

**PUBLIC HEALTH ASSESSMENT ADDENDUM**

**CURCIO SCRAP METAL YARD**

**SADDLE BROOK TOWNSHIP, BERGEN COUNTY, NEW JERSEY**

**CERCLIS Number NJD011717584**

**PREPARED BY:**

**NEW JERSEY STATE DEPARTMENT OF HEALTH  
UNDER A COOPERATIVE AGREEMENT WITH  
THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY**

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## SUMMARY

Curcio Scrap Metal, Inc. is a one acre site located at 416 Lanza Avenue, Upper Saddle Brook Township, Bergen County, New Jersey (Appendix I) containing two active scrap metal recycling businesses, Curcio Scrap Metal, Inc. (CSMI) and Cirello Iron and Steel Company (CISC). Curcio Scrap Metal started its salvaging operations in the early 1950's recycling paper and rags and then expanded into copper and aluminum recycling. The area around the property is mixed with light industry, commercial businesses and residences. The site is subdivided into the East, West and South Lots. The West and the South Lots have been paved and the East Lot is unpaved. The East Lot, therefore, is more subject to contamination. Salvage operations take place at the East Lot. The site is above a shallow aquifer. Below this aquifer is a deep fractured bedrock aquifer which supplies water to public and private wells in the area. The site was investigated on October 27, 1982, by the New Jersey Department of Environmental Protection and Energy (NJDEPE) following a citizen's complaint that electrical transformers were being stored and cut up at the property. Analytical sampling revealed the presence of polychlorinated biphenols (PCB's) from transformers that had been cut up. The United States Environmental Protection Agency (USEPA), performed a Site Inspection (SI) in September 1984. They found three different PCB's, lead, copper, nickel and trichloroethylene where found in on-site soil samples. Several oil spills have been documented. The USEPA identified five potentially responsible parties accountable for contamination of the site: Frank Curcio, Curcio Scrap Metal, Cirello Iron and Steel, Consolidated Edison Company of New York (Con Ed) and SECO Corp. On May 27, 1988, the USEPA entered into an Administrative Consent Order (ACO) with Con Ed, Curcio Scrap Metal and SECO Corp. requiring them to perform a Remedial Investigation Feasibility Study (RI/FS) of the site. The investigations revealed that the soil and groundwater on-site was contaminated. The USEPA divided the site into two Operable Units. The first Operable Unit, issued on February 8, 1991, described the possible remedial alternatives for addressing the contaminated soil in and around the East Lot. The Record of Decision (ROD) for the first Operable Unit was signed in June 1991. Future Operable Units will address the surface and groundwater contamination. Community concerns focused upon the public health impacts of the site, the remediation of the site and of worker health and safety. The ATSDR and the NJDOH consider the site to be an urgent public health hazard via the ingestion pathway to on-site workers, scrap metal haulers and trespassers, based upon the chronic oral exposure to contaminated soil between the early 1950's to the present. They risk loss of memory, anemia, brain and kidney damage and weakness in the extremities due to lead exposure and risk contracting cancer due to PCB exposure. There is inadequate data to determine the potential for adverse health effects for residents who live near the site.

## BACKGROUND

### A. SITE DESCRIPTION AND HISTORY

Curcio Scrap Metal, Inc. is a one acre site located at 416 Lanza Avenue, Upper Saddle Brook Township, Bergen County, New Jersey (Figure I). The site has two active scrap metal recycling businesses, Curcio Scrap Metal, Inc. (CSMI) and Cirello Iron and Steel Company (CISC). Curcio Scrap Metal started its salvaging operations in the early 1950's. The East and West lots, which were once used for dairy farming, were purchased in 1975. The South Lot was purchased in 1981. Curcio Scrap Metal initially recycled paper and rags and then expanded into copper and aluminum recycling.

The site is bordered by Lanza Avenue to the north, Walther Avenue to the south, commercial businesses and residential properties to the west and a concrete company, P. Michellotti and Son, to the east. The area around the property is mixed with light industry, commercial businesses and residences (Figure II). Residential and commercial businesses are in high density adjacent to the western side of the property. About 30,000 people live within three miles of the site.

The site is subdivided into the East, West and South Lots, each measuring approximately 10,000 square feet (Figure III). The west Lot was paved in 1977, after the original structures on the lot were demolished. The South Lot, which was purchased in 1981, was paved in 1985 and then a warehouse was erected. The East Lot is unpaved and is, thus, more subject to contamination. CSMI and CISC have administrative buildings on the west and south lots. Salvage operations take place at the east lot.

An east lot drainage ditch leads from the property into a small pipe that runs in a north-easterly direction under the property. The drainage pipe empties into Schroeder's Brook several hundred feet away from the property. The brook flows for about 800 feet prior to entering a pipe leading to a nearby lake.

The site is above a shallow aquifer that is two to six feet below the surface. Starting approximately 16 feet below the surface is the Brunswick Formation, a deep fractured bedrock aquifer, which supplies water to public and private wells in the area.

The east lot contains piles of scrap metal in various stages of salvage. In the center of this lot is a large crane with a magnet to move the scrap metal to the various piles and containers. Bulldozers and other heavy equipment are also used to move the scrap metal. Two roll-off containers are usually located in the southeastern section of the east lot and are periodically emptied.

The site was investigated on October 27, 1982, by the New Jersey Department of Environmental Protection and Energy (NJDEPE) following a citizen's complaint that electrical transformers were being stored and cut up at the property. The NJDEPE found oily black fluid in the drainage ditch and in puddles and ditches

under and adjacent to the transformers. Analytical sampling revealed that the fluid contained two polychlorinated biphenols (PCB's): Arochlor 1260 and Arochlor 1242, at concentrations of 105 and 47 ppm, respectively. Analytic samples taken from the drainage ditch revealed the presence of 462.4 ppm of Arochlor 1260 in the oil layer and 0.025 ppm in the water layer. Cirello Iron and Steel was directed to remove and dispose of all contaminated soil. The company complied, however, a follow-up site inspection by the NJDEPE discovered that some contamination remained.

The United States Environmental Protection Agency (USEPA) performed a Preliminary Assessment (PA) of the site in April 1984, followed by a Site Inspection in September 1984. The USEPA site investigation revealed the presence of three different PCB's, lead, copper, nickel and trichloroethylene in on-site soil samples.

Oil was found in a nearby pond 200 feet east of the property on May 15, 1985. The property was inspected in June 1985, by the NJDEPE who determined that CISC had a spill of approximately 200 gallons of hydraulic fluid that flowed off-site. On August 8, 1989, CISC had a PCB-contaminated oil spill of undetermined quantity. The contaminated oil probably flowed off-site into surface waters.

Following a Potentially Responsible Party (PRP) search in 1986, the USEPA identified five PRP's responsible for contamination of the site: Mr. Frank Curcio, Curcio Scrap Metal, Cirello Iron and Steel, Consolidated Edison Company of New York (Con Ed) and SECO Corp. On May 27, 1988 the USEPA entered into an Administrative Consent Order (ACO) with Con Ed, Curcio Scrap Metal and SECO Corp. They were required to perform a Remedial Investigation/Feasibility Study (RI/FS) of the site, which was initiated on July 19, 1989. The USEPA, on December 29, 1989, issued a Unilateral Administrative Order to CISC and CSMI due to the unauthorized moving of contaminated soil within the property and the damaging of two on-site monitoring wells by their activities.

The Phase I investigation, conducted from July to August 1989, concentrated mainly on soil and groundwater sampling of the site. Phase II of the Remedial Investigation was performed in July 1990, to determine the extent of the soil contamination and on-site groundwater contamination. These investigations revealed that the soil and groundwater on-site was contaminated (8).

The USEPA performed a Risk Assessment for the site in December 1990, to determine the potential risk posed by the site to the public. It was determined that the Lifetime Excess Cancer Risk (LECR) to be five in a hundred for on-site workers, primarily due to the contaminated soil.

The site was divided into two studies (Operable Units). The first Operable Unit Remedial Plan, issued by the USEPA on February 8, 1991, addressed the remediation of the contaminated soil in and around the East Lot. The Record of Decision (ROD) for Curcio Scrap Metal was signed in June 1991 (9). The second Operable Unit will address surface and groundwater contamination.

The USEPA was in contact with the Occupational Safety and Health Administration (OSHA) from July 1990 to March 1991 regarding the worker conditions. OSHA sampled the air and soil at various locations on the site from

November 1990 to March 1991. From the sampling results OSHA concluded that a citation could not be issued because the results did not exceed the OSHA limits.

## **B. SITE VISIT**

On January 28, 1991, Jonathan Savrin, Research Scientist, of the NJDOH and the Technical Coordinator from the NJDEPE conducted a site visit at Curcio Scrap Metal. Then, Howard Rubin, Research Scientist, of the NJDOH and a representative of the Bergen County Health Department made a site visit on July 14, 1992. All sections of the site were paved except for the East Lot which consisted of compacted soil. This section of the site is the focal point because it is unpaved, and is the location of the recycling activities. The only outstanding features on the East Lot were a truck scale and the scale building at the northern end, and the metal cutting area in the northeastern section. Catch basins were at the northeastern and southwestern ends of the East Lot.

An underground culvert extends from the East Lot to a pond which lies near the railroad tracks and drains into Schroeder's Brook. There was no evidence of recreational use of the brook near the site.

There was some evidence of trespassing. In fact, Curcio had placed metal sheets around portions of the East Lot to deter trespassing.

The workers appeared to be unaware of the potential adverse health effects associated with the site as evidenced by their lack of protective clothing and the lack of appropriate emergency equipment. Also, they used inadequate noise and eye protection.

## **C. DEMOGRAPHICS, LAND USE AND NATURAL RESOURCE USE**

Curcio Scrap Metal is located in a densely populated area in Saddle Brook Township, Bergen County, New Jersey. The site is close to the residential areas of Garfield, Saddle Brook and Elmwood Park. Approximately 30,000 people reside within a three mile radius of the site. Between 1,000 and 3,000 people live within a one-mile radius of the site. Elementary schools, parks and a hospital are within 0.5 mile of the site. The closest residence is approximately 300 feet from the edge of the site.

There are residential streets and private homes mixed with commercial businesses on the western side of the site. Residences are supplied with water by either the Hackensack or the Passaic Valley Water Companies. On the southern side of the site are residential and light industrial areas. To the north are residential and light industrial areas and Route 46. To the east of the site is a light industrial area and a New Jersey Transit railway line.

## **D. HEALTH OUTCOME DATA**

There are multiple sources of health outcome data in New Jersey. State and local data for health outcome information include the New Jersey State Cancer

Registry, Adverse Pregnancy Outcomes Registry, Vital Statistics Records, Renal Dialysis Network and hospital discharge reports. Federal databases such as those maintained by the Department of Health and Human Services (National Cancer Institute, NIOSH and ATSDR) are not site-specific, but may be used for comparison and evaluation purposes.

## **COMMUNITY HEALTH CONCERNS**

In order to gather information on community health concerns, the NJDOH attended a public meeting held by the USEPA in Saddle Brook on February 21, 1991 to present and discuss the preferred remedial alternative for the Curcio Scrap Metal site. The concerns of the community focused upon the public health impacts of the site, the remediation of the site and worker health and safety.

## **ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS**

The Toxic Chemical Release Inventory (TRI), developed by the USEPA, estimates the annual release of toxic substances into the environment (Air, water and soil) by industries. The NJDOH conducted a search of the TRI, from 1987 through 1989, to identify facilities that had toxic chemical releases near the site and the Township of Saddle River. Three facilities reported emissions of chemicals. Fein Container released 71 pounds of xylenes and 1 pound of toluene in 1987 and 5 pounds of lead in 1988. Coining Corporation of America released 250 pounds of copper in 1987 and 22.5 pounds of 1,1,1-trichloroethane in 1988. Seventy pounds of tetrachloroethylene was released by Custom Optics in 1987. These releases are comprised of chemicals different from those found at the Curcio site. Therefore, additional exposure to site-related chemicals from these releases is unlikely.

### **A. ON-SITE CONTAMINATION**

Refer to page 2 in the Preliminary Health Assessment document for Saddle Brook Township, July 7, 1988, for basic information regarding on-site contamination (5). Further sampling was done subsequent to the Preliminary Health Assessment.

#### **Soil**

The East Lot is unpaved and is the most contaminated section of the site. The overburden soil extends to a depth of about 16 feet in the East Lot. The overburden soil in the top four to six feet contains reworked natural soil mixed with various fill material and scrap metal fragments. Saturated soil, due to the shallow aquifer, started at a depth between six to eight feet below the surface of the East Lot. The soil on the East Lot is continually mixed and regraded as

a normal part of the salvaging operation. Thus, the soil should be fairly homogeneous.

More than 50 on-site soil samples were taken for the RI/FS in July and August 1989 (8). Most of the samples were taken from the East Lot either at a depth of 0 to 2 feet, from 2 to 4 feet or 4 to 6 feet. Analyses found that the contaminants were predominantly PCB's, volatile organic chemicals (VOC's) and inorganic chemicals at all depths. The range of PCB's at 0 to 2 feet ranged from 0 to 6200 ppm with an average of 630.9 ppm for 28 samples. All but one sample was found to contain PCB's. For lead, the range was 93.3 to 11,300 ppm for 21 soil samples, with an average of 5393.7 ppm. All samples contained lead.

During the same period, the NJDEPE sampled the South Lot at six locations for VOC's and for PCB's at a depth up to six feet. The results were determined via gas chromatography in a mobile field laboratory. The maximum concentrations found at the South Lot were 0.88 ppm of VOC's and 13.5 ppm of PCB's. Analyses were not performed for either inorganic or base/neutral compounds. No samples were taken under the warehouse on the South Lot or in the area between the East Lot and the West Lot. Only limited sampling was conducted at the West Lot, with maximum concentrations of 0.045 ppm of VOC's and 3.2 ppm of PCB's being found. Table I lists the chemicals found in on-site soil samples that were above their comparison values.

Comparison values for health assessment are contaminant concentrations in specific media that are used to select contaminants for further evaluation. These values include Environmental Media Evaluation Guides (EMEG's), Cancer Risk Evaluation Guides (CREG's), and other relevant guidelines. CREG's are estimated contaminant concentrations based on a one excess cancer in a million persons exposed over a lifetime. CREG's are calculated from EPA's cancer slope factors. EPA's maximum Contaminant Level Goal (MCLG) is a drinking water health goal. EPA believes that the MCLG represents a level that no known or anticipated adverse effect on the health of persons should occur which allows an adequate margin of safety. Proposed Maximum contaminant Level Goals (PMCLG's) are MCLG's that are being proposed. Maximum Contaminant Levels (MCL's) represent contaminant concentrations that USEPA deems protective of public health (Considering the availability and economics of water treatment technology) over a lifetime (70 years) at an exposure rate of 2 liters of water per day. While MCL's are regulatory concentrations, PMCLG's and MCLG's are not. USEPA's Reference Dose (RfD) and Reference Concentration (RfC) are estimates of the daily exposure to a contaminant that is unlikely to cause adverse health effects.



Table I. CONTAMINANTS FOUND IN ON-SITE SOIL SAMPLES

Contaminant	Maximum Conc. (ppm)	Depth (Feet)	Comparison Values	
			ppm	Source
Lead	39300.0	0-2	*N/A	
Mercury	466.0	0-2	N/A	
PCB's	6200.0	0-2	0.1	**CREG
Trichloroethylene	6.4	2-4	N/A	

\*N/A - Not Available

\*\*CREG - Cancer Risk Evaluation Guide

Oil-laden soil is suspected to have been moved, in 1983, from the East Lot to the South Lot and then moved back to the East Lot. Two samples in the East Lot were found to contain total petroleum hydrocarbons (TPH) at concentrations that are considered to be hazardous by the NJDEP, 30,000 ppm. One sample contained 31,000 ppm of TPH at a depth of 2 to 6 feet and the other sample contained 53,000 ppm of TPH at a depth of to 6 feet. The depth of the water table during sampling was six feet. The warehouse was built on the South Lot, in 1985, covering the area which might have contained this soil. Contamination occurring as a result of soil piles having been moved around the site is of concern and has not been adequately investigated.

**Groundwater**

Groundwater samples were taken from three on-site monitoring wells in July and August 1989 (8). Some VOC's, non-volatiles and metals were detected in the monitoring well samples at concentrations below their comparison values. Table II lists those compounds found between 4 to 6 feet deep that were above their comparison values. The monitoring well samples were taken from the shallow aquifer and not from the deep bedrock Brunswick Formation aquifer. The monitoring wells were driven to a depth of 6 feet but did not appear to hit the saturated zone. At six feet, the soil was wet but not saturated. However, it is probable that the superficial aquifer has been contaminated.

Table II. CONTAMINANTS FOUND IN ON-SITE GROUNDWATER SAMPLES

Contaminant	Maximum Conc. (ppm)	Depth (Feet)	Comparison Values	
			ppm	Source
Bis(2-ethylhexyl)-phthalate	44.0	4-6	0.0025	*CREG
Cadmium	77.8	4-6	0.007	**EMEG
Lead	5280.0	4-6	0.05	+MCL
Mercury	12.3	4-6	++N/A	
Polychlorinated biphenyls (PCB's)	0.0015	4-6	0.00018	EMEG
Selenium	2.2	4-6	0.11	EMEG

- \*CREG - Cancer Risk Evaluation Guide
- \*\*EMEG - Environmental Media Evaluation Guide
- +MCL - Maximum Contaminant Level
- ++N/A - Not Available

**Air**

On-site air sampling was not performed.

**B. OFF-SITE CONTAMINATION**

**Soil**

Soil samples were taken along Lanza Avenue, north of the site during the Phase I Remedial Investigation in July and August, 1989 (8). PCB's were found to be at a maximum level (3.6 ppm) in sample cores, at a depth of 0 to 2 feet. This was the only chemical that was above it's Agency for Toxic Substance and Disease Control (ATSDR) comparison value. The maximum concentration of lead, 107 ppm, was detected at a depth of 0 to 2 feet. There is no comparison value for lead in soil. This indicates that there was some migration of the contaminants off-site. No off-site soil samples were taken at private homes.

**Groundwater**

PCB's were detected at concentrations of 3.2 ppm of arochlor 1248 and 5.6 ppm of arochlor 1260, in a private well water sample (5). However, the location of the well was not reported in the RI. There are four private wells in the vicinity of the Curcio Scrap Metal site, two of which were in use in 1988 (5). However, city water is available for all residences and businesses. The wells

are probably being used for industrial purposes rather than as a source of drinking water. Also, the Remedial Investigation (8) mentions a well adjacent to the Curcio Site. One up-gradient monitoring well was installed on Lanza Avenue, but there were no results because the monitoring well was ruined (8) either by vandals or by the heavy machinery.

#### ***Sediment and Surface Water***

Oil was found in a nearby pond 200 feet east of the property on May 15, 1985. The property was inspected in June 1985, by the NJDEPE who determined that CISC had a spill of approximately 200 gallons of hydraulic fluid that flowed off-site. On August 8, 1989, CIS had a PCB-contaminated oil spill of undetermined quantity which also probably flowed off-site into surface waters. Insufficient numbers of off-site sediment and surface water samples have been taken to determine the extent of pollution for these media. The second Operable Unit will determine the extent of groundwater, surface water and sediment contamination.

#### ***Air***

Off-site air sampling was not performed.

### **C. QUALITY ASSURANCE/QUALITY CONTROL**

The NJDOH relied on the information provided by the NJDEPE and the USEPA for quality assurance/quality control (QA/QC) information. Thus, it must be assumed that the proper procedures were followed with regard to chain-of-custody, laboratory analyses and data reporting if there were no negative declarations.

Environmental samples were analyzed under the guidelines of the USEPA Certified Laboratory Program. Analytical data were validated by the NJDEPE. While proper quality assurance and control measures were generally followed during sample collection and analyses, the quality of the data was affected by quality control sample contamination for some of the samples.

### **D. PHYSICAL AND OTHER HAZARDS**

Physical hazards exist on the Curcio site due to the operation of a metal reclamation facility. These hazards include exposure to large sharp metal edges, exposure to the compaction area and the use of heavy equipment such as cranes, bulldozer and front-loaders within a small work area. Noise is of concern for the workers on-site.

## PATHWAY ANALYSES

To determine whether nearby residents are exposed to contaminants migrating from the site, NJDOH evaluates the environmental and human components that lead to human exposure. Pathway analysis consists of five elements: A source of contamination, transport through an environmental medium, a point of exposure, a route of exposure, and an exposed population.

NJDOH categorizes an exposure pathway as a completed or potential exposure pathway if the exposure pathway cannot be eliminated. Completed pathways require that the five elements exist and indicate that exposure to a contaminant has occurred in the past, is currently occurring, or will occur in the future. Potential pathways, however, require that at least one of the five elements is missing, but could exist. Potential exposure pathways indicate that exposure to a contaminant could have occurred in the past, could be occurring now, or could occur in the future. An exposure pathway can be eliminated if at least one of the five elements is missing and will never be present. Table III identifies the completed exposure pathways. Table IV identifies the potential exposure pathways. The discussion that follows these tables incorporates only those pathways that are important and relevant to the site.

### A. COMPLETED EXPOSURE PATHWAYS

#### *Soil Pathway*

Completed exposure pathways at the Curcio Scrap Metal site are limited to those pathways associated with contaminated soil generated on-site (Table III). Salvage operations began in the early 1950's recycling paper and rags and later on recycled aluminum and copper. Salvage operations continue at the present time. Therefore, the potential duration for exposure is currently approximately 40 years and shall continue until the site is either remediated or salvage operations cease.

The exposed population consists of the approximately 15 employees who work on-site either at Curcio Scrap Metal, or at Cirello Iron and Steel Company. Scrap waste haulers continuously bring the scrap metal to the site. There are unknown numbers of trespassers on the site who are at risk. The total number of people considered to be at risk is approximately 100, consisting of the present and past workers and waste metal haulers. The length of exposure is considered to be 40 years, the length of time that Curcio has been in operation. There is no evidence to indicate when contamination first occurred. It is possible that Curcio handled rags and paper products contaminated with toxic chemicals from the beginning of their operations. Thus, an exposure time of 40 years is a conservative estimation.

There are several likely routes of exposure. Inhalation of contaminated soil particles that have become resuspended in the air is a major concern since the soil is frequently being regraded during the salvaging operations. Ingestion may occur if food containing contaminated dust or soil particles is eaten or if

oral contact is made with soil-laden hands. Also, there is the possibility of direct contact with contaminated soil allowing PCB's to be absorbed through the skin. Adults ingest small amounts of soil, usually around 100 mg/day. Soil ingestion could be higher for jobs that require close contact with the soil or where dust is generated.

Analytical samples indicate that the unpaved portion, the East Lot, is the most heavily contaminated section of the site. The highest levels of contamination occurred within the first four feet of soil but the soil was shown to be contaminated down to a depth of six feet, the level of the water table. The chemicals found in soil samples at concentrations above ATSDR comparison values (Table I) were lead, mercury, PCB's and trichloroethylene.

## **B. POTENTIAL EXPOSURE PATHWAYS**

### *Groundwater Pathway*

The shallow groundwater aquifer below the Curcio site appears to be contaminated. Although Saddle Brook residences use the city water supply, at least some private wells exist. It is not known if these wells are the source of drinking water or are used for other purposes, although the residences and/or businesses with the private wells probably also have city water.

It is possible that there are sufficient concentrations of contaminants of concern in the groundwater contaminant plume off-site so that a risk of adverse health effects exists. However, groundwater sampling has not delineated the contaminant plume or determined if the plume is expanding or receding. The contaminated shallow aquifer sits above the highly fractured Brunswick Formation which supplies water for residences in neighboring areas. Therefore, there is a risk that the deep bedrock aquifer is or may become contaminated (Table IV). The residents on city water could become exposed by ingestion, inhalation or by skin contact.

Table III. Completed Exposure Pathways

EXPOSURE PATHWAY ELEMENTS					TIME
SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Curcio Scrap Metal Site	Soil	Curcio Scrap Metal Site	Ingestion, Inhalation, Skin contact	Curcio Employees, Scrap Haulers & Trespassers	Past, Present, Future

Table IV. Potential Exposure Pathways

EXPOSURE PATHWAY ELEMENTS					TIME
SOURCE	ENVIRONMENTAL MEDIA	POINT OF EXPOSURE	ROUTE OF EXPOSURE	EXPOSED POPULATION	
Curcio Scrap Metal Site	Groundwater	Saddle Brook Wells	Ingestion Inhalation, Skin Contact	Saddle Brook Residents	Past, Present, Future
Curcio Scrap Metal Site	Off-Site Soil	Saddle Brook Streets	Ingestion, Inhalation, Skin Contact	Saddle Brook Residents	Past, Present, Future
Curcio Scrap Metal Site	Air	On-Site, Off-Site	Inhalation, Skin Contact	Saddle Brook Residents, Curcio site Employees	Past, Present, Future

### *Off-Site Soil Pathway*

It is possible that significant amounts of contaminated soil may have migrated off-site. Unwashed trucks leaving the site are laden with contaminated soil. Consequently, the pavement on Lanza Avenue is covered with soil. However, inconclusive off-site soil sampling has been conducted. Thus, nearby residents could be exposed via direct contact with contaminated soil, by inhaling fugitive dusts or by ingestion. Possible exposure has occurred in the past and present and probably will continue into the future (Table IV). The migration of contaminants into off-site soils should be quantitated.

### *Air Pathway*

Contaminants of concern that are generated at the Curcio site may become air-borne via the generation of fugitive dusts during normal operating procedures. Workers at the Curcio site and perhaps nearby residents can be exposed directly by skin contact or by inhalation of the air-borne contaminants. Exposure has occurred in the past, presently continues and probably will continue in the future (Table IV). Sufficient air sampling has not been conducted on-site and no air sampling was conducted off-site.

## **PUBLIC HEALTH IMPLICATIONS**

### *Introduction*

In this section, NJDOH will discuss the health effects in persons exposed to specific contaminants, evaluate state and local health databases, and address specific community health concerns. To evaluate health effects, ATSDR has developed a Minimal Risk Level (MRL) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancer, adverse health effects are unlikely to occur. MRL's are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 364 days) and chronic (greater than 365 days). ATSDR presents these MRL's in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status. In the following discussion, ATSDR Toxicological Profiles were used for several different toxic chemicals.

### **A. TOXICOLOGICAL EVALUATION**

The toxicological effects of the contaminants detected in the groundwater have been considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its



pharmacokinetics in children and adults, and its toxicity in children and adults.

### **Soil Exposure**

In the past, the present and for the foreseeable future, workers at the site were exposed to soil that was contaminated with a variety of different toxicants for up to 40 years. It is unlikely that prolonged exposure to most of these contaminants at the concentrations that were detected in the soil samples would result in adverse health effects. It is known that Curcio started its recycling operation in the 1950's. The exposure dose assessment is based on adults and assumes that they ingested 100 mg of contaminated soil per day for 40 years. The exposed population via on-site soil exposure consists of approximately 100 workers employed by Curcio Scrap Metal, Inc., Cirello Iron and Steel Company, scrap haulers and trespassers on the site.

Off-site soil testing is inadequate to determine if the contaminants of concern that were found in on-site soil samples are present in off-site soils. Thus, the possibility exists that off-site soils might be contaminated with these chemicals. It cannot be determined if adverse health effects occurred in residents who live near the site due to a lack of off-site soil data.

### **Lead**

The adverse health effects caused by exposure to lead has been well documented in both animal and human studies. Lead may decrease the mental capacity of children, retard their growth and development and may cause premature births and smaller babies. In adults, lead exposure may cause slower reaction time, memory loss, anemia, brain damage, kidney damage, colic, male reproductive system damage, weakness in the fingers, wrists and/or ankles, increased blood pressure in middle-aged men and possibly death. The effects caused by lead are the same regardless of the route of exposure. Some animal studies have linked exposure to lead with cancer. However, there is inconclusive evidence relating oral lead exposure with cancer (7).

There is no current chronic oral Minimum Risk Level (MRL) or oral Reference Dose (RFD) value for lead. Based upon maximum levels of lead detected in on-site soil samples, calculated exposure doses were above the No Observed Adverse Effect Level (NOAEL) for ingestion exposures of prolonged duration cited in the ATSDR Toxicological Profile for lead (1). Such concentrations may equal and perhaps exceed the NOAEL for chronic exposure in animals (For effects other than cancer). Thus, it is possible for adverse health effects to occur. Since no air samples were taken, it is possible that adverse effects might have also occurred by the inhalation route. The calculated exposure dose was based, for the 100 workers, scrap haulers and trespassers at the Curcio site, on adults ingesting 100 mg of soil per day for 40 years.

### **Mercury**

Mercury is a naturally occurring ubiquitous element that is found either

in the inorganic form as a mineral or in the organic form, usually as methylmercury. Chronic exposure to inorganic mercury may cause behavioral changes, weight loss, anorexia and immune deficiency. There is insufficient human or animal evidence to link mercury with cancer. (6)

Mercury was found in on-site soil samples at a maximum concentration of 466 ppm (Table I). The estimated chronic exposure dose is below the adult RFD value for the on-site soil samples based on adults ingesting 100 mg of soil per day for 40 years. Further, the estimated exposure dose was below the chronic oral and dermal No Observed Adverse Effect Level (NOAEL) for animals (2). Thus, the data indicate that the population exposed to mercury contamination (Approximately 100 workers, scrap haulers and trespassers) in on-site soils was at insufficient levels to cause adverse health effects. Since no air samples were taken, it is impossible to estimate the exposure dosages and resultant health effects that might have occurred due to the inhalation route.

### **PCB's**

Site data indicate that exposure to PCB's occurred for the adult workers and trespassers at the Curcio Scrap Metal Site through the ingestion pathway. There was no data describing concentrations of PCB's in the air. For a period of approximately 40 years, as many as 100 people were exposed daily to low levels of PCB's by the direct contact of contaminated soil. Exposure dose assessment assumes that adults ingested 100 mg per day of soil.

On-site personnel who work in areas of the East Lot that contains the highest PCB contamination may be exposed to PCB's. That exposure exceeds ATSDR's MRL for chronic (Greater than 1 year) oral exposure. Such concentrations may equal and perhaps exceed the NOAEL for chronic exposure in animals (For effects other than cancer) represented in the ATSDR Toxicological Profile for PCB's (3). Therefore, it is possible for those personnel to develop non-cancer health effects due to PCB exposure.

Polychlorinated biphenyls are carcinogenic in animals and potentially carcinogenic in humans. According to the USEPA, PCB's as a group are classified as probable human carcinogens. In animals, hepatocarcinogens, adenocarcinomas and hepatocellular carcinomas have been reported (3). The maximum reported concentration of PCB's in on-site soil exceeded the minimum dose needed for cancer effects. The lifetime excess cancer risk (LECR) associated with the oral exposure route for PCB's at the site present a high increased risk of cancer.

The cancer risk associated with PCB exposure at the Curcio Scrap Metal site may be interpreted according to the following example. If 100,000 on-site workers were exposed through ingestion by working eight hours per day, five days a week for 40 years to the maximum concentration detected in the soil samples, approximately an additional 1667 cases of cancer may occur in 70 years. For the approximately 100 workers, scrap metal haulers and trespassers at the site who were exposed to PCB's, it is, therefore, possible that they will develop cancer as a result of their exposure. The risk of contracting cancer from exposure to PCB's is greater for those workers and waste metal haulers who had prolonged contact with PCB-contaminated soil. However, due to inadequate off-site

sampling, the potential for adverse health effects for the residents and workers at businesses around the site cannot be determined.

### **Trichloroethylene**

Animal studies suggest that TCE may be an animal carcinogen. However, conclusive evidence is not yet available. It is considered to be a potential cancer hazard to humans because no definitive causal relationship has been established between chronic exposure to humans exposed to trichloroethylene and cancer. There are no health guidelines for noncancer effects for TCE given by either the ATSDR or the USEPA. On-site soil data indicate that exposure to trichloroethylene (TCE) occurred for the approximately 100 workers, scrap haulers and trespassers at the Curcio site for approximately 40 years. The calculated chronic exposure dose for trichloroethylene found in on-site soil is below the concentration found to elicit a carcinogenic effect in laboratory animals, based on adults ingesting 100 mg of soil per day. Therefore, the concentration of TCE found in soil samples is probably unlikely to cause cancer in humans.

Based upon maximum levels of TCE detected in on-site soil samples, exposure doses were below the "no observed adverse effect level" (NOAEL) for ingestion exposures of prolonged duration cited in the ATSDR Toxicological Profile for trichloroethylene (4). At such concentrations, adverse health effects are not likely to occur.

### **B. HEALTH OUTCOME DATA EVALUATION**

Health outcome data was not reviewed for this contamination site. There were no more than 100 people exposed to the contamination on-site. Thus, the exposed population is so small that any increased rates of cancer or other diseases due to the contamination would not be observable by a review of the data bases. Further, the data bases are residence based and the workers could live in different areas. An occupational evaluation would be more appropriate.

### **C. COMMUNITY HEALTH CONCERNS EVALUATION**

Community health concerns are addressed as follows:

Question 1) How do I know if the concentration of contaminants in my yard is lower than the clean-up levels being applied to the site? Is there a need for additional off-site soil sampling?

Answer 1) There is a need for additional off-site soil sampling. The possibility exists that off-site areas may contain PCB's or other contaminants of concern at concentrations greater than background levels.

Question 2) I have relatives that work on the site. What about worker health and safety issues? If it's a Superfund site why has the site not been closed?

Answer 2) Worker health and safety issues are of concern. The USEPA was in

contact with the Occupational Safety and Health Administration (OSHA) between July 1990 and March 1991. OSHA sampled the air and soil on-site. From these results OSHA concluded that their limits were not exceeded.

Question 3) Were enough soil samples taken to characterize the on-site contamination? What about areas outside of the East Lot? What about Radioactive substances?

Answer 3) Sufficient sampling has been done to adequately characterize the East Lot soil. However, there are other areas of the lot that may require further characterization. Based on preliminary tests, there is no indication that radioactive materials were used or disposed of at the site.

Question 4) Is incineration of the waste safe?

Answer 4) PCB incineration does not pose a public health concern when performed properly.

Question 5) What if the area is developed in the future? Are deed restrictions being considered?

Answer 5) Deed restrictions may be used if significant levels of contamination are left in the area. However, as long as contaminated soil is remediated to residential cleanup levels, the area would not pose a concern for residential development and, therefore, deed restrictions would not be needed.

Question 6) Trucks leaving the site carry a lot of dirt through the residential streets. Why not use a catch basin with grates that would remove some of the soils that the trucks are carrying?

Answer 6) The public health concern would be reduced either by removing soil from the trucks or by cleaning the trucks before they leave the site and by installing a catch basin with grates.

## CONCLUSIONS

1. NJDOH and ATSDR have concluded that the Curcio Scrap Metal site is an urgent health threat to employees, scrap metal haulers and trespassers. They were exposed and are continuing to be exposed to sufficient levels of contaminated soil to possibly result in carcinogenic and noncarcinogenic effects. The Preliminary Health Assessment (5) considered the site to be a potential public health concern due to a lack of analytical data.

2. In the past, the present and the future (until the site is remediated), about 100 people including past and present employees at the site, scrap metal haulers and trespassers may have been exposed to hazardous concentrations of lead and PCB's.

3. Due to inadequate off-site sampling, it cannot be determined if adverse health effects will occur in residents who live near the site.

4. The potential for adverse health effects that could occur due to volatilization, on-site soil in sections other than the East Lot, off-site soil, groundwater and the drainage basins, drainage pipes and surrounding surface waters is unknown because of insufficient sampling to perform a health assessment.

5. The potential for adverse health effects exist if the bedrock aquifer becomes contaminated by the overlying shallow aquifer.

6. The impact of trucks from the site tracking contaminated soil into residential neighborhoods has not been evaluated.

7. Workers at the site do not take adequate precautions to lessen the likelihood of exposure to contaminated soil and fugitive dusts.

8. Heavy metal contamination may be the contaminant of concern for certain sections of the site. Although the ROD states that heavy metal contamination should be remediated, there are no clean-up objectives for non-PCB contamination.

### RECOMMENDATIONS

1. The site should be closed until it has been fully remediated because the Curcio workers, scrap metal haulers and trespassers are at risk. Further, no one should be allowed on-site without the proper training and the appropriate protective equipment.

2. OSHA should evaluate the site to determine if the workers are exposed to occupational risks.

3. The workers should be educated regarding exposure to contaminants. Workers exposed to toxic levels of contaminants should be treated and monitored.

4. Additional environmental data are required to ascertain the scope of the potential for adverse public health effects in the West Lot, the South Lot, off-site soil, surface waters and groundwater.

5. Remediation of the East Lot should proceed as planned. Additional characterization of the site should occur in Operable Units as described.

6. Until the site is closed and remediated, all trucks should be decontaminated after each haul, cleaned prior to leaving the site and grates over the catch

basins should be installed.

7. Additional sampling by the USEPA is needed to determine if residents are being exposed to toxic levels of contaminants.

8. The site should be posted as a hazardous waste site.

9. The shallow and bedrock aquifers should be monitored. The shallow aquifer should be remediated so that the bedrock aquifer will not be at risk.

### **PUBLIC HEALTH ACTION PLAN**

The Public Health Action Plan (PHAP) for the Curcio site contains a description of actions to be taken by NJDOH and/or ATSDR at and around the site subsequent to the completion of this public health assessment. The purpose of the PHAP is to ensure that this public health assessment not only identifies public health hazards but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included is a commitment on the part of NJDOH and ATSDR to follow-up on this plan to ensure that it is implemented.

#### **A. Public Health Actions Taken**

1. Environmental data and proposed remedial activities have been evaluated within the context of human exposure pathways and relevant public health issues.

#### **B. Public Health Actions Planned**

1. Consider further follow-up activities if additional data become available that suggest human exposure is occurring or has occurred in the past.

2. Notify OSHA of the conclusions and recommendations of this Health Assessment Addendum.

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## REFERENCES

1. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Lead. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, October 1991.
2. Agency for Toxic Substances and Disease Registry, Toxicological Profile for Mercury. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, December 1989.
3. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Selected PCB's. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, October 1991.
4. Agency for Toxic Substances and Disease Registry, Draft Toxicological Profile for Trichloroethylene. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, October 1991.
5. Agency for Toxic Substances and Disease Registry, Health Assessment for Curcio Scrap Metal Yard, Saddle Brook Township, Bergen County, New Jersey, July 7, 1988.
6. Budavari, Susan, Maryadele J. O'Neil, Ann Smith and Patricia E. Heckelman. The Merck Index. Eleventh Edition. Merck & Co., Inc., Rahway. 1989.
7. Clayton, G.D. and Clayton, F.E. Patty's Industrial Hygiene and Toxicology. Volume 2C. Third Edition, New York. John Wiley & Sons, New York. 1982.
8. United States Environmental Protection Agency. Draft Remedial Investigation and Feasibility Study: First Operable Unit - East Lot Soil, Curcio Scrap Metal, Inc. Site. Saddle Brook, New Jersey. June, 1990.
9. United States Environmental Protection Agency. Record of Decision: Curcio Scrap Metal, Inc. USEPA Region II. June 30, 1991.