HEALTH CONSULTATION

Atlantic Station Redevelopment

Atlanta, Fulton County, Georgia

EPA FACILITY ID: GAD003326477

August 9, 2004

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Background and Statement of Issues

The Agency for Toxic Substances and Disease Registry (ATSDR) was petitioned to investigate the Atlantic Station Redevelopment Project. The purpose of this Health Consultation is to address whether soil contamination left on site could pose a health hazard to future residents at the development, as well as posing a hazard to the surrounding community during the construction phases of the project.

Atlantic Station is the former site of a steel mill that operated for nearly 100 years. A fertilizer manufacturer (Tri Chem) operated at the site as well. Under the oversight of the Georgia Environmental Protection Division (GA EPD), the contaminated site areas were either cleaned up or covered with a site barrier, (i.e., a 2-foot soil barrier) to prevent future contact with contaminated soils).

History, Demographics, and Other Agency Involvement

The Atlantic Station Redevelopment project (Atlantic Station) is a 138-acre site in midtown Atlanta, Georgia. Atlantic Station is undergoing redevelopment into a mixed-use community [1]. The project is located on land previously occupied by the Atlantic Steel Mill. When complete, Atlantic Station will comprise a multi-use complex of residential, office, hotel, entertainment, and retail spaces [2]. Multiple residential, industrial and commercial areas surround the redevelopment. Site-specific demographic data—based on 2000 census data—are included in the site map, Figure 1, Appendix A.

For nearly 100 years, the Atlantic Steel Mill occupied 130 acres of the site [3]. In 1992, Atlantic Steel discontinued steel-making operations. In December 1998, the mill ceased steel-rolling operations. Since 1977, Tri Chem Company occupied 1.7 acres of the site and had manufactured fertilizer from fly ash it collected from the plant. Prior to 1977, the Tri Chem facility was used in some capacity for the manufacturing of burial vaults [2]. Tri Chem ceased operations in 1997 [2]. Smaller lots, ranging from 0.07 to 1.61 acres, comprised the remaining site area. These lots were used for vehicle parking or single-family homes [2].

Environmental regulation of the site has been through various permits and regulations issued by GA EPD. These included a Resource Conservation and Recovery Act (RCRA) permit for post-closure care and remediation of a former furnace-dust waste pile [2]. The United States Environmental Protection Agency (EPA) has been involved in the site under the auspices of Project XL, a national pilot program allowing state and local governments, businesses, and federal facilities to develop innovative strategies for environmental and public health protection. EPA provides flexibility in regulations or policies to assist in developing these strategies [4]. At Atlantic Station, Project XL allowed the construction of a bridge over Interstate 75/85 to connect the development with midtown Atlanta and a Metro Atlanta Rapid Transit Authority (MARTA) rail station. Project XL enabled the new bridge to be built, because the EPA considers the redevelopment project as a traffic control measure. Without this consideration, the bridge could not be built. The federal government has banned new road construction in metro Atlanta because of the region’s failure to meet national ambient air quality standards [5].

EPA and Georgia Division of Public Health (GDPH) have been involved in investigating off-site properties surrounding the Atlantic Steel site, as part of the Northside Drive Area Lead Removal project. EPA found several properties with lead contamination associated with past Atlantic Steel and NL Industries, Inc. operations. GDPH is preparing a health consultation regarding the Northside Drive Area Lead Removal project.

Community Concerns
Community members voiced concerns about the cleanup and subsequent re-use of the Atlantic Steel and Tri Chem facilities. These concerns included

- worker exposure to contamination on site,
- worker exposure from improper removal of asbestos material (such as floor tile),
- future residential and non-residential exposure from soil contamination remaining on site, and
- potential past exposure of the community to contaminated dust during the partial site remediation activities.

Discussion

Environmental data
Site data obtained by ATSDR included the Phase I Investigation Report, Phase II Investigation Report and Remediation Certification Report and air monitoring data for the site [2,3,6,7].

Soil Sampling Results
Prior to construction of Atlantic Station, the developer reviewed environmental and historical data in conjunction with GA EPD to determine where site cleanup was needed. Potentially impacted areas (PIAs) where contamination was likely to be present were identified and sampled. Results are shown on Table 1, Appendix B. If the soil contamination was present at levels greater than what was determined to be safe through a construction worker risk assessment, the PIA was cleaned up [3]. The Phase II Investigation Report, using EPA risk assessment methodology, describes the process to determine those locations that needed cleanup.

To assess the non-PIA areas of the site, 10 surface soil and sub-surface boring samples were collected over the 138-acre site [3]. Samples were randomly collected using a 300-foot by 200-foot grid. Samples were taken over the eastern third (4 samples), central third (3 samples) and western third (3 samples) of the site. Table 2 summarizes soil-boring samples and Table 3 summarizes the surface soil samples.

Post remedial sampling was performed to ensure that remaining levels of contamination were safe for construction workers. The Remediation Certification Report contains the results of post remediation sampling [6]. Samples were taken at the remediated PIA sites (Table 4). Surface soil sampling was performed randomly over the site after installation

of a 2-foot soil barrier (Table 5). The soil barrier was installed to prevent future residential contact with contaminated soil. A grid of 74 points was used for this sampling, with 28 points randomly sampled (a total of 46 analytical results were reported—some grids were sampled multiple times); results are shown in Table 5. Where chemicals exceeded their respective EPA Region III Risk Based Concentration (RBC), the developer extended the coverage of soil barriers.

For complete information of how the site was investigated and cleaned up, see the site's Phase I Environmental Site Assessment, the Phase II Investigation Report, and the Remediation Plan Certification Report [2,3,6].

Air Monitoring Data

Air monitoring was performed during the remediation phase of the redevelopment project, when the most heavily contaminated PIAs were removed. Samples were collected at various times for arsenic, cadmium, lead, particulates not otherwise classified, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, and trichloroethylene. Most samples were collected on filters worn by workers who were actually performing the remediation work at various PIAs. Some samples were perimeter monitors around the PIAs while they were being remediated. Table 6 summarizes the contaminant levels detected.

Ground-water Sampling Results

Eight overburden ground-water quality monitoring wells were installed on site to assess potential groundwater impacts from on-site PIAs. Using the analytical results of the overburden monitoring wells, two additional groundwater monitoring wells were completed. Summary of contaminants found in all groundwater wells are shown in Table 7.

Data Quality Evaluation

Soil samples were collected for the purposes of characterizing the PIAs of the site and deciding which of those needed remediatation to protect the workers during the Atlantic Station construction. Only limited (10 samples) data were collected to assess the levels of contamination for the non-PIA areas of the site. During construction, large portions of the site soils were relocated or removed from the site. Therefore, the soil sample data collected in both PIA and non-PIA areas will not be representative of contamination concentrations currently under site barriers.

ATSDR has obtained the results of air monitoring of workers and work areas at the site. Samples were collected according to established NIOSH sampling methodology. Significant excavation of contaminated soils occurred during this sampling [8]:

- More than 6,600 truckloads of petroleum-impacted soils were excavated and removed from the site.
- 12,699 tons of lead contaminated soil were excavated, treated and removed from the site.

- Simultaneous to the PIA remediation, grading and demolition contractors were working on site.

While the samples are not directly representative of actual community exposure, they do indicate what the "worst case" maximum possible exposure to the community because they were collected on site during excavation and removal of the most highly contaminated areas of the site.

Pathway Analysis – On Site Contamination

An exposure pathway is the process by which an individual is exposed to contaminants originating from a contamination source. An exposure pathway consists of the following five elements: 1) a *source* of contamination; 2) a *media* such as air or soil through which the contaminant is transported; 3) a *point of exposure* where people can contact the contaminant; 4) a *route of exposure* by which the contaminant enters or contacts the body; and 5) a *receptor population*. A pathway is considered complete if all five elements are present and connected. If one of these elements is missing, the pathway is considered incomplete and human exposure is not possible. The completed and uncompleted pathways analyzed for this health consultation are shown in Appendix C.

Sources of Contamination

Atlantic Steel mill operations generated a wide variety of hazardous chemicals. Examples include slag, oils, solvents, and mill scale. Some of these materials were disposed on site in places such as impoundments, settling basins, and silos. Hazardous chemicals also spilled and leaked during mill operations. The developer identified these areas of contamination across the Atlantic Steel and Tri Chemical sites and assessed which contaminated areas needed abatement.

Not all chemical contamination was removed and chemicals could remain on site because

- an identified PIA which was not cleaned up (i.e., below level of worker risk),
- residual chemicals remaining after PIA remediation, or
- an area of contamination was not identified.

Soils and Groundwater

Contamination has been found in the surface and subsurface soils of the site. Table 2 represents contaminants initially found. Table 3 shows contaminant levels remaining in the remediated PIAs for specific contaminants. As discussed in the data quality section, contamination under site soil barriers is presently unknown.

Understanding the current and future land use of the Atlantic Station site is critical to determining if any potential public health issues exist due to residual contamination of the site [9]. The presence of contamination remaining on the Atlantic Steel site is not a public health concern if there is no contact with contaminated soil.

The redevelopment plan of Atlantic Station indicates two main areas of development (Appendix A, Figure 2). The area east of State Street is being developed primarily for commercial use. Buildings will be built on top of a large subterranean parking garage. The area west of State Street is planned for multifamily residential, park space, and storm water drainage. One large parking garage and shopping center will be located on the far western tip of the site. Groundwater from the site is intercepted on the eastern end on the site and is treated prior to discharge to the Atlanta sewer system. Some groundwater contamination (metals and trichloroethylene) is present below the eastern part of the site. Because Atlantic Station residents will not be using groundwater for drinking purposes and the parking garage overlies areas of groundwater contamination, ATSDR does not consider exposure to groundwater contamination in this health consultation.

The eastern half of Atlantic Station, being developed for commercial use, presents minimal potential for future exposure to contaminated soils. During the construction phase, a substantial portion of the site was excavated for a parking deck. This parking deck, when completed, will cover 33 acres of the site east of State Street. It will also be under all of the development east of State Street. Several of the PIAs were either (1) excavated and removed from the site during this phase of the construction, or (2) will remain below a 33-acre parking deck. Because of the removal of a large portion of the site east of State Street and the presence of the concrete parking deck below these areas of the development, no potential for human contact exists.

The western half of the Atlantic Station site (west of State Street) has large areas covered by a 2-foot clean soil barrier. This part of the site is planned for future residential, commercial and park use. There were few PIAs in these areas(Figure 2). Some of the PIAs in the western parcel were not remediated because they were below risk-based levels established for the construction workers, as described in the Phase II Investigation Report [3] Some areas have no environmental data; however, these were petroleum-stained soils and were removed based on visual contamination. Currently, the soil layer prevents any future residential contact with these materials.

While ATSDR cannot eliminate the possibility of vapor intrusion from contaminated soils and groundwater, it appears that the removal of contaminated soil has in fact eliminated such vapor intrusion . The only groundwater sample showing a possibility of vapor intrusion is the one from monitoring well 105, indicating vinyl chloride at .055 mg/l. All the other results appear to be too low to result in any indoor contamination. Monitoring well 105 is located in the northeastern area where a parking deck will underlie any structures on the site. Vinyl chloride vapors could not reach any occupied retail or living space because of the large volume of outdoor air circulating through the parking deck.

To ensure that the 2-foot soil layer remains in place, a conservation easement was established. The conservation easement is a land-use control that transfers limited ownership interest in the property to the City of Atlanta and the State of Georgia. The conservation easement for Atlantic Station requires the current and future owners of the site to ensure that the barriers (including the 2-foot soil barrier) are maintained in their

current condition. The conservation easement requires a registered professional engineer to certify that any breach to a site barrier is in conformance with the Remediation Plan and that the barrier is restored to its original condition [6]. Because the measures needed to implement the Remediation Plan will be contingent on the type of construction and future land use, the judgment of the professional engineer is vital to ensure that potential environmental hazards are assessed and controlled. The City of Atlanta is primarily responsible for ensuring that the conditions of the conservation easement are followed. Should the city not be capable of taking action, the Georgia Department of Environmental Protection can require the property owner to implement the conservation easement. Ongoing maintenance and monitoring of the site barriers will be the primary responsibility of the property owners, who will be informed of this requirement as the conservation easement is part of the chain of title [10].

If site barriers were to fail, exposures to residents could possibly occur via inhalation, ingestion and dermal routes. Given the provisions of the redevelopment plan and the current construction on the Atlantic station site, there is very little potential for a failure to occur in a site barrier. Therefore, no potential hazard is expected for future occupation. Any residual contamination in these areas will be isolated well below site barriers. If the site barriers are maintained, there will be no residential exposure to the contaminants left on site.

Fugitive Airborne Contamination

Contaminated soil was disturbed during the site remediation and construction phases of the project. Air monitoring was performed during the remediation phase of the redevelopment project, when the most heavily contaminated PIAs were removed. Samples were collected at various times for arsenic, cadmium, lead, particulates, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, and trichloroethylene. Samples were collected on filters, either at the perimeter of the PIAs or worn by workers who were actually performing the remediation work at various PIAs.

Area residents might have inhaled contaminated dust from the redevelopment project. The distance that the contamination traveled is strongly influenced by prevailing meteorological conditions at the time of the dust release. ATSDR estimates that approximately 100 to 1000 persons could have been potentially exposed to dust from the site activities.

Worker Exposures to Soil Contamination, Alleged Worker Illness

A former worker has expressed concern regarding potential past worker exposure to remaining on-site contamination and resulting adverse health issues. Workers who feel that they are or could be hurt or become ill on the job can contact two federal agencies: the National Institute for Occupational Safety and Health (NIOSH), and the Occupational Safety and Health Administration (OSHA). Concerned workers can request that NIOSH conduct a Health Hazard Evaluation at their job site by calling 1-800-35-NIOSH. The Occupational Safety and Health Act gives workers the right to file complaints arising from concerns about workplace safety and health. Workers, who believe they have been

exposed to occupational safety and health hazards, can file a compliant by calling the OSHA's Region IV office at (404) 562-2300.

Improperly Removed Asbestos Containing Materials

An individual expressed concern regarding asbestos-containing materials that could have been improperly removed from the site (e.g., no containment during removal, dry sweeping of asbestos debris, improper worker protection, etc.). Improper removal of asbestos-containing materials could have released fibers. ATSDR cannot determine what health hazard this would have posed without knowing the air concentrations or how long people were exposed. However, any asbestos fibers released would be removed or covered during demolition and excavation of the site. ATSDR does not anticipate future community exposure to asbestos fibers from asbestos-containing materials on site, as all buildings have been removed from the site.

Radioactive Materials

Through an attorney, a former worker reported suffering from radiation sickness because of working at the Atlantic Station site [11]. ATSDR referred this worker to both NIOSH and OSHA. However, because radioactive contamination, if present on the site, could expose the public, ATSDR investigated if there was any potential for radiation at the former Atlantic Steel site, either in the form of licensed radioactive material used at Atlantic Steel or the potential for radiation-contaminated, recycled material.

According to newspaper accounts, the worker had unearthed a container of "green liquid material" [11]. The newspaper also reports that a physician using a Geiger counter found elevated radioactivity near a former Atlantic Station worker's thyroid but not at other portions of the body [11]. Had the worker been exposed to cesium 137 or cobalt 60, these chemicals would have been dispersed throughout the body, resulting in radiation being detected from other parts of the worker's body as well [12,13]. Radium, thorium, americium 241, strontium, and tritium, when absorbed by the body, will not collect in the thyroid exclusively as described by the former Atlantic Station worker [14,15,16,17]. Additionally, krypton, a clear gas, would not appear as the "green liquid material" the worker described [18]. A possible source of radiation in the worker's thyroid is radioactive iodine. Iodine, when absorbed by the body, will collect in the thyroid and remain there for approximately 90 days, at which time less than 1% of the initial amount would be remaining in the thyroid [19]. The worker's reports of exposure and the resulting medical exam, which revealed internal radiation localized to the thyroid, are not consistent with the types of radioactive materials associated with steel mills.

Neither the Phase I nor the Phase II Assessments of the site addressed radioactive materials at the site. ATSDR contacted the state of Georgia Department of Natural Resources (DNR) for the disposition of any licensed radioactive material (e.g. a radioactive source used in equipment such as gauges). Atlantic Steel transferred the site's licensed radioactive material off the premises prior to the beginning of the redevelopment project and the license was terminated (Tom Hill, Georgia Department of Natural Resources, personal communication, 2002). During a site visit on 5/14/02, an ATSDR health physicist surveyed the site with a microR meter. This instrument would have

detected any gamma radiation sources near the ground surface associated with Co 60, radium, or Cs 137. No readings were detected above background.

There have been sporadic instances of accidental processing of radioactive materials (called orphan sources) at steel mills, resulting in contamination of the mill and of the product [20,21]. A recent study found 2,357 reports of radioactive materials found in scrap metal in the United States and Canada from 1983 to 1997. Approximately 62% of those reports were naturally occurring radioactive materials [21]. Other radioactive materials found in scrap are radium, cesium 137, thorium, americium 241, cobalt 60, krypton, strontium and tritium [21]. From 1983–1997, 29 confirmed cases of accidental meltings of radioactive material occurred in the UnitedStates and Canada. When processed, these materials could be present the milled steel, consumer products or waste materials such as slag or furnace dust, depending on the radioactive material that was melted [20,21]. The most common sources of radioactive material involved in melting incidents include cesium 137 (51% of meltings) and cobalt 60 (23% of meltings) [20,21]. The Atlantic Steel plant installed radiation detection equipment at the site during the early 1980s to identify scrap that contained radioactive materials, According to plant health physicist, there has not been an identified incident of radioactive material being melted at the site (Neil Harmon, Health Physicist (retired), Atlantic Steel, personal communication, 2003).

Public Health Implications

Concerned residents have reported fugitive dust releases from the site. Some residents were concerned that this dust was contaminated. The site's remediation plan requires control of airborne particulate emissions for the site through means such as wetting down of disturbed soils. As a result, most air monitoring results from both personal and perimeter monitoring were below the analytical limits of detection (Appendix B, Table 6). Of the 95 air samples taken, 13 found measurable levels of airborne lead, 10 found measurable levels of particulates not otherwise classified, and 2 samples found polynuclear aromatic hydrocarbons (PAH). The specific PAH identified was caprolactum, which was labeled a tentatively identified compound (i.e. a compound is one for which uncertainty exists as to its identity and concentration). The contaminants detected were well below applicable occupational exposure limits established by the Occupational Safety and Health Administration [22]. For lead, all but one of the samples that detected lead were below the 1.5 $\mu g/M^3$ - National Ambient Air Quality standard for lead [23]. Results of the sampling indicate the potential for dust to be generated on site. The maximum concentration of dust was 4.5 mg/m^3, which was a sample collected at the perimeter of a PIA. Dust is frequently measured on construction sites. For instance, in a survey of 36 construction sites nationwide found median respirable dust levels for laborers to be 2.36 mg/m^3 [24]. The level of particulates that the community would have been exposed to would be less than 4.5 mg/m^3—dispersion would have reduced the concentration as the dust blew off the site. Because the overall frequency of detection is low, ATSDR does not believe that past air emissions from the redevelopment posed a threat to public health. And because future areas of construction on site will not occur in areas with as much contamination, community exposures are to contaminants in on-site

soils through fugitive dust are expected to be less than what was detected in these samples.

Child Health Considerations
ATSDR evaluated the sampling data to assess the potential health effects on children in the community and found no exposures where children would be especially sensitive, provided that site barriers continue to be effective.

Conclusions

- Using available air monitoring data and the continued effectiveness of site barriers, ATSDR categorizes this site as “no apparent public health hazard.”

- ATSDR found no evidence of radioactive materials at the Atlantic Station redevelopment.

Recommendations

ATSDR does not recommend additional measures beyond implementation of already existing institutional and engineered controls provided for in the Conservation Easement and Remediation Plan.

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References

1. Atlantic Station Web site. Available at: http://www.atlanticstation.com/default.asp. Accessed September 11, 2002.

2. Law Engineering and Environmental Services, Inc. Phase I investigation report: Atlantic Steel Industries, Inc, property. Atlanta, Georgia; September, 1999.

3. Law Engineering and Environmental Services, Inc. Phase II investigation report: Atlantic Steel Industries, Inc. property. Atlanta, Georgia; October, 1999.

4. What is Project XL? Available at: http://www.epa.gov/projectxl/file2.htm. Accessed September 11, 2002.

5. Atlantic Steel Redevelopment Project. Available at: http://www.epa.gov/projectxl/atlantic/index.htm. Accessed September 11, 2002.

6. Law Engineering and Environmental Services, Inc. Remediation plan certification report: Atlantic Steel Industries, Inc. property. Atlanta, Georgia; December 7, 2001.

7. Corporate Environmental Risk Management. Memorandums to Ray Rodriguez from Dwayne Cheaton concerning air monitoring report for samples collected. August 18,2000; October 31, 2000; November 17,2000; March 6, 2001.

8. HEPACO Hazmatters. Spring 2001. HEPACO handles Atlanta's first brownfield cleanup. Available online: http://www.hepaco.com/PDF_Files/Spr01.pdf

9. Schilling J, Gaspar, C, Mishkovsky, N. Beyond Fences: Brownfields and the Challenges of Land Use Controls. Atlanta, GA: International City/County Management Association; 2000.

10. Morris, Manning & Martin, LLC. Letter to James Durant regarding the Conservation Easement. Atlanta, GA. May 16, 2003.

11. Wall M. Was Atlantic Station worker radiated? Creative Loafing, Atlanta, Georgia; 2002 May 15.

12. Agency for Toxic Substances and Disease Registry. Toxicological profile for cesium (draft for public comment). Atlanta: US Department of Health and Human Services; July 2001.

13. Agency for Toxic Substances and Disease Registry. Toxicological profile for cobalt (draft for public comment). Atlanta: US Department of Health and Human Services; September 2001.

14. Agency for Toxic Substances and Disease Registry. Toxicological profile for radium. Atlanta: US Department of Health and Human Services; December 1990.

15. Agency for Toxic Substances and Disease Registry. Toxicological profile for thorium. Atlanta: US Department of Health and Human Services; October.1990

16. Agency for Toxic Substances and Disease Registry. Toxicological profile for americum (draft for public comment). Atlanta: US Department of Health and Human Services; July 2001.

17. Agency for Toxic Substances and Disease Registry. Toxicological profile for strontium. Atlanta: US Department of Health and Human Services; July 2001.

18. Hess FC. Chemistry made simple. New York: Doubleday & Company, Inc.1984. p. 108.

19. Agency for Toxic Substances and Disease Registry. Toxicological profile for iodine (draft for public comment). Atlanta: US Department of Health and Human Services; September 2001.

20. Lubenau JO, Yusko JG. Radioactive materials in recyled metals. Health Phys 1995 68:440-51.

21. Lubenau JO, Yusko JG. Radioactive materials in recycled metals-an update. Health Phys 1998 74:293-99.

22. Occupational Safety and Health Standards, 29 C.F.R.:1910.1000 (2002).

23. National Ambient Air Quality Standards. Available at: http://www.epa.gov/airs/criteria.html. Accessed February 11, 2003.

24. Rappaport SM. Goldberg M. Susi P. Herrick RF. Excessive exposure to silica in the U.S. construction industry. Ann Occupl Hyg 2003; 47(2):p.111–122.

APPENDIX A, Figures
Figure 1 – Site Introductory Map

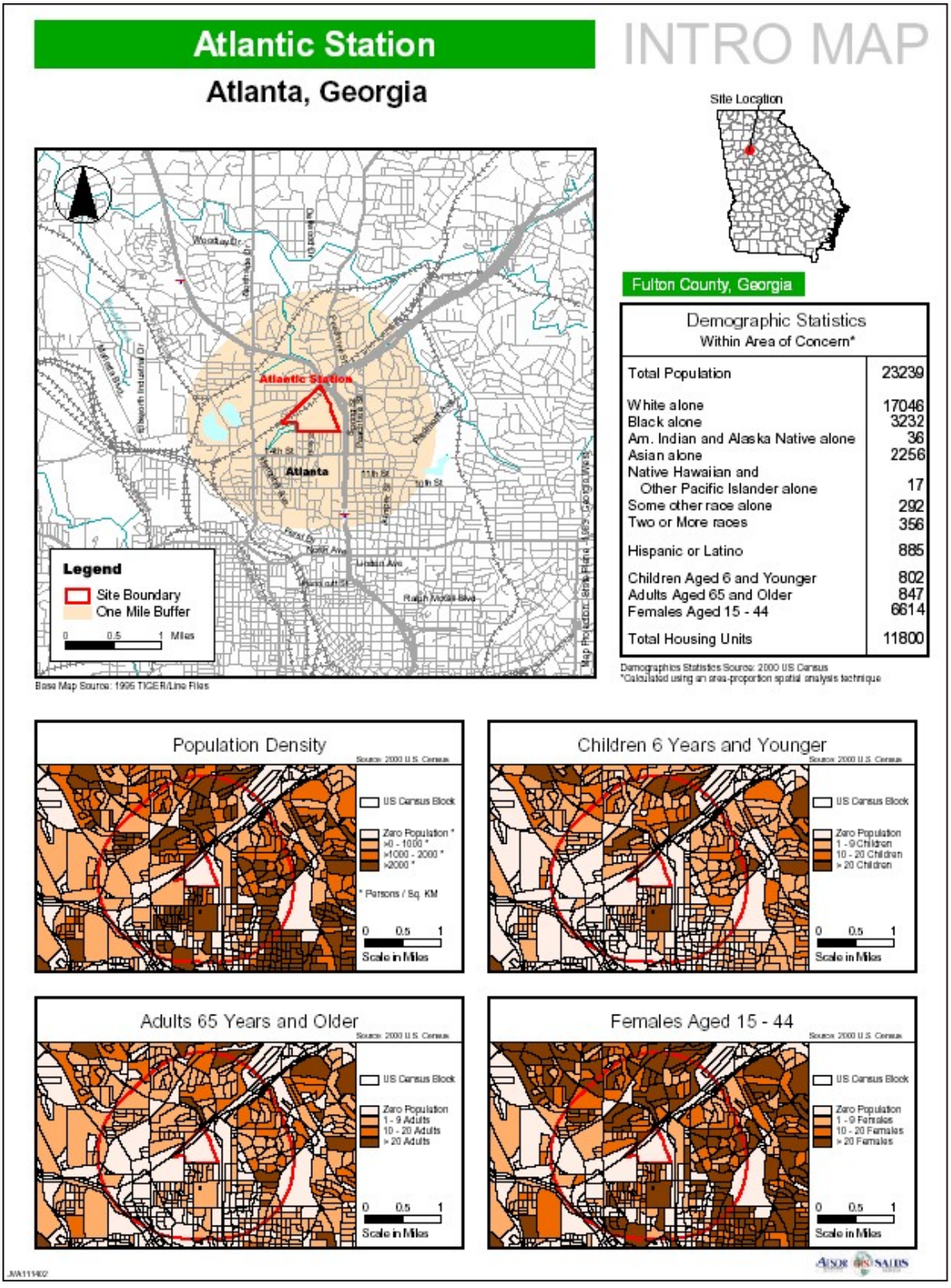
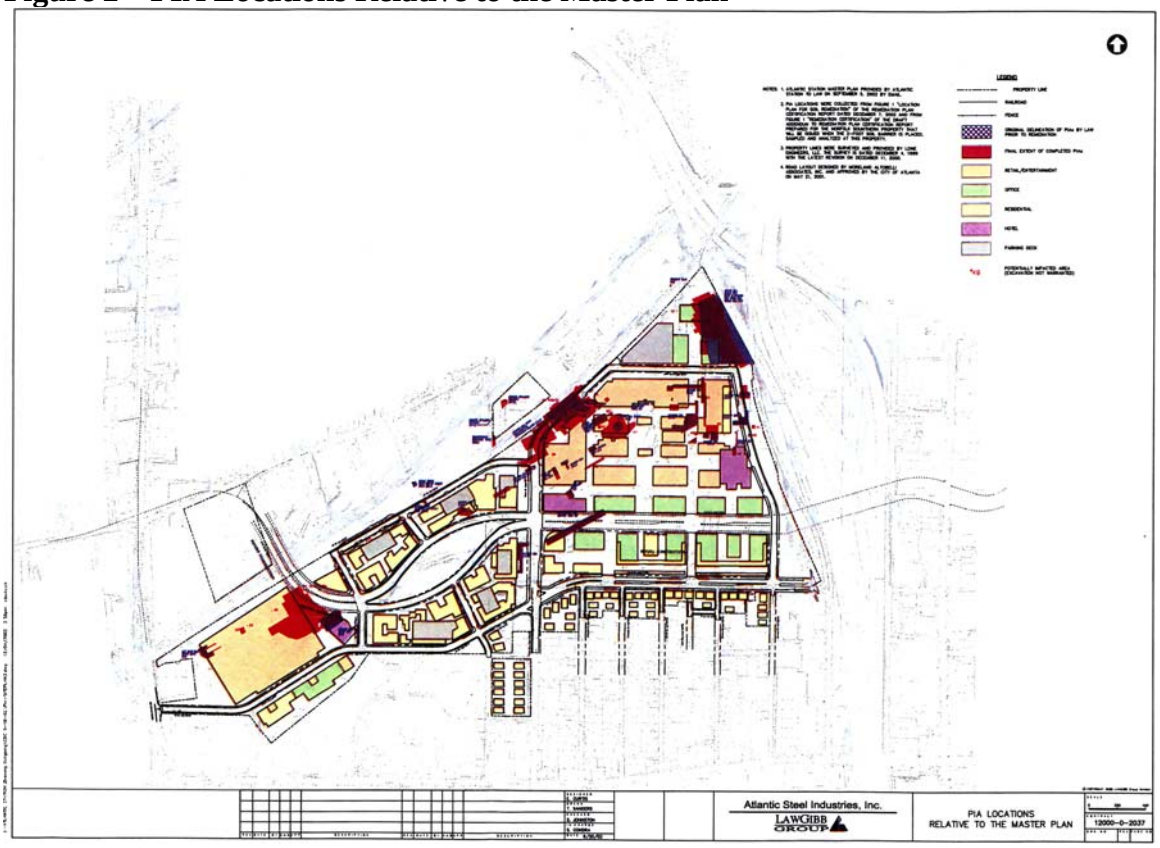


Figure 2 – PIA Locations Relative to the Master Plan



Appendix B, Tables

Table 1 – Summary of Soil Contaminants Found During Phase II Sampling

Chemical	Number of Detections	Maximum Detection (mg/kg)	Minimum Detection (mg/kg)
LEAD	94	120000	0.71
FLUORANTHENE	93	27	0.043
CHROMIUM	90	2300	5.6
BENZO(A)PYRENE	85	7	0.026
BENZO(B)FLUORANTHENE	85	8.8	0.016
CHRYSENE	83	5.8	0.035
PHENANTHRENE	82	16	0.038
INDENO(1,2,3-C,D)PYRENE	80	4.6	0.016
PYRENE	77	17	0.037
ARSENIC	75	150	6.3
BENZO(A)ANTHRACENE	74	5.9	0.015
BARIUM	65	520	1
BENZO(K)FLUORANTHENE	64	2.7	0.021
NAPHTHALENE	59	43	0.07
BENZO(G,H,I)PERYLENE	55	6.5	0.027
CADMIUM	48	260	0.9
ACETONE	47	890	0.054
ZINC	40	12000	21
ANTHRACENE	30	2.4	0.044
FLUORENE	26	3.1	0.041
ACENAPHTHYLENE	23	2.4	0.042
ACENAPHTHENE	12	5.9	0.07
XYLENES,TOTAL	11	520	0.00078
TETRACHLOROETHYLENE(PCE)	11	0.27	0.0058
DIBENZ(A,H)ANTHRACENE	10	4.9	0.029
TRICHLOROETHYLENE	10	1300	0.0057
TOLUENE	9	21	0.0054
MERCURY	6	7.6	0.57
BENZENE	6	0.021	0.0033
PCB-1248 (AROCHLOR 1248)	5	7500	0.41
CARBON DISULFIDE	4	0.012	0.0059
ETHYLBENZENE	4	66	0.0023
METHYL ISOBUTYL KETONE	4	0.034	0.015
PCB-1260(AROCHLOR 1260)	3	1	0.06
1,1,1-TRICHLOROETHANE	3	0.36	0.0099
1,2-DICHLOROETHENE	2	0.02	0.018
SILVER	2	26	18

Chemical	Number of Detections	Maximum Detection (mg/kg)	Minimum Detection (mg/kg)
METHYL ETHYL KETONE	2	0.35	0.063
1,1-DICHLOROETHENE	2	0.018	0.0073
1,1,2-TRICHLROETHANE	1	0.13	0.13
BENZLE BUTYL PHTHALATE	1	1.1	1.1
BEZNO(A)ANTHRACENE	1	0.086	0.086
BROMOMETHANE	1	0.015	0.015
METHYLENE CHLORIDE	1	0.012	0.012
PCB-1254 (AROLCHLOR 1254)	1	3	3
bis(2-ETHYLHEXYL)PHTHALATE	1	0.64	0.64

Table 2 – Ten Random Pre-Remediation Soil Borings

Chemical	*Number of Detections*	*Maximum Detection (mg/kg)*	*Minimum Detection (mg/kg)*
Antimony	0		
Arsenic	1	9.1	9.1
Barium	4	230	110
Beryllium	0		
Cadmium	0		
Chromium	6	820	13
Cobalt	4	21	5.9
Copper	9	200	8
Lead	2	240	62
Mercury	0		
Nickel	4	47	11
Selenium	0		
Silver	0		
Thallium	0		
Tin	1	62	62
Vanadium	10	139	12
Zinc	10	380	380

Table 3 – Ten Random Surface Samples

Chemical	*Number of Detections*	*Maximum Detection (mg/kg)*	*Minimum Detection (mg/kg)*
Arsenic	9	41	5.3
Barium	8	360	160
Cadmium	8	24	5.1
Chromium	10	1800	110
Lead	10	1400	37
Mercury	0		
Selenium	0		
Silver	0		
Zinc	10	8800	210

Table 4– Verification Sampling Results

Chemical	*Number of Detections*	*Maximum Detection (mg/kg)*	*Minimum Detection (mg/kg)*
BENZO(A)PYRENE	199	3.9	0
DIBENZ(A,H)ANTHRACENE	172	13	0.02
LEAD	226	2600	2.8
CADMIUM	169	41	1.1
BENZO(A)ANTHRACENE	167	12	0.02
BENZO(B)FLUORANTHENE	135	11	0.03
PCB-1254 (AROLCHLOR 1254)	40	22	0.058
INDENO(1,2,3-C,D)PYRENE	18	1.4	0.02
ARSENIC	3	5.9	3.4
TRICHLOROETHYLENE	8	310	0.15

Table 5- Post-Soil Barrier Installation Surface Soil Samples

Chemical	*EPA Region III RBC*	*Number of Detections*	*Number of detections above RBC*	*Maximum Detection(mg/kg)*	*Minimum Detection (mg/kg)*
Antimony	3.1	0			
Arsenic	0.43	5	5	19	4.6
Barium	550	32		340	110
Beryllium	16	14		2.4	1.2
Cadmium	7.8	3		7.8	6
Chromium	12000	44		270	12
Cobalt	160	42		40	6.5
Copper	310	44		260	6.9
Lead	400	36	1	410	6.3
Mercury	2.3	0			
Nickel	160	41		80	7.6
Selenium	39	0			
Silver	39	0			
Thallium	0.55	1		13	13
Tin	4700	5		21	6.5
Vanadium	55	46	23	110	23
Zinc	2300	46		780	31
Acetone	N/A	2	2	88	71
Benzo(a)anthracene (µg/kg)	870	2	1	1000	430
Benzo(b)fluroanthene (µg/kg))	870	2		530	380
Benzo(k)fluoranthene (µg/kg)	8700	1		480	480
Benzo(a)pyrene (µg/kg)	87	19	12	1500	22
Chrysene (µg/kg)	87000	4		1200	420

Chemical	EPA Region III RBC	Number of Detections	Number of detections above RBC	Maximum Detection(mg/kg)	Minimum Detection (mg/kg)
Dibenzo(a,h)anthracene (µg/kg)	87	11	4	110	41
Fluoranthene (µg/kg)	310000	8		2400	470
Phenanthrene (µg/kg)	230000	2		560	450
Pyrene (µg/kg)	230000	8		2500	400
Pesticides (µg/kg)*	N/A	0			
PCB 1242 (µg/kg)	N/A	6	6	150	22
PCB 1260 (µg/kg)	320	7		190	44

* Analytes not specified

Table 6–Air Contaminant Levels

Contaminant	*Number of Detections*	*Range (mg/m^3)*
Lead	13	0.000217- 0.0269
Particulates not otherwise classified	10	0.22- 4.5
Caprolactum	2	4.6-7.3 †

Table 7 – Summary of Groundwater Sampling Results

Contaminant	*Number of Detections*	*Minimum Detection (mg/l)*	*Maximum Detection(mg/l)*
1,1-DICHLOROETHANE	1	0.022	0.022
ACENAPHTHYLENE	1	0.016	0.016
ANTHRACENE	1	0.0022	0.0022
BARIUM	7	0.02	0.16
BENZO(A)ANTHRACENE	1	0.00023	0.00023
BERYLLIUM	1	0.006	0.006
CADMIUM	1	0.006	0.006
CIS-1,2-DICHLOROETHYLENE	1	0.063	0.063
FLUORANTHENE	1	0.0063	0.0063
FLUORENE	1	0.0052	0.0052
LEAD	3	0.01	0.32
PHENANTHRENE	1	0.016	0.016
PYRENE	1	0.0026	0.0026
TRICHLOROETHYLENE (TCE)	3	0.009	0.021
VINYL CHLORIDE	1	0.055	0.055
ZINC	4	0.026	13

† Tentatively Identified Compound, results estimated.

APPENDIX C – Exposure Pathways Table

Pathway Name	***Status***	***Source***	***Media***	***Point of Exposure***	***Route of Exposure***	***Exposed Population***	***Time***
Residential On Site Soil	Incomplete	Atlantic Steel operations	Surface and subsurface soil	None	None	None	None
Fugitive Dust	Complete – No Apparent Public Health Hazard	Fugitive dust from Atlantic Station redevelopment construction activities	Air	Residential	Inhalation	1,000	Past

Appendix D –Response to Comments

Comment 1
I am concerned that uncovered trucks, carrying soil used our residential streets to remove soil from the development. In response to a neighbor on Mecaslin St, Dr. Hilburn Hilsteadt provided a letter stating that all trucks leaving the development during that time were hand washed and covered. With this obvious conflict (a believe me, not your own eyes), I was concerned that the remediation had not been conducted properly, and contamination of our neighborhood could have occurred, and could still be occurring. I was led to believe that this Health Consultation would include the adjacent neighborhood. Several residents were willing to talk to the ATSDR, and provide testimony that may have supported or conflicted with other information available to the ATSDR, but would have certainly resulted in a robust Consultation, rather than the one-sided document that is provided for our input. The residents who live on Mecaslin, along with the employees of Channel 46 news, and long time patrons of Bobby and June's restaurant would all be good sources to conclude whether this was a common occurrence, and whether the remediation was conducted properly; and additionally providing conflict or re-enforcement of the data provided to the ATSDR for this report.

ATSDR Response to comment 1:
We held a public availability session on October 30th, 2003, to meet with the surrounding community and to gather any additional concerns that they may have. During this meeting, we gathered concerns that were similar to the comments below about the potential impact of the Atlantic Station redevelopment into the adjacent communities.

Comment 2
The purpose as stated on page 2 in the Health Consultation says "is to address whether contamination left on site could pose a health hazard to future residents at the development, as well as posing a hazard to the surrounding community during the construction phases of the project". To accomplish the purpose of your Health Consultation, why was no soil/dust sampling done adjacent to the project specifically to determine if active contamination from the project was not currently happening to the surrounding residential communities. With the remediation complete, this effort would ensure that the remediation worked, and no unforeseen contamination had, or was occurring. This would additionally, allow for expeditious clean up of any areas determined to be contaminated, and would prevent health hazards to the residential neighborhoods. I for one, have dust, directly attributable to the development all over the outside of my house. Much, in areas that rain will not wash off (porch/eaves etc). The ATSDR is welcome to take samples of this dust.

ATSDR Response to Comment 2
Dust was released during the redevelopment of the site. However, the air sampling data from the excavation and removal of the most heavily contaminated portions of the site showed that the dust released during the remediation was not contaminated at levels to be associated with health effects.

Comment 3
Several residential developers are currently excavating and constructing in areas directly adjacent to Home Park. Were these lots (south of 16th St, running east from State St) tested for soil contamination at the depths planned for construction? If not, contaminated soil could be exposed and spread during construction.

ATSDR Response to Comment 3
Historically, this area of the site was not used in processes at the mill that would have generated significant levels of contamination (Figure 2, Appendix A).

Comment 4
Have all developers of the project provided written acknowledgement of the conservation barrier, and their specific responsibilities that they have to adhere to in order to ensure the integrity of the barrier? Is this information available to the public? This will help to avoid the "oops, I didn't know" situations that arise in the real world.

ATSDR Response to Comment 4
ATSDR advises federal, state and local environmental or public health agencies about the public health significance of community exposures to hazardous chemicals. As such, our roll is not regulatory and we do not have the authority to require specific controls at any given site. The specific measures of the conservation easement was negotiated between the Atlanta Development Authority (the holder of the easement), the City of Atlanta (the enforcement agent), Atlantic Station L.L.C. (the property owner). If the city fails to enforce the easement, the Georgia Environmental Protection Division may enforce the conservation easement as the alternative enforcement agent.

Comment 5
What does exposure to dust from the site mean to the residents? What measures can be taken to identify contamination signs, long-term effects for residents and mitigate possible future contamination?

ATSDR Response to Comment 5
The air data show very little contamination was released during remediation of the PIAs. Significant amounts of soil were excavated and removed from the site during the remediation [1]:

- More than 6,600 truckloads of petroleum impacted soils were excavated and removed from the site.
- 12,699 tons of lead contaminated soil was excavated, treated and removed from the site.
- Simultaneous to the PIA remediation, grading and demolition contractors were working on site.

Given these factors, ATSDR believes that the air monitoring conducted by HEPACO during the remediation phase of the redevelopment shows no impact to the adjoining communities.

Comment 6
I am concerned about exposure to future residents. The developer has not performed any testing of soil in the areas where proposed housing is slated. Many of the hazardous substances in the potentially impacted areas could migrate through the soil, groundwater, or air.

ATSDR Response to comment 6
Future exposures will be controlled by a combination of site barriers and the conservation easement. The contaminants detected during the site investigation will not migrate upward through the soil. Contaminated groundwater from the site is intercepted and treated. The easement established a perpetual obligation that allows for the property owner or the acquirer of a subdivided tact of the property to assume the obligations for the parcel that it owns. The easement also prohibits the use of groundwater at the property for drinking water purposes. Because the property is supplied by the City of Atlanta water system, use of the groundwater for drinking water is not likely. The easement also governs the perpetual operation of the groundwater interception system, which is a component of the Remediation Plan for the property. Finally, the easement governs the maintenance of the site barriers, such as the 2-foot clean soil barrier.

The conservation easement was negotiated between the Atlanta Development Authority (the holder of the easement), the City of Atlanta (the enforcement agent), Atlantic Station L.L.C. (the property owner). If the city fails to enforce the easement, the Georgia Environmental Protection Division may enforce the conservation easement as the alternative enforcement agent.

Comment 7
Simply not testing ignores a potential future hazard to occupants of the site. Although barriers may be in place now, it does not contemplate future exposure risks to workers exposed to the soils (e.g. underground utility workers).

ATSDR Response to Comment 7
The remediation plan for the site explicitly was designed with the construction worker in mind (cf. Soil Sampling Results page 3). The main utility lines are installed beneath primary roads. These roads have 10 feet of clean fill. This allows for repair of utility lines without breaching of a site barrier.

Comment 8
Trucks carrying dirt from the remediation of the site have been recorded on video camera as not having any covering or washing as they drove by the City water supply. Occasionally, dirt balls would fall onto the streets of Atlanta.

ATSDR Response to comment 8
The city water works generates over 246 million gallons of drinking water per day, which is routinely tested for contamination under the Clean Water Act. Therefore, the city's water supply is not threatened by any fugitive dust from haulers from the site.

Exposures from the dirt falling onto the streets presents a negligible potential dosage to people as the contact with the soil will be severely limited by traffic.

Appendix D References

1. HEPACO Hazmatters. Spring 2001. HEPACO handles Atlanta's first brownfield cleanup. Available online: http://www.hepaco.com/PDF_Files/Spr01.pdf