in part because their brains and nervous systems are still developing. The major adverse health effect from exposures to excessive amounts of lead is damage to the nervous system potentially resulting in prolonged or permanent neuro-behavioral disorders (ATSDR, 2000).

The main exposure routes with regard to lead poisoning are via ingestion (eating or drinking) or inhalation (breathing it in). The major pathway of concern, especially with regard to infants and toddlers, is via incidental ingestion of lead-contaminated soil/dusts resulting from repeated hand-to-hand mouth action. Small children and infants are closer to and spend more time on the ground where they may come into contact with lead-contaminated soil and dust outdoors and lead paint chips and dust indoors. In addition, gastro-intestinal adsorption of lead is five to ten times greater in infants and young children than in adults. Inhalation of lead-contaminated dust is another major route for exposure to lead in the environment, but more commonly affects adults in specific occupational settings rather than small children in their homes or outdoors in their yards.

Recommended Action Level for Lead in Soils

At other lead sites in Ohio, HAS and U.S. EPA have used 400 parts per million lead residential soils standard as the action level for lead soil removal actions. These included removal actions associated with Brentwood Estates Subdivision site in Butler County (HAS, 2005), Lewisburg Drum site in Preble County (HAS, 1998), the Norwood Radiator site in Cincinnati (HAS, 2001), the Eagle-Picher Foundry site in Fulton County (HAS, 2002, 2003A), Lexington Manor Subdivision site Butler County (HAS, 2003B), the Kings Mills Junior High School site in Warren County (HAS,2003C), and at the Cincinnati Country Day School site (HAS, 2004). The 400 ppm lead level has been used as a screening level, an action level, and/or a clean-up goal at all of these sites. The rationale for the use of this number is found in U.S. EPA Office of Solid Waste and Emergency Response Directive #9355.4-12 (U.S. EPA, 1994) which determined that a residential soil lead screening level of 400 ppm lead was protective of children. Exposure to lead levels of 400 ppm or less is not expected to result in increased blood levels in children. It is believed that this conservative clean-up level is fully protective of public health, including sensitive segments of the population like small children.

Evaluation of the Health Hazard posed by Lead in Soils at the Fair Oak Park

In the 11th Report on Carcinogens (2004), the National Toxicology Program (NTP) of the U.S. National Institutes of Health concluded that "exposure to lead and lead compounds is reasonably anticipated to be human carcinogens". In arriving at its conclusion, the NTP relied upon studies on laboratory animals and workers exposed to high levels of lead. The laboratory animals developed brain, kidney, and lung cancer. The workers inhaled high levels of lead fumes or accidentally ingested lead dust. The worker studies did not account for diet, smoking, and exposure to other cancer-causing agents. The worker study showed weak evidence for increased risk for lung, stomach, or bladder cancer. The workers were exposed to lead at 50 to 5000 micrograms per cubic meter (ug/m^3) in air and had 40 to 100 micrograms lead per deciliter (ug/dl) in blood. In this case, these above exposures do not fit the types and amounts of exposures for children and nearby residential users of the playgrounds.

The recommended 400 ppm lead screening level was exceeded in 8 of 139 (5.7 %) surface soil samples collected at a depth of 0 to 6 inches below ground surface. The area where soils exceeded the screening level is in the western half of the park on the poorly developed football field. The grass in this area was thin and bare soil was exposed between the tufts of grass. However, no lead shot was observed during the site visit and discussions with township employees describe this area of the site as having poor drainage and often with standing water. Township employees stated that the football field is not regularly used due to the persistent wet conditions, although it is occasionally used by individuals flying radio-controlled model airplanes. Based on the condition of the park, with minimal grass cover and exposed bare soils and poor drainage, the likelihood of visitors being exposed to the lead in contaminated soils at levels that would adversely impact their health was possible.

Conditions at the site in the past, such as, during development of the site into a residential park, are largely unknown. Park visitors, especially children, may have been at risk of exposure to elevated lead levels when surface soils were disturbed or before grass cover was established. Several decades have elapsed since the development of this site into a park, therefore, it is difficult to determine if visitors developed adverse health effects from lead exposures in the park at that time.

A potential exposure pathway of concern, prior to the completion of the Removal Action, included children playing in bare dirt in areas with elevated lead levels in the surface soils. HAS staff saw marginal grass coverage in areas with elevated lead levels (>400 ppm). However these areas are reportedly wet most of the year and the football field was only occasionally used for flying model airplanes, suggesting that the likelihood of exposure was minimal. To be on the safe side, park visitors were advised to limit contact with the soils and following park activities that might bring them into contact with soils or dust to insure that hands are washed when they come in from outdoors. With the completion of the US EPA Time-Critical Removal Action in September, 2005, the threat of exposure to elevated levels of lead in the park was eliminated by the removal of the lead-contaminated soils and back-filling of the excavated areas with clean topsoil. Lead in the surface soils no longer poses a real or potential public health threat to park visitors.

CHILDREN'S HEALTH CONSIDERATIONS

ATSDR and HAS consider children in the assessment of all sites that pose a potential or real public health hazard. ATSDR and HAS use public health guidelines that are specifically developed to be protective of children. As indicated above, children are often at greater risk of developing adverse health effects from exposure to elevated lead levels in their environment than are adults. As such, the potential threat to the health of area children is the main focus of this health consultation.

CONCLUSIONS

- Due to the removal of the identified lead-contaminated soils in the eight grid locations at Fair Oak Park as part of the US EPA Time-Critical Removal Action completed in September 2005, the soils at the site currently pose *No Public Health Hazard* to the park visitors.
- When the park was first being developed in the 1980's, exposed lead-contaminated soils may have posed a *Public Health Hazard* to residents.
- Due to the removal of the lead contaminated soils from the subdivision, soils in the park will pose *No Public Health Hazard* to park visitors *in the future.*

RECOMMENDATIONS (Made prior to the US EPA Removal Action)

1. The selected clean-up goal action level of 400 ppm for lead in soils at Fair Oak Park is thought to be fully protective of the public health, including sensitive elements of the population like small children.

2. Park visitors should use proper hygiene techniques to reduce their chance of exposure to lead-contaminated soils and dust. Visitors should practice frequent hand-washing following park activities that might bring contact with exposed soils.

PUBLIC HEALTH ACTION PLAN

Ohio EPA and US EPA completed sampling of soils at Fair Oak Park and determined the full extent of lead contamination in March 2005. The US EPA time-critical removal action to remove lead-contaminated soils from the park commenced in August 2005. US EPA contractor removed soils with lead concentrations in excess of 400 ppm from the park. Confirmation sampling indicates that lead contaminated soils no longer pose a public health threat to park visitors.

Prior to the completion of the removal action, HAS met with the Monroe Township trustees to discuss the extent of the public health threat the lead in soil at the park posed to park visitors; provided educational material for the trustees and area residents (fact sheets: Exposure to Toxic Chemicals and Lead, Answers to Frequently Asked Health Questions); and with US EPA discussed possible actions to take to reduce exposure. HAS reviewed the confirmation sample results collected by US EPA from the soil excavation areas of concern and determined that these soils no longer pose a public health hazard to visitors to the park. HAS will be available to Monroe Township representatives and the community to answer health-related questions and to provide educational materials with regard to potential adverse health effects from lead exposure if requested. HAS will also review any additional environmental data to determine if park visitors are being exposed to lead at levels of health concern. No further HAS actions are currently planned for this site.

PREPARED BY

Peter J. Ferron - Health Assessor/Environmental Specialist 2
Robert Frey, Ph D - Principal Investigator/Chief of the Health Assessment Section

REFERENCES

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HEALTH ASSESSMENT SECTION (HAS). 1998. Health Consultation for the Lewisburg Drum Site, Lewisburg, Preble County, Ohio. April 24, 1998. U.S. Department of Health & Human Services. 3 p.

HAS. 2001. Health Consultation for the Norwood Radiator Site, Norwood, Hamilton County, Ohio. August 14, 2001. U.S. Department of Health & Human Services. 6 p.

HAS. 2002. Health Consultation – Off-site Residential Properties Investigation, Eagle-Picher Industries, Delta, Fulton County, Ohio. December 12, 2002. U.S. Department of Health & Human Services. 8 p + attachments.

HAS. 2003A. Health Consultation – Off-site Disposal of Foundry Sand, Eagle-Picher Industries, Delta, Fulton County, Ohio. February 6, 2003. U.S. Department of Health & Human Services. 12 p + attachments.

HAS. 2003B. Health Consultation for the Lexington Manor Subdivision Lead Contamination (aka. Lexington Manor Lead Site), Fairfield, Butler County, Ohio. July 31, 2003. U.S. Department of Health & Human Services. 10 p + attachments.

HAS. 2003C. Health Consultation for the Kings Mills Middle School, Kings Mills, Warren County, Ohio. September 30, 2003. U.S. Department of Health & Human Services. 5 p + attachments.

HAS. 2004. Health Consultation for the Cincinnati Country Day School Lead Site, Cincinnati, Ohio. June 28, 2004. U.S. Department of Health & Human Services. 7 p.

HAS. 2005. Health Consultation for Brentwood Estates Subdivision, Butler County, Ohio. February 25, 2005. U.S. Department of Health & Human Services. 10 p + attachments.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA). 1994. Office of Solid Waste and Emergency Response Directive #9355.4-12. Revised Interim Soil Lead Guidance for CERCLA sites and RCRA Corrective Actions Facilities, August 1994.

CERTIFICATION

This Lead Contamination Health Consultation was prepared by the Ohio Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun. Editorial review was conducted by the Cooperative Agreement partner.

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Technical Project Officer, SPS, SSAB, DHAC, ATSDR

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

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Chief, State Program Section, SSAB, DHAC, ATSDR

Table 1				
Fair Oak Park Lead Site				
Amelia, Clermont County, Ohio				
Total Lead Sample Results				
Date	**Sample ID**	**Result**	**Units**	**Source**
3/21/2005	S-001	12	ppm	Ohio EPA XRF results
3/21/2005	S-002	17.7	ppm	Ohio EPA lab results
3/21/2005	S-003	23.2	ppm	Ohio EPA lab results
3/21/2005	S-004	16	ppm	Ohio EPA XRF results
3/21/2005	S-005	11.8	ppm	Ohio EPA lab results
3/21/2005	S-008	39.4	ppm	Ohio EPA lab results
3/21/2005	S-009	32	ppm	Ohio EPA lab results
3/21/2005	S-010	10.8	ppm	US EPA lab results
3/21/2005	S-011	8.35	ppm	US EPA lab results
3/21/2005	S-012	40.5	ppm	Ohio EPA lab results
3/21/2005	S-013	19.7	ppm	Ohio EPA lab results
3/21/2005	S-014	13	ppm	Ohio EPA XRF results
3/21/2005	S-015	8.98	ppm	US EPA lab results
3/21/2005	S-016	8.67	ppm	Ohio EPA lab results
3/21/2005	S-017	28	ppm	Ohio EPA XRF results
3/21/2005	S-018	14.1	ppm	Ohio EPA lab results
3/21/2005	S-019	15	ppm	Ohio EPA XRF results
3/21/2005	S-020	20	ppm	Ohio EPA XRF results
3/21/2005	S-021	193	ppm	Ohio EPA XRF results
3/21/2005	S-022	141	ppm	Ohio EPA XRF results
3/21/2005	S-023	24.3	ppm	Ohio EPA lab results
3/21/2005	S-024	65.6	ppm	Ohio EPA lab results
3/21/2005	S-025	32.9	ppm	Ohio EPA lab results
3/21/2005	S-026	224	ppm	Ohio EPA lab results
3/21/2005	S-027	28.8	ppm	Ohio EPA lab results
3/21/2005	S-028	37.5	ppm	Ohio EPA lab results
3/21/2005	S-029	8.6	ppm	Ohio EPA lab results
3/21/2005	S-030	9.27	ppm	US EPA lab results
3/21/2005	S-031	418	ppm	Ohio EPA lab results
3/21/2005	S-032	116	ppm	Ohio EPA lab results
3/21/2005	S-033	136	ppm	Ohio EPA XRF results
3/21/2005	S-034	56	ppm	Ohio EPA XRF results
3/21/2005	S-035	142	ppm	US EPA lab results
3/21/2005	S-036	132	ppm	Ohio EPA XRF results
3/21/2005	S-037	149	ppm	Ohio EPA lab results
3/21/2005	S-038	132	ppm	Ohio EPA lab results
3/21/2005	S-039	21	ppm	Ohio EPA XRF results
3/21/2005	S-040	16	ppm	Ohio EPA XRF results
3/21/2005	S-041	12	ppm	Ohio EPA XRF results
3/21/2005	S-042	51	ppm	Ohio EPA lab results

Table 1 (continued)				
Fair Oak Park Lead Site				
Amelia, Clermont County, Ohio				
Total Lead Sample Results				
Date	**Sample ID**	**Result**	**Units**	**Source**
3/21/2005	S-043	103	ppm	Ohio EPA lab results
3/21/2005	S-044	104	ppm	Ohio EPA lab results
3/21/2005	S-045	131	ppm	Ohio EPA lab results
3/21/2005	S-046	305	ppm	Ohio EPA lab results
3/21/2005	S-047	34.6	ppm	US EPA lab results
3/21/2005	S-048	23.8	ppm	US EPA lab results
3/21/2005	S-049	44.6	ppm	Ohio EPA lab results
3/21/2005	S-050	15	ppm	Ohio EPA XRF results
3/21/2005	S-051	8	ppm	Ohio EPA XRF results
3/21/2005	S-051 DUP	12	ppm	Ohio EPA XRF results
3/21/2005	S-052	4,940	ppm	Ohio EPA lab results
3/21/2005	S-053	48.3	ppm	US EPA lab results
3/21/2005	S-054	10	ppm	Ohio EPA XRF results
3/21/2005	S-055	102	ppm	Ohio EPA lab results
3/21/2005	S-056	56.8	ppm	Ohio EPA lab results
3/21/2005	S-057	111	ppm	Ohio EPA lab results
3/21/2005	S-058	41	ppm	Ohio EPA XRF results
3/21/2005	S-059	57	ppm	Ohio EPA XRF results
3/21/2005	S-060	44.2	ppm	Ohio EPA lab results
3/21/2005	S-061	19.6	ppm	Ohio EPA lab results
3/21/2005	S-062	42	ppm	Ohio EPA XRF results
3/21/2005	S-063	143	ppm	Ohio EPA XRF results
3/21/2005	S-064	643	ppm	Ohio EPA XRF results
3/21/2005	S-064 DUP	628	ppm	Ohio EPA XRF results
3/21/2005	S-065	514	ppm	Ohio EPA lab results
3/21/2005	S-066	241	ppm	Ohio EPA XRF results
3/21/2005	S-067	183	ppm	Ohio EPA XRF results
3/21/2005	S-068	117	ppm	Ohio EPA lab results
3/21/2005	S-069	37.2	ppm	Ohio EPA lab results
3/21/2005	S-070	182	ppm	Ohio EPA lab results
3/21/2005	S-071	110	ppm	Ohio EPA XRF results
3/21/2005	S-072	72.5	ppm	Ohio EPA lab results
3/21/2005	S-073	93.6	ppm	Ohio EPA lab results
3/21/2005	S-074	12	ppm	Ohio EPA XRF results
3/21/2005	S-075	38	ppm	Ohio EPA XRF results
3/21/2005	S-076	539	ppm	US EPA lab results
3/21/2005	S-077	282	ppm	Ohio EPA XRF results
3/21/2005	S-077 DUP	272	ppm	Ohio EPA XRF results
3/21/2005	S-078	953	ppm	Ohio EPA lab results
3/21/2005	S-079	1,130	ppm	Ohio EPA lab results
3/21/2005	S-080	129	ppm	Ohio EPA XRF results

Table 1 (continued)				
Fair Oak Park Lead Site				
Amelia, Clermont County, Ohio				
Total Lead Sample Results				
Date	**Sample ID**	**Result**	**Units**	**Source**
3/21/2005	S-081	64	ppm	Ohio EPA XRF results
3/21/2005	S-082	135	ppm	Ohio EPA lab results
3/21/2005	S-083	96	ppm	Ohio EPA XRF results
3/21/2005	S-084	25.4	ppm	US EPA lab results
3/21/2005	S-085	16.5	ppm	US EPA lab results
3/21/2005	S-086	35	ppm	Ohio EPA XRF results
3/21/2005	S-087	108	ppm	Ohio EPA lab results
3/21/2005	S-088	63	ppm	Ohio EPA XRF results
3/21/2005	S-089	155	ppm	US EPA lab results
3/21/2005	S-090	134	ppm	US EPA lab results
3/21/2005	S-091	108	ppm	US EPA lab results
3/21/2005	S-092	143	ppm	US EPA lab results
3/21/2005	S-093	356	ppm	US EPA lab results
3/21/2005	S-094	159	ppm	US EPA lab results
3/21/2005	S-095	49.3	ppm	US EPA lab results
3/21/2005	S-096	27.8	ppm	US EPA lab results
3/21/2005	S-097	10.4	ppm	US EPA lab results
3/21/2005	S-098	4.2	ppm	US EPA lab results
3/21/2005	S-099	32.5	ppm	US EPA lab results
3/21/2005	S-099 DUP	44.2	ppm	US EPA lab results
3/21/2005	S-100	34.7	ppm	US EPA lab results
3/21/2005	S-101	33.7	ppm	US EPA lab results
3/21/2005	S-102	18.9	ppm	US EPA lab results
3/21/2005	S-103	266	ppm	US EPA lab results
3/21/2005	S-104	138	ppm	US EPA lab results
3/21/2005	S-105	54.7	ppm	US EPA lab results
3/21/2005	S-106	547	ppm	US EPA lab results
3/21/2005	S-107	30.8	ppm	US EPA lab results
3/21/2005	S-108	7.44	ppm	US EPA lab results
3/21/2005	S-109	9.89	ppm	US EPA lab results
3/21/2005	S-110	9.26	ppm	Ohio EPA lab results
3/21/2005	S-111	78	ppm	Ohio EPA XRF results
3/21/2005	S-112	58.8	ppm	Ohio EPA lab results
3/21/2005	S-113	11	ppm	Ohio EPA XRF results
3/21/2005	S-114	316	ppm	Ohio EPA XRF results
3/21/2005	S-114 DUP	332	ppm	Ohio EPA XRF results
3/21/2005	S-115	47.5	ppm	US EPA lab results

Table 1 (continued)				
Fair Oak Park Lead Site				
Amelia, Clermont County, Ohio				
Total Lead Sample Results				
Date	**Sample ID**	**Result**	**Units**	**Source**
3/21/2005	S-116	69	ppm	Ohio EPA XRF results
3/21/2005	S-116	17.1	ppm	Ohio EPA lab results
3/21/2005	S-117	47	ppm	Ohio EPA XRF results
3/21/2005	S-119	16	ppm	US EPA lab results
3/21/2005	S-120	9.68	ppm	US EPA lab results
3/21/2005	S-121	21	ppm	Ohio EPA XRF results
3/21/2005	S-122	12	ppm	Ohio EPA XRF results
3/21/2005	S-123	22	ppm	Ohio EPA XRF results
3/21/2005	S-124	19	ppm	Ohio EPA XRF results
3/21/2005	S-125	18	ppm	Ohio EPA XRF results
3/21/2005	S-126	21	ppm	Ohio EPA XRF results
3/21/2005	S-127	72.1	ppm	US EPA lab results
3/21/2005	S-128	12	ppm	Ohio EPA XRF results
3/21/2005	S-129	16	ppm	Ohio EPA XRF results
3/21/2005	S-132	43.5	ppm	US EPA lab results
3/21/2005	S-133	52	ppm	US EPA lab results
3/21/2005	S-134	79	ppm	US EPA lab results
3/21/2005	S-135	10.1	ppm	US EPA lab results
3/21/2005	S-136	57	ppm	US EPA lab results
3/21/2005	S-137	121	ppm	US EPA lab results
3/21/2005	S-138	32.8	ppm	US EPA lab results
3/21/2005	S-139	14	ppm	US EPA lab results

Table 2: Fair Oak Park Lead Site								
Post Excavation Sample Log								
Sample #	**Sample Date**	**Location**	**Matrix**	**Analyses**	**Remarks**	**SampleType**	**Result**	**Units**
AREA-G-PE-001	08/25/05	Grid G	Soil	Total Pb		Post Exc.	118	mg/kg
AREA-F-PE-001	08/25/05	Grid F	Soil	Total Pb		Post Exc.	147	mg/kg
AREA-E-PE-001	08/25/05	Grid E	Soil	Total Pb		Post Exc.	71.3	mg/kg
AREA-H-PE-001	09/06/05	Grid H	Soil	Total Pb	Duplicate	Post Exc.	86.5	mg/kg
AREA-I-PE-001	09/06/05	Grid H	Soil	Total Pb		Post Exc.	50.2	mg/kg
AREA-D-PE-001	09/06/05	Grid D	Soil	Total Pb		Post Exc.	216	mg/kg
AREA-C-PE-001	09/06/05	Grid C	Soil	Total Pb		Post Exc.	136	mg/kg
AREA-B-PE-001	09/07/05	Grid B	Soil	Total Pb		Post Exc.	9.4	mg/kg
AREA-A-PE-001	09/07/05	Grid A	Soil	Total Pb		Post Exc.	17.9	mg/kg
HAULROAD-PE-001	09/08/05	Haul Road	Soil	Total Pb		Post Exc.	60.8	mg/kg
STOCKPILE-PE-001	09/12/05	Under Pile	Soil	Total Pb		Post Exc.	77.5	mg/kg

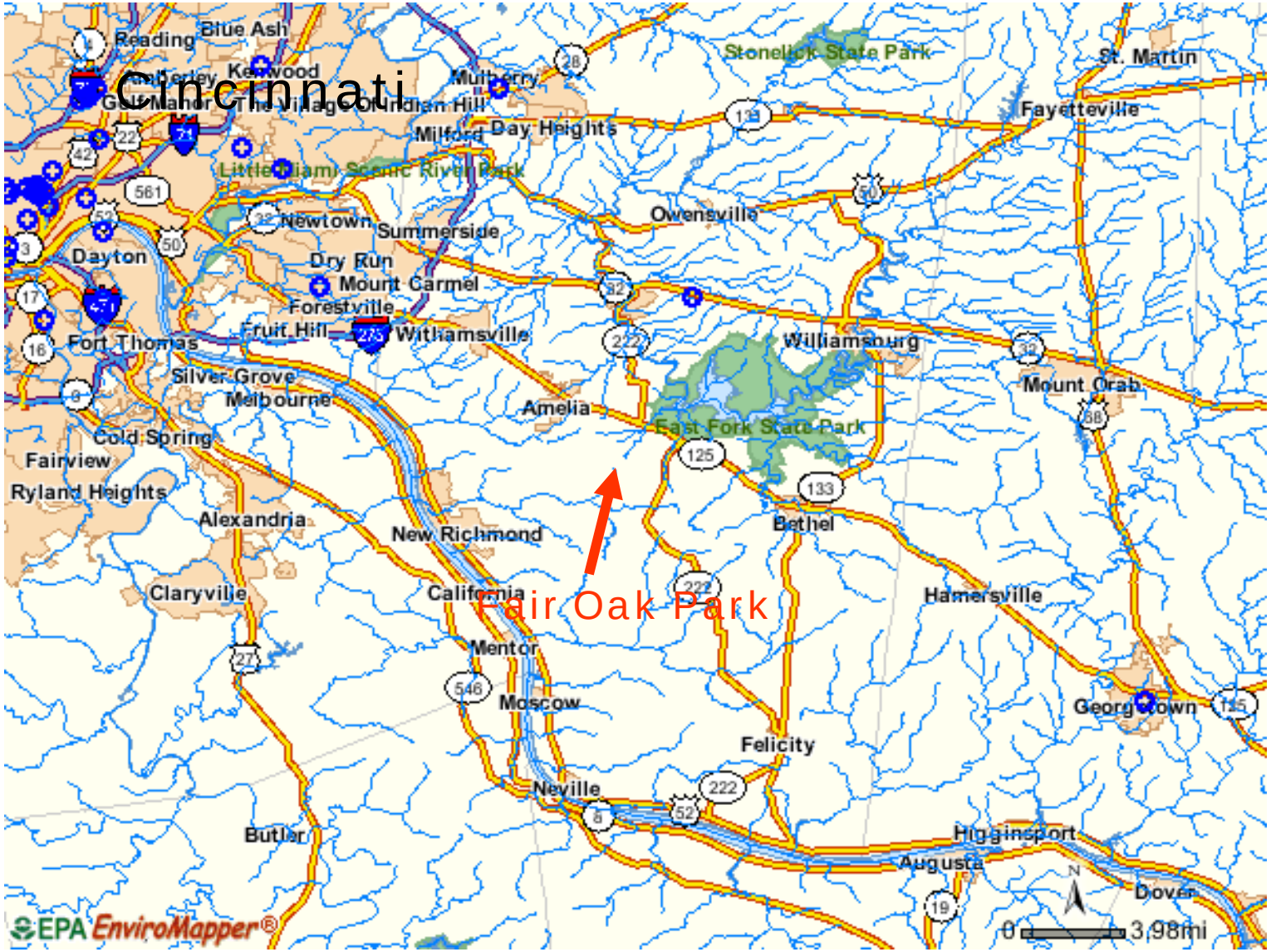

Figure 1. Fair Oak Park Location, Amelia, Ohio, Clermont County

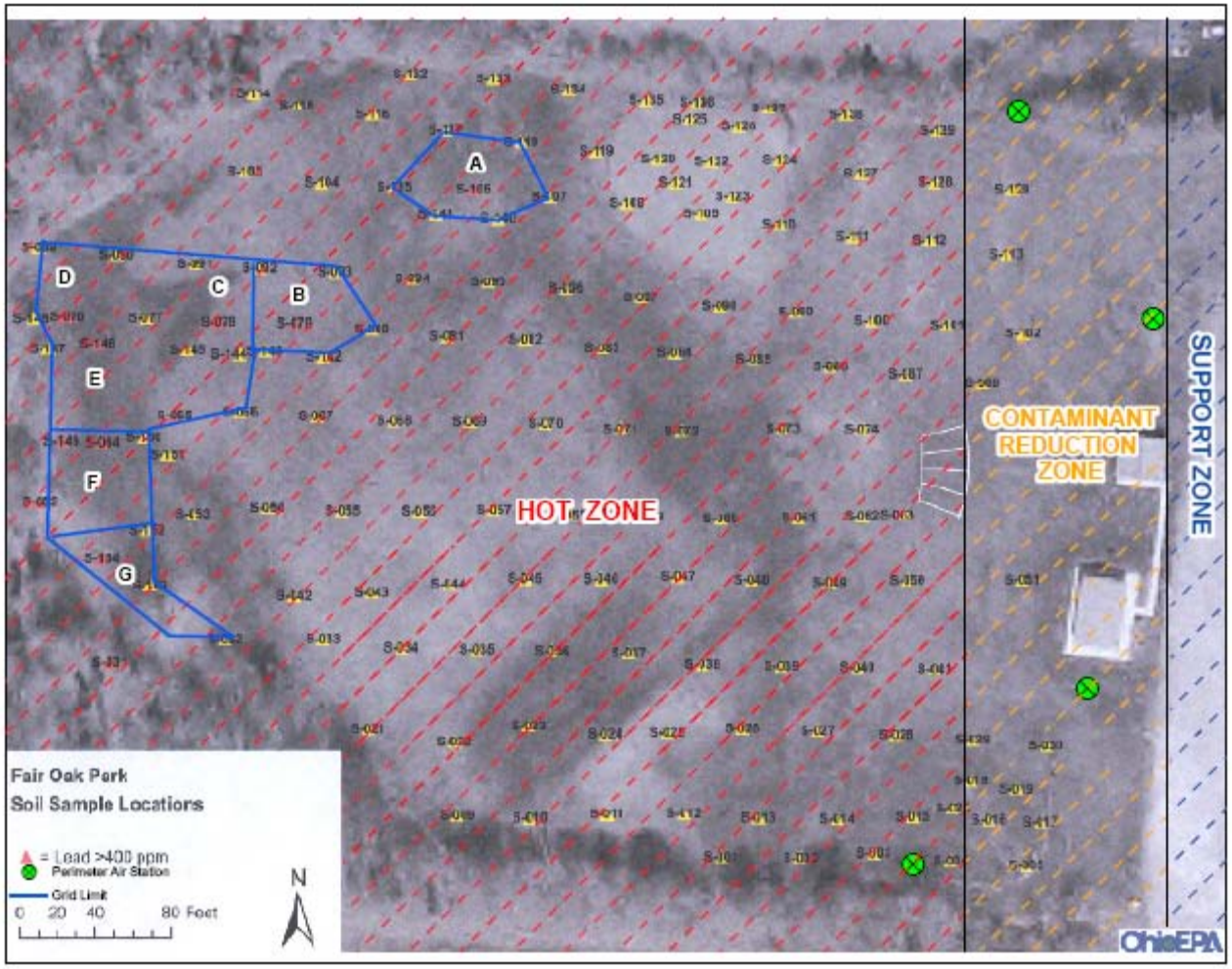

Figure 2. Fair Oak Park areas of high lead contamination