UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

DATE: MAR 18 2010

SUBJECT: Removal Site Evaluation for Jewett Off-Site Soil Sampling, Borough of Staten Island, Richmond County, New York

FROM: Kimberly Staiger, On-Scene Coordinator
Removal Assessment and Enforcement Section

TO: File

The Council of the City of New York submitted a request to the United States Environmental Protection Agency (EPA) on June 3, 2008 for a review of a property located on 2000 Richmond Terrace; the site at one time of the John Jewett & Sons White Lead Company. The Pre-remedial Section, to whom the review was assigned by the Regional Administrator, subsequently requested the assistance of the Removal Action Branch (RAB) to evaluate Jewett White Lead Company (Site) for a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal action.

During EPA's review of the property located at 2000 Richmond Terrace, it was found that this property was originally part of a white lead manufacturing operation that spanned both sides of Richmond Terrace. The historical footprint of the former Jewett White Lead Company includes 2015 Richmond Terrace (Block 185, Lot 548) and 2000-2012 Richmond Terrace (Block 1006, Lot 32). John Jewett & Sons White Lead Company owned the Site from 1839 until April 3, 1890 when National Lead & Oil Company of New York ("National Lead") acquired the Site property. Operations at the Site included the manufacture of white lead, an additive found in lead-based paint and ceramics. A major fire destroyed the plant's main building house and storage house in 1920.

On December 31, 1943, Moran Towing Corporation acquired the 2015 Richmond Terrace property, Block 185 Lot 548 from National Lead. And on May 31, 1946, the one acre parcel of property located at 2000-2012 Richmond Terrace, Block 1006 Lot 32 was acquired by the Sedutto Family from National Lead. Between 1949 and 1990, various businesses operated at 2000-2012 Richmond Terrace including the Sedutto's Ice Cream factory. In 2000 the buildings and any remaining debris were eventually razed and cleared after several fires at the Sedutto's Ice Cream factory.

Currently the 2000 Richmond Terrace property is vacant, but was being used by Perfetto Realty Corp. (PRC) to store construction equipment and materials from a local construction project.

The Site is located on the north shore of Staten Island in the Port Richmond area. Richmond Terrace, the main roadway running east-west along the Kill Van Kull, has been active since the early nineteenth century. Many of Staten Island's first industries were established along what is now called Richmond Terrace. The Site is bordered to the east by a shipyard facility, to the south by an abandoned elevated railroad line, and to the west by Cable Queen, a New York submarine contracting company. The Site sits adjacent to the Kill Van Kull, which is to the north of the Site. The area around the Site is a mix of light industrial, commercial, and residential. A residential neighborhood commences just south of the elevated railroad line and one block west on Port Richmond Avenue. The nearest residence is located approximately 100 feet south of the Site. Bus stops are present on Richmond Terrace in front of the facility and on Park Avenue across the street from the entrance to the fenced property.

EPA evaluated the 2000 Richmond Terrace property during the period of December 17 – 18, 2008. The analytical results from the sampling event in December 2008 revealed the presence of elevated levels of lead throughout most of the property, both laterally and with depth. The average surface lead concentration was 5,081 mg/kg. The average lead concentration in the soil samples collected at depths of 1-foot, 2-foot and 3-foot below grade were 28,245 mg/kg, 61,201 mg/kg, and 53,398 mg/kg, respectively. Off-site soil samples collected from four locations along the curbline of Richmond Terrace adjacent the property were found to contain lead in concentrations ranging from 383 mg/kg to 2,760 mg/kg.

Analytical data collected at the 2000 Richmond Terrace property indicate that elevated levels of lead are present throughout the Site, and activities at the Site could potentially cause the soils to become airborne or to migrate off-site during dry weather conditions. In addition there is physical evidence that soil has migrated off-site onto a portion of Richmond Terrace via runoff during rainfall events and onto Park Avenue via vehicular traffic leaving the Site. The Removal Site Evaluation (RSE) for the 2000 Richmond Terrace property dated April 24, 2009 concluded that a CERCLA removal action is warranted to address the potential threats posed by the contaminated soil at the Jewett White Lead Site.

At EPA's request, the property owner of 2000 Richmond Terrace initiated an interim removal action to stabilize conditions at the property on April 6, 2009. The interim removal action consisted of establishing storm water management controls, improving the condition of the existing fencing, spreading grass seed and mulch, posting "lead-hazard" warning signs, and wet-sweeping sediment/dirt along the sidewalk and curb adjacent to the Site along Richmond Terrace and Park Avenue. This work was completed on April 20, 2009.

Off-Site Soil Sampling

Based upon the elevated levels of lead in both the surficial soils on-site and in the off-site samples collected along the adjacent sidewalk, EPA developed a sampling plan to collect additional off-site soil samples in the surrounding community. From June 8th to June 12th 2009, EPA conducted off-site soil sampling in the Port Richmond Community to determine if the lead from the Jewett White Lead Site had migrated into the surrounding neighborhood. Soil samples were collected in the residential backyards located adjacent the Site, beneath the elevated train line, in public medians located within a six-block area of the Site, and in a background area. Elevated levels of lead were found in the surface soils and with depth in all areas sampled.

Random and biased soil samples were collected from the residential backyards, which included a utility service yard. The random soil sample locations were in areas of either bare or grass covered soil and the biased samples were collected in bare soil locations, high use areas, or within the driplines of structures suspected to contain lead-based paint. A total of thirteen residential properties were including in the June 2009 sampling event. The lead concentrations found in the residential soil samples ranged from 11.4 mg/kg to 3,510 mg/kg, with the highest lead levels detected in the biased soil samples collected within the driplines of homes. The average lead concentration in the surface soils of the residential backyards exceeds the 400 mg/kg screening level for lead in soil at residential properties. The average lead concentration in the backyard soil samples collected at depths of 0-2", 2-6", and 6-12" below grade were 549 mg/kg, 675 mg/kg, and 902 mg/kg, respectively. The average lead concentration for the surficial soil samples in the residential yards was determined using the randomly selected soil samples to allow for statistical comparisons. The average concentration of lead appears to increase with depth as does sampling variability.

Soil samples collected in the grassy medians along sidewalks within a six-block radius of the Site had an average lead concentration of 666 mg/kg, 663 mg/kg, and 546 mg/kg, in the 0-2", 2-6", and 6-12" depth interval, respectively. The lead concentrations ranged from 78.1 to 1,070 ppm for the 0-2" depth interval, from 187 to 1,330 mg/kg for the 2-6" depth interval, and from 203 to 1,720 mg/kg for the 6-12" depth interval in the "near-Site" grassy medians.

Lead was detected in the grassy medians sampled both in the background and in the area surrounding the site. The lead levels seen in the grassy medians closest to the site are comparable to the lead levels detected in grassy medians in the background area. The average concentration of lead in the surface soils within the six-block area closest to the site is 666 mg/kg, while the average concentration of lead in the surface soils in the background area is 788 mg/kg. Soil samples collected in the grassy medians along sidewalks on Harrison Avenue between Faber Street and Sharpe Avenue, approximately 0.25 miles upwind from the Jewett Site had an average lead concentration of 788 mg/kg, 792 mg/kg, and 352 mg/kg, in the 0-2", 2-6", and 6-12" depth interval, respectively. Lead concentrations ranged from 484 to 1,480 mg/kg in the 0-2" depth interval, from 1.2 to 1,430 mg/kg in the 2-6" depth interval, and from 100 to 841 mg/kg in the 6-12" depth interval in the background grassy medians. While the background samples collected in the 0-2" and 2-6" depth interval are observationally higher in lead concentration than the soil samples collected from the grassy medians in the one block area adjacent the Site, statistically the background and near-site samples are similar in lead content at all depths.

Additional soil samples were collected beneath the elevated train line immediately adjacent the Site, and from the elevated train line several blocks upwind of the Site. Surficial soil samples collected beneath the elevated train line next to the 2000 Richmond Terrace property had lead concentrations ranging from 282 to 2,540 mg/kg, while surficial soil samples collected beneath the elevated rail line in a background location between Shape and Port Richmond Avenues had lead concentrations ranging from 148 to 2,340 mg/kg. The surface soil samples collected beneath the elevated rail line in the background had a greater average concentration of lead than the near site elevated rail line surface soil samples (1,039 mg/kg vs. 683 mg/kg).

The road grit samples collected throughout the community were generally lower in concentration than any other samples collected with an overall average of 171 mg/kg. The average concentration of lead found in the road grit collected along Richmond Terrace was 154 mg/kg, while the average concentration of lead in the road grit samples collected around the

2000 Richmond Terrace property was 133 mg/kg. Road grit samples collected along the curbline adjacent the 2000 Richmond Terrace property confirm that the interim removal measures in place are preventing the migration of soils in stormwater from the property.

Letter of Health Consult

The off-site soil sampling results were shared with the New York State Department of Health and New York City Department of Health and Mental Hygiene. The New York State Department of Health, under cooperative agreement with the Agency for Toxic Substances and Disease Registry, prepared a Letter Health Consultation (LHC) for the potential exposures to lead in residential soils in the neighborhood south of the site on February 11, 2010. It concludes that long-term contact with residential soils contaminated with lead in the Port Richmond community could harm people's health and actions are recommended to prevent or reduce these exposures.

Recommendations for the residents and/or property owners includes maintaining a cover of grass, adding clean soil, gravel, or mulch over bare soils (especially in children's play areas) and having children wash their hands after playing in the yard. The Letter of Health Consult is attached as Appendix A.

Attribution Analysis

Because of concerns that other sources of lead may be contributing to lead contamination in the community, several analytical methods were used to determine the attribution of the lead in the soil samples collected both on-site and off-site. The following types of attribution analysis were conducted: X-Ray Absorption Spectroscopy, X-Ray Diffraction, Elemental Correlation, and Lead Isotopic Ratio Analysis.

X-Ray Absorption Spectroscopy (XAS) is a widely-used technique for determining the local geometric and/or electronic structure of matter. Speciation is a key application of XAS. Soil samples collected from the 2000 Richmond Terrace property and analyzed using XAS were observed to contain lead carbonate (cerussite), which is a common form of lead seen in the environment. Nearly all forms of lead that are released to soil from anthropogenic sources are transformed by chemical and biotic processes to form lead carbonate or to adsorbed forms in soil. Since the soil samples at the Site are observed to contain lead carbonate, a common form of lead in the environment, EPA was unable to distinguish between site-related lead and lead from other environmental sources using this analysis.

X-Ray Diffraction (XRD) was also performed on the soil samples collected both on the 2000 Richmond Terrace property and the off-site soil samples. XRD can be used characterize the atomic-scale structure of lead. However, the soil samples collected off-site had concentrations of lead that were too low to perform the XRD analysis. Much higher levels of lead are necessary to perform the XRD analysis on the off-site samples and for this analysis to be useful for lead attribution.

Elemental Correlation is an observation of the relationships that exists between various metals. Soil samples collected from on-site and off-site locations were analyzed for metal by Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES). The results of these analyses were compared to determine if a relationship exists. A relationship was observed to exist off-site that was different from relationships observed in the 2000 Richmond Terrace soil samples. A reasonably strong relationship was found to exist between lead and barium in both the off-site and the 2000 Richmond Terrace soil samples. The lead to barium ratio for the on-site soil samples is considerably higher than the ratio in the off-site soil samples. The elemental correlation table for lead and barium is attached as Appendix B. The soil samples collected from the 2000 Richmond Terrace property also showed a relationship between manganese and lead. This relationship does not occur in any of the off-site soil samples, even though the manganese detection limits were sufficiently low enough to detect this relationship if it did exist. In addition to barium and manganese, antimony, silver and cadmium also exhibited a relationship to lead in the samples collected at the Jewett Site. Antimony, silver, and cadmium all exhibited a 1:100,000 ratio with lead; however the detection limits of this analysis was not low enough to observe these metals in the off-site soil samples. Since the lead-barium and lead-manganese relationships observed in the on-site soil samples are different from the off-site soil samples, it does not appear that the Jewett White Lead Site is a significant contributor to the lead present in the Community. However, it is important to note that other contributing sources may be present that affect the relationship of metals in off-site soils.

Natural lead (Pb) is a mixture of four stable isotopes: 204, 206, 207, and 208. Among all the naturally occurring lead isotopes, only 204 Pb is non-radiogenic, whereas, 206, 207, and 208 are the daughter products from the radioactive decay of uranium and thorium. There are several different mining districts throughout the world that produced lead ore. The geological age of the ore body determines the relative abundance of the four stable isotopes of lead, and the source ores of the refined lead determine the metal's isotopic composition. The purpose of measuring the lead isotope ratios for these soil samples was to determine if these measurements would serve as a unique tracer of lead contamination to identify the sources of lead in the samples.

Twenty-one soil samples were analyzed for Lead Isotopic Ratio Analysis. Of those 21 samples, five were collected on the former Jewett White Lead site, two were collected along Richmond Terrace where site soils were observed to collect, and the remaining samples were from off-site areas. The soil samples collected on the Jewett Site resulted in a range of 1.122 to 1.138 for Pb 206/207 and a range of 2.393 to 2.411 for Pb 208/207. The two soil samples collected along Richmond Terrace where site soils were observed to collect resulted in a range of 1.136 to 1.146 for Pb 206/207 and a range of 2.407 to 2.418 for Pb 208/207. The remaining off-site soil samples collected from residential backyards, the train trestle, near-site grass patches and the background area resulted in a range of 1.144 to 1.195 for Pb 206/207 and 2.427 to 2.464 for Pb 207/208. Please see the plot of the isotopic results included as Appendix C. The soil samples collected from the Jewett Site are observed to be very distinct from the off-site soil samples. An interpretation of the results indicates that the deeper on-site samples have an isotopic signature consistent with lead dusts found in North Africa and Europe. The isotopic composition of lead dusts in North Africa and Eastern Europe range from 1.096 to 1.164 for Pb 206/207 and range from 2.361 to 2.446 for Pb 208/207 (Bollhofer et al., 2001). A figure depicting the different regions of the globe according to the lead isotopic composition of their aerosols is included as Appendix D.

The off-site soil samples have a signature that is different from the deeper on-site soils. The off-site soil samples collected from residential backyards, beneath the elevated train line, the near-site grass patches and the background area are similar in Pb 206/207 ratios as other published lead isotopic analysis in the New York City (Carvanos et al., 2009) and Jersey City (Adgate et al., 1998). The Caravanos et al. study reported that Pb 206/207 isotopes measured for boroughs in New York City in 2003-2004 from dust wipes resulted in a Pb 206/207 range of 1.172 to 1.222, and the Adgate et al. study reported Jersey City soils with a range of Pb 206/207 from 1.155 to 1.200. The off-site soil samples collected in the Port Richmond community appear to be consistent with anthropogenic lead pollution common in the North Eastern United States industrialized urban areas. Based upon the lead isotopic ratio results, it appears that the lead in the backyards and the community is predominantly from environmental sources other than the Jewett White Lead Site.

Background Soil Samples

Background soil samples were collected in the grassy medians along sidewalks on Harrison Avenue between Faber Street and Sharpe Avenue, approximately 0.25 miles upwind from the Jewett Site, a neighborhood comparable to the one block residential neighborhood immediately adjacent the Site. The background samples had elevated levels of lead similar to the levels seen in samples collected in the grassy areas near the Site. The average concentration of lead in the surface soils within the six-block area closest to the site is 666 mg/kg, while the average concentration of lead in the surface soils in the background area is 788 mg/kg. Background soil samples had an average lead concentration of 788 mg/kg, 792 mg/kg, and 352 mg/kg, in the 0-2", 2-6", and 6-12" depth interval, respectively. Soil samples collected in the grassy medians along sidewalks within a six-block radius of the Site (also called "near-Site" soil samples) had an average lead concentration of 666 mg/kg, 663 mg/kg, and 546 mg/kg, in the 0-2", 2-6", and 6-12" depth interval, respectively. While the background samples collected in the 0-2" and 2-6" depth interval are observationally higher in lead concentration than the soil samples collected from the grassy medians in the one block area adjacent the Site, statistically the background and near-site samples are similar in lead content at all depths.

A concentration gradient or pattern was not observed in the residential or community samples collected in the grassy medians, implying that the Jewett Site is not the predominant source of lead in the areas sampled.

Urban Lead Studies

Lead is a common contaminant found in soil and dust in the urban environment due mostly in part to its former use in paint, gasoline and other products, and in former industrial practices. Several studies have been published about lead contamination in heavily industrialized urban areas and cities with heavy traffic patterns. These studies found similar lead concentrations in urban soils to the lead concentrations found in the Port Richmond Community. In a Jersey City, NJ study lead concentrations in the soil ranged from 70 to 2,080 mg/kg with an average lead concentration of 540 mg/kg (Adgate et al., 1998). Soil samples collected in the street side soil of the inner-city of New Orleans, LA found peaks of lead ranging from 600 to 1,200 mg/kg (Mielke, 1994). A Portland, ME study found levels of lead ranging from 9 mg/kg to >100,000 mg/kg with most of the 1,859 soil samples collected greater than 400 mg/kg (Wagner, T. et al, 2008). Studies conducted in New Orleans, St. Paul and Minneapolis, MN, have shown that for most urban areas, decades of leaded paint and gasoline use have resulted in the accumulation of lead in the soil (Mielke, 1999).

Studies have found a strong link between elevated soil lead levels and lead-based paint and leaded gasoline emissions. Soil lead levels tend to be much higher in city centers with heavy traffic patterns consistent with the use of leaded-fuels. Lead was used in gasoline as an anti-knock agent from 1929 until it was banned in 1986. About 75 percent of gasoline lead was emitted from exhaust pipes in the form of a fine lead dust. Gasoline-generated soil lead has been found to be highest adjacent to roadways and drops off quickly with increasing distances from driving surfaces.

Lead-Based Paint

Elevated soil lead levels have been found to be related to deteriorated exterior lead-based paint (Jacobs et al., 2002). Since lead-based paint still covers building exteriors, it can be a significant source of soil contamination. As the paint on a buildings exterior deteriorates, lead paint chips and dust concentrate in the surrounding soil. Renovating, remodeling, and performing routine home maintenance will also mobilize this lead if proper precautions are not taken. Lead concentrations in soil are typically highest in the drip zone, or dripline, the area surrounding and extending out about three feet from the perimeter of the building. (US EPA, 2001). A 1990 HUD report to Congress found that nearly half of the ten million homes with non-intact lead-based paint on exterior walls have excessive soil lead hazards.

Higher concentrations of lead were observed in the soil samples collected nearest residential structures, suggesting that the use of lead-based paint may be a significant source of contamination in the backyards. The three soil samples with the highest lead levels (3,510 mg/kg, 2,440 mg/kg, and 2,340 mg/kg) collected in the residential backyards were located within the dripline of a home or garage with exterior lead-based paint. X-Ray Fluorescence (XRF) sampling confirmed the presence of lead-based paint on the exterior of seven of the thirteen residential properties included in the June 2009 off-site soil sampling event.

Conclusion

Several lines of evidence were evaluated as part of this analysis including: radioisotope ratios, elemental correlations, statistical analysis of near site samples and background samples, spatial distribution of lead in the soil, the presence of lead-based paint on the exterior of structures and a comparison of sampling results to studies of lead in other industrialized urban areas. Based upon the review of all the lines of supporting evidence, EPA concluded that the Jewett White Lead Site is not a significant contribution source to the lead found in the community. The lead in the community appears to be consistent with urban lead contamination typically seen in the industrialized Northeast United States. Since the lead contamination found at the residential properties sampled is not primarily associated with a release from the Jewett White Lead Site or other facility, a Superfund removal action is not warranted.

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Appendix A

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Flanigan Square 547 River Street Troy, New York 12180-2216

Richard F. Daines, M.D.
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James W. Clyne, Jr.
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February 11, 2010

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Re: Letter Health Consultation
Residential Property Sampling
2009 Sampling Results
Former Jewett White Lead Property
and Adjacent Residential Neighborhood
Staten Island, Richmond County

Dear Ms. Staiger:

The New York State Department of Health (NYSDOH), under the cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), has evaluated soil lead data collected by the United States Environmental Protection Agency (USEPA) near the former Jewett White Lead property in Staten Island, Richmond County. In a January 2009 letter to the USEPA, the NYSDOH determined that additional soil sampling was needed to better characterize the on-site and off-site soil conditions. Based on USEPA follow up sampling, this letter summarizes NYSDOH's public health evaluation of potential exposures to lead in residential soils in the neighborhood south of the site and provides an update on actions taken on-site.

Background and Statement of Issues

The former Jewett White Lead property, located at 2000 Richmond Terrace in Staten Island, Richmond County, is a former lead pigment processing facility owned by National Lead Industries until 1949. The facility was located on parcels currently designated as 2000-2012, and 2015 Richmond Terrace in the Borough of Staten Island, Richmond County. According to the historical information, lead substrates were stored and converted on-site into a product known as "white-lead" through the Dutch Process and for the most part used for pigments in paint products. This process was initially used by Jewett White Lead and then by National Lead from 1839 until manufacturing ceased in 1949. Since 1949, the property has changed owners at least three times with none of the subsequent owners manufacturing lead-based products. Currently the

0.25-acre site contains no structures and was recently used to store construction materials for local public works projects. Immediately bordering the site to the south is an inactive raised railroad trestle from the former Staten Island Railroad. Adjacent to the abandoned railroad track are single and multi-family residential dwellings. To the north, east and west are active industrial and commercial facilities. A site location map is attached as Appendix A, Figure 1.

In 2008, the current owner submitted data to USEPA indicating elevated concentrations of lead in the on-site soil. USEPA requested, through the cooperative agreement with ATSDR, that NYSDOH evaluate the data to determine the potential for exposure to nearby residents. NYSDOH noticed that the three samples were collected from 0-15 inches below ground surface. NYSDOH considers samples from 0-2 inches in depth to represent soil that people are most likely to be exposed to through casual contact. Additionally, samples collected from deeper discrete intervals (e.g. 2-6 inches and 6-12 inches below ground surface) would provide useful exposure information for people who may engage in activities that would require excavating through the surficial layer to deeper sub-surface soil. Such activities could include gardening and upgrades to their landscaping by installing trees or sub-surface lawn utilities. Therefore, NYSDOH and ATSDR found that these samples were not sufficient for an exposure evaluation and recommended, in January 2009, that additional samples be collected so public health implications could be evaluated.

In December 2008, USEPA collected soil samples from 16 test pits excavated to a depth of 4 feet below grade. Surface soil samples were collected from the 0-3 inch interval at each location prior to excavation. Soil samples were also collected at 1 foot, 2 foot, and 3 foot depths. Additionally, four off-site samples were collected along Richmond Terrace. One sample was sediment collected from the sidewalk; the remaining three samples were road grit collected from the curb line. The lead levels in these off-site samples ranged from 282 - 2,760 milligrams per kilogram (mg/kg) lead. Through review of the results and consideration of USEPA field personnel observations, the NYSDOH and ATSDR determined that these road grit results indicated that lead contaminated soil may be migrating from the site to the roadway and possibly to the adjacent residential neighborhoods. This represented a public health concern for people, especially children in the nearby residential neighborhood.

In April 2009, USEPA requested that the current property owner take interim measures to stabilize the Site to prevent the migration of lead contaminated soils in storm water runoff. The property owner established storm water management controls, improved the existing condition of the fencing, spread grass seed and mulch, posted lead hazard warning signs, and performed wet sweeping of the sediment and dust on the sidewalks and adjoining curb line.

In June 2009, USEPA collected off-site soil samples from the community which included the backyards of homes in the neighborhood directly adjacent to the site (see Appendix A, Figure 1). A discussion of this sampling event is given below.

Discussion

A. Environmental Contamination and Pathways

In June 2009, the USEPA collected soil samples at locations that included an abandoned railroad trestle, residential yards, roadside grass patches, a Consolidated Edison owned property and grit from roads in the Port Richmond community. The focus of this health consultation is the residential soil sampling program, because the likelihood for exposure is greatest in this area. Surface soils (0-2 inches) were collected from 13 properties, subsurface soils (2-6 inches) were collected from five of 13 properties and the deepest soil (6-12 inches) from six of 13 properties. Several residential properties had multiple soil samples collected from them and the NYSDOH in conjunction with ATSDR concluded that the appropriate approach to determine exposures was to compare the average concentration across the study area to the appropriate standard.

NYSDOH averaged and compared the results to the New York State (NYS) 6 NYCRR Part 375 Environmental Remediation Programs Regulations cleanup objective for soils in residential areas (NYSDEC 2006). The NYS Part 375 Soil Cleanup Objective for lead in residential soil is 400 mg/kg, which is the same as the USEPA's lead hazard standard for bare soils in children's play areas (USEPA 2001).

The average surface soil lead concentration for the homes closest to the former Jewett White Lead property is 626 (mg/kg). Five properties sampled in the 2-6 inch interval had an average lead concentration of 706 mg/kg. For soil samples collected in the 6-12 inch interval, the average concentration is 1096 mg/kg. All averaged intervals exceeded the 400 mg/kg lead hazard standard. The results for lead in soil are located in Appendix A, Table 1

Four soil samples, three with the highest levels of lead (2340 mg/kg, 2440 mg/kg and 3510 mg/kg), were not considered in this evaluation because they were collected within the dripline boundaries where water runs off the roof and/or sides of structures treated with lead-based paint. USEPA defines a drip-line as the area surrounding and extending out approximately three feet from the perimeter of a structure. Soils adjacent to homes painted with lead based paints typically contain elevated levels of lead. USEPA, through use of measurements from field instruments (XRF) confirmed that three samples were from properties, with homes, where lead-based paint was present, the potential exists for residents to be exposed to the lead in soil at these locations, the measures recommended in this document to reduce their exposure should also be considered in the drip-line of the structures.

The USEPA conducted attribution tests to determine if Jewett was a significant contributing source to the lead levels. Based upon the USEPA's review of multiple lines of evidence, including radioisotope ratios, elemental correlations, statistical analysis of near site samples, and samples collected 0.25 mile predominantly upwind of the site spatial distribution of lead in the soil, and a comparison of sampling results to studies of lead in other industrialized urban areas, USEPA concluded that the Jewett site was not a significant contributing source to the lead levels found in the backyards or in the community. Other sources of lead in the community could include weathered lead-based exterior paint, leaded gasoline emissions or industrial emissions.

Observations made during site visits indicate that exposure to lead contaminated soils is likely in the neighborhood. Residents maintaining gardens and flower beds or using their yards for seasonal recreational purposes could be exposed to lead from incidental ingestion of lead contaminated soils and/or inhalation of lead-containing soil or dust. This may include eating fruits and vegetables grown in the soil and household dust derived from lead-contaminated soils.

USEPA carried out additional sampling in an area approximately a quarter mile to the southwest of the Jewett site and determined that lead levels elsewhere in the Port Richmond area may be found at concentrations comparable to those described above.

B. Toxicological and Epidemiological Evaluation for Adult and Children's Health Issues

People can be exposed to lead by ingesting lead in paint chips or dust, by breathing in lead dust, by ingesting lead in soil, and by drinking water that contains lead. Lead can be harmful to health (ATSDR 2001). Young children are at greater risk of health effects from lead than older children and adults because they are smaller, their bodies are still developing, and they have a greater ability to absorb lead into their bodies once it is ingested. The developing fetus is also sensitive to the health effects of lead. In children, exposure to elevated levels of lead before or after birth can impair the normal development of the central nervous system, and can lead to learning or behavioral problems. In adults, exposure to high levels of lead can cause effects on the nervous system and blood (anemia or blood pressure changes). The risk for these and other health effects increases as the amount of lead and the duration of exposure increases.

The elevated levels of lead detected in bare surface soil areas above the NYS and USEPA standards for lead in soil on the residential properties could increase the exposure to this contaminant for the people (particularly young children), through routine play and garden activities. In addition, exposure to lead on the residential properties could increase through incidental ingestion or inhalation of lead-containing dust.

Conclusions

For the community living in Port Richmond, near the former Jewett White Lead property, NYSDOH and ATSDR give a high priority to making sure that the citizens have the opportunity to be educated and understand the risks associated with the exposure to soils in their neighborhood that contain elevated concentrations of lead. NYSDOH and ATSDR conclude that long-term contact with residential soils contaminated with lead in the Port Richmond community could harm people's health (see Appendix C) and actions are recommended to prevent or reduce these exposures. This is because many of the properties have lead levels in residential surface soils that exceed the New York State cleanup objective for residential use and USEPA lead standard for bare surface soil in children's play areas, both of which are 400 mg/kg.

USEPA concluded that the Jewett site was not a significant contributing source to the levels of lead found in the backyards of the Port Richmond community.

Property owners/occupants who participated in the June 2009 investigation have been notified of their individual results. Additional community outreach will be conducted to answer questions and concerns that members of the community may have.

Recommendations

Because the increased potential exists for exposure to lead through contact with lead bearing soil, which could harm people's health, NYSDOH and ATSDR recommend that residents and/or property owners take measures to reduce exposure to contaminated soil. These measures could include maintaining a cover of grass, adding clean soil, gravel, or mulch over bare soils (especially in children's play areas) and having children wash their hands after playing in the yard. Additionally, these measures may include the removal of the contaminated soil and replacement with clean soil, depending on the lead levels of the individual property and the actual potential for human exposure, particularly with respect to young children.

Residents should take steps to minimize exposure to the lead in garden soils. These can include adding organic matter such as compost or manure to garden soil and peeling and washing crops prior to eating them.

The urgency to take these or other measures increases as the lead level in soil increases over 400 mg/kg. Regardless of the levels of lead in soil, keeping bare soil covered and using normal hygienic practices such as washing hands after playing or working outside can help reduce exposure to any chemicals and microorganisms that may be contained in soil.

NYSDOH and ATSDR are prepared to provide assistance to residents, property owners, and the New York City Department of Health in disseminating in formation about these measures.

USEPA has determined it will be appropriate to take permanent measures to eliminate the potential for future human exposures to soils contaminated with high levels of lead on the former Jewett White Lead property. Such permanent measures will ensure the site remains protective should the use of the land change or the temporary measures taken by the current property owner deteriorate over time. NYSDOH and ATSDR concur with USEPA's determination that such measures should be taken.

If you have any questions regarding this letter health consultation, please contact me at 518-402-7860.

Sincerely,

Christopher Doroski
Public Health Specialist
Bureau of Environmental
Exposure Investigation

ec: G. Litwin/S. Bates/D. Miles/file - NYSDOH BEEI
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N. Clark/N. Graber - NYCDOH
B. Devine - MARO

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References

ATSDR (Agency for Toxic Substances and Disease Registry) 1999. Toxicological Profile for Lead (Update). U.S. Department of Health and Human Services. Atlanta, Georgia: Public Health Service.

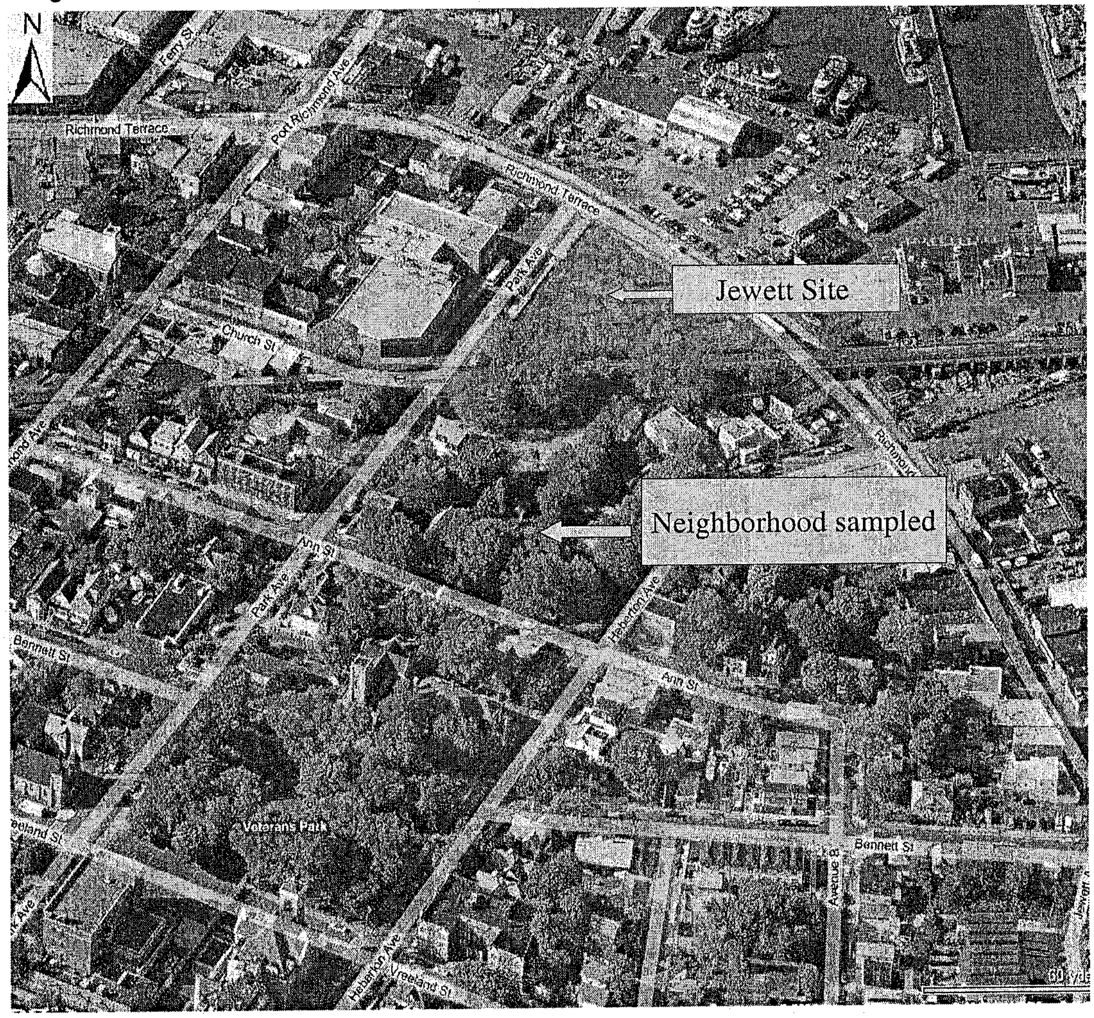
USEPA (United States Environmental Protection Agency) 2001. Lead: Identification of Dangerous Levels of Lead, Final Rule. Federal Register 66: 1206-1240.

NYSDEC (New York State Department of Environmental Conservation) 2006. Division of Environmental Remediation 6NYCRR Part 375 Environmental Remediation Programs.

Appendix A

Figure 1

Figure 1. Jewett White Lead Site and Neighborhood sampled for Lead in Soil



Appendix B

Table 1. Residential Block Soil Sample Results

Appendix B

Table 1. RESIDENTIAL BLOCK SOIL SAMPLES

Location	Sample Depth (INCHES)	Lead Result*	Sample Depth (INCHES)	Lead Result*	Sample Depth (INCHES)	Lead Result*
1	0-2	565				
2	0-2	180				
	0-2	214				
3	0-2	91.3	2-6	214	6-12	292
	0-2	701				
4	0-2	1130				
5	0-2	469				
	0-2	579	No Sample	No Sample	6-12	326
6	0-2	584				
7	0-2	800				
	0-2	1200				
8	0-2	1050	2-6	794	6-12	724
	0-2	834				
	0-2	1060	2-6	652	6-12	587
	0-2	1130				
	0-2	550	2-6	366	6-12	305
9	0-2	450				
	0-2	505				
	0-2	338				
	0-2	480				
	0-2	278				
	0-2	794	2-6	995	6-12	891
	0-2	683				
	0-2	1110	2-6	1250	6-12	2620
10	0-2	840	2-6	911	6-12	2150
	0-2	11.4				
11	0-2	190				
	0-2	1310				
12	0-2	249	2-6	468	6-12	1970
	0-2	221				
	0-2	1250				
13	0-2	198				
Average		**626**		**706**		**1096**

* All results in MG/KG

Appendix C

Conclusion Categories and Hazard Statements

Conclusion Categories and Hazard Statements

ATSDR has five distinct descriptive conclusion categories that convey the overall public health conclusion about a site or release, or some specific pathway by which the public may encounter site-related contamination. These defined categories help ensure a consistent approach in drawing conclusions across sites and assist the public health agencies in determining the type of follow-up actions that might be warranted.

1. **Short-term Exposure, Acute Hazard** ***"ATSDR concludes that...could harm people's health."***

This category is used for sites where short-term exposures (e.g. < 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid public health intervention.

2. **Long-term Exposure, Chronic Hazard** ***"ATSDR concludes that...could harm people's health."***

This category is used for sites that pose a public health hazard due to the existence of long-term exposures (e.g. > 1 yr) to hazardous substance or conditions that could result in adverse health effects.

3. **Lack of Data or Information** ***"ATSDR cannot currently conclude whether...could harm people's health."***

This category is used for sites in which data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels to support a public health decision.

4. **Exposure, No Harm Expected** ***"ATSDR concludes that...is not expected to harm people's health."***

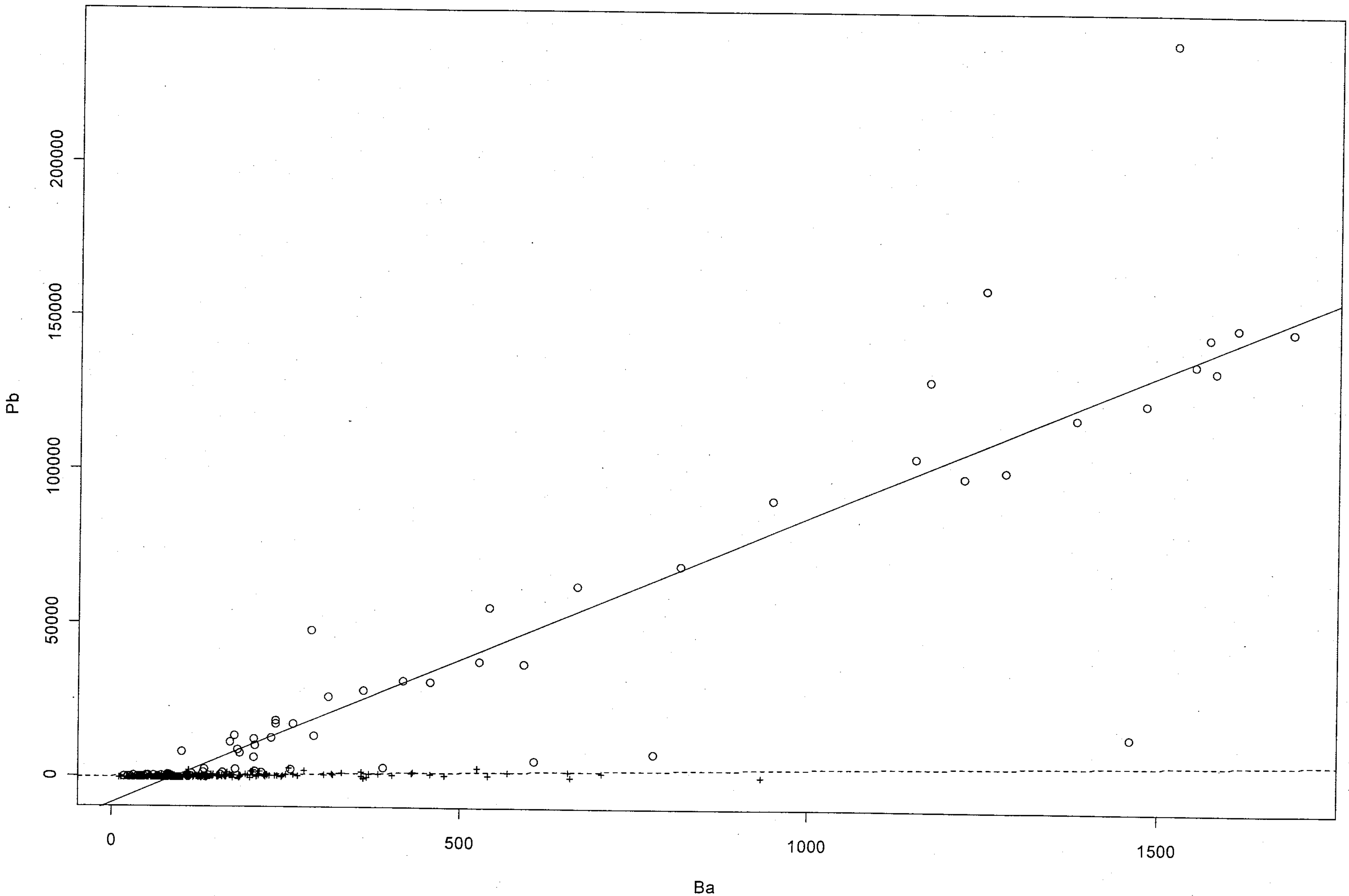
This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past, and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.

5: **No Exposure, No Harm Expected** ***"ATSDR concludes that...will not harm people's health."***

This category is used for sites that, because of the absence of exposure, are not expected to cause any adverse health effects.

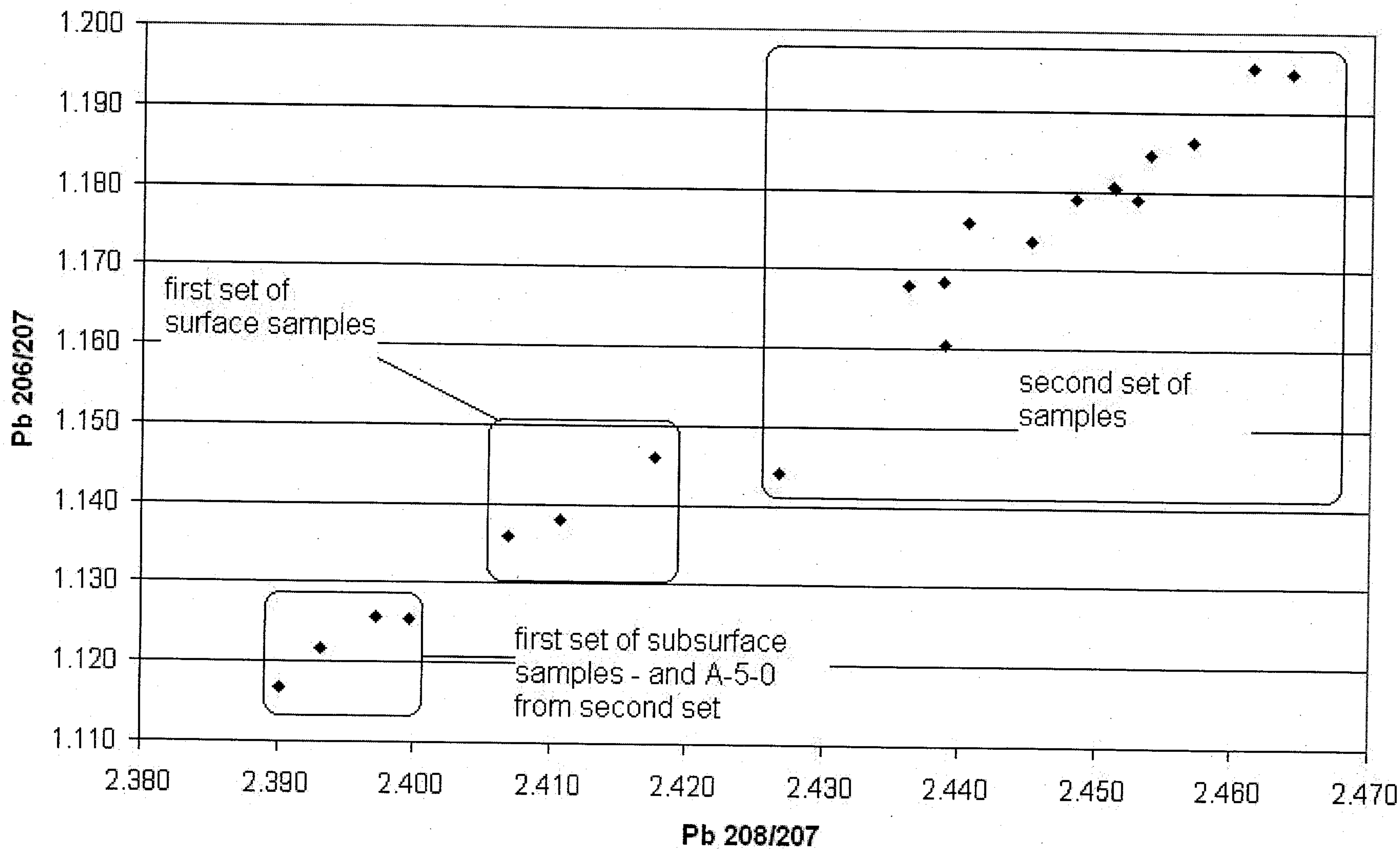
Appendix B

Elemental Correlation



Appendix C

Staten Island Pb data



Appendix D

Global Lead Isotope Composition

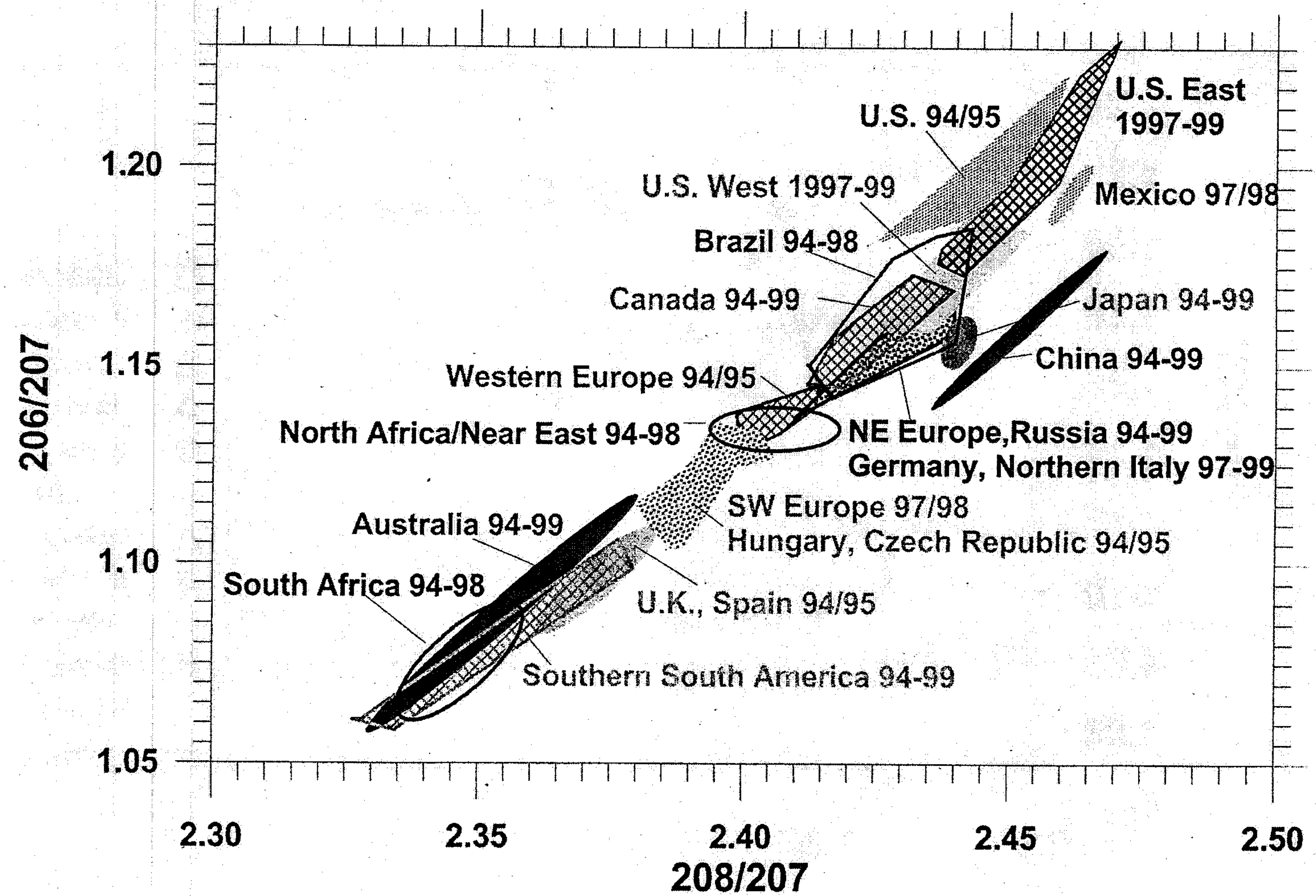


Fig. 9. A global map of the Pb isotopic composition of airborne particles between 1994 to 1999. The Southern Hemisphere data are from Bollhöfer and Rosman (2000)