

STATE OF MINNESOTA
COUNTY OF HENNEPIN

DISTRICT COURT
FOURTH JUDICIAL DISTRICT

East Phillips Neighborhood Institute, Inc., and
Cassandra Holmes,

Plaintiffs,

v.

The City of Minneapolis,
Minnesota Pollution Control Agency, and
Minnesota Environmental Quality Board,

Defendants.

Court File No. 27-CV-20-8414
The Honorable Edward T. Wahl

AFFIDAVIT OF
EDWARD A. NATER

MINNESOTA
JUDICIAL
BRANCH

STATE OF MINNESOTA)
)
COUNTY OF HENNEPIN) SS.

I, Edward Nater, declare as follows:

1. I am an emeritus professor in the Department of Soil, Water and Climate at the University of Minnesota where I have conducted research and taught the last 33 years. The majority of my research is centered on the biogeochemistry of pollutants with particular emphasis on mercury. I received a PhD in Soil Science from the University of California at Davis with emphasis in biogeochemistry.
2. I occasionally engage in environmental consulting projects. Over the years I have consulted with the MN DNR, the MPCA, the City of Minneapolis, and a few environmental engineering companies in the Twin Cities. I have written and co-authored papers and reports, conducted risk assessments, authored white papers, and provided expert witness testimony.

A Short History of Environmental Contamination in the Phillips Neighborhood

CMC Heartland Lite Site

3. Arsenic contamination of soils in the Phillips neighborhood was first discovered in 1994 during reconstruction of the Hiawatha Avenue corridor near the CMC Heartland site, which was suspected to be the source of the arsenic contamination since arsenical pesticides had been manufactured on that site in the past. Because the arsenic was associated with an agricultural chemical, the Minnesota Department of Agriculture (MDA) investigated the site. Analyses of the CMC Heartland site showed that it was heavily contaminated with arsenic. Concentrations in surface soil ranged from near background levels to 5,200 ppm (0.5%). Subsurface soil contamination in some areas extended as deep as 25 feet below the surface, the depth of the water table. In addition, a plume of arsenic- and antimony-contaminated groundwater had formed under the CMC Heartland site and was moving slowly to the southwest. To prevent further wind dispersal of arsenic, the site was temporarily covered with 1 to 2 feet of crushed asphalt and clean fill in 1996.
4. Reade Manufacturing operated on the CMC Heartland site from 1938 until 1963. During this time, Reade manufactured arsenical pesticides (mainly sodium arsenate, a liquid used as a biocide along railroad lines). They may have also manufactured lead arsenate. US Borax leased the land from 1963 until 1968 and also manufactured, stored, and shipped arsenical pesticides. Arsenate powder was shipped to the site in open boxcars, transported

on uncovered moving belts, and sometimes stored on the ground in uncovered piles. Arsenic was transported from the site by wind dispersal and contaminated soils in much of the Phillips neighborhood and surrounding areas, including the Roof Depot Site prior to construction of the Roof Depot building. Arsenic also leached into the soil and eventually formed a plume of contaminated water beneath the site.

5. At various times the CMC Heartland Site had also been used as a railyard, a lumber storage yard that included a machine shop, and two bulk petroleum storage facilities. Contamination from these industries may also have been present on site.

Roof Depot Site

6. Soils on the Roof Depot Site were contaminated by wind dispersed arsenic from the CMC Heartland Lite site. These soils appear to have been incorporated into sub floor fill during construction of the Roof Depot Building. Soils extracted from boreholes at several locations beneath the floor and bituminous roads and parking areas surrounding the building are contaminated with arsenic at concentrations higher than the MPCA's Screening Soil Leaching Value (5.8 ppm). Concentrations in the boreholes range from background levels to 147 ppm.
7. Arsenic deposited by wind after the construction of the Roof Depot Building would have most likely been deposited on roofs, walls, and ground surfaces. Contaminated dust deposited on these surfaces could have accumulated wherever runoff drained into the soil, producing arsenic and lead hotspots under the paved parking areas. These small infiltration areas may have high to very high arsenic concentrations. The arsenic- and antimony-contaminated groundwater plume also extends beneath the Roof Depot Site.
8. The Roof Depot Site was formerly used as a coal yard with a machine shop, Minnehaha Lake Motor Parts, a machine shop and foundry, a Sears Roebuck warehouse, and as a warehouse and sales office for Roof Depot. Axman Surplus, McGean Rohco, and Building Material Supply also used the Roof Depot Building as a warehouse at various times. These activities may also have contaminated the site.

Residential Areas

9. Residential areas in the Phillips Neighborhood were also contaminated by wind-dispersed arsenic from the CMC Heartland Lite site. Following their investigation of the CMC Heartland Lite site, the MDA and the Minnesota Department of Health (MDH) conducted further investigations in the neighborhood. Limited soil investigations of 167 residential properties performed in 2001 and 2003 showed arsenic concentrations as high as 635 ppm. At that time MDH requested assistance from the EPA's Superfund Removal

Program to manage residential arsenic contamination. By 2005 the EPA had sampled more than 3,500 residential properties in the neighborhood (Table 1), and found widespread arsenic contamination of the neighborhood. Cleanup of residential sites with arsenic concentrations >95 ppm (considered to be the acute exposure level) began in 2004. Contaminated soil was removed to a depth of 12 inches under lawns and play areas and 18 inches under gardens and landscape plantings. Clean topsoil was brought in to reestablish the original grade. In 2007 the EPA designated all residential sites in the Phillips neighborhood as the South Minneapolis Residential Soil Contamination Superfund site. At a later date EPA lowered the remedial goal to 25 ppm and residences with arsenic concentrations exceeding that standard were also remediated. Residences that had less than 25 ppm arsenic in soil were not remediated.

10. Non-residential sites in the neighborhood were remediated by the Minnesota Department of Agriculture (MDA). Cleanup of the CMC Heartland site began in the fall of 2004 and was completed in 2005. Approximately 4 feet of soil was removed from most of the site; however, in the most highly contaminated area, contaminated soil was removed to a depth of 26 feet, the top of the water table. A plume of arsenic- and antimony-contaminated water is present under the CMC Heartland site and extending to the southeast. The source of the antimony contamination was not identified in reports. In total, 62,000 cubic yards of soil were removed from the site and an equivalent amount of clean fill was brought in to bring the land surface back to its original grade. Non-residential sites in the area having arsenic concentrations greater than 20 ppm (the Industrial Soil Reference Value) were also remediated at this time under the direction of MDA.
11. Like many older urban neighborhoods, the Phillips Neighborhood also has relatively high soil lead concentrations (Dr. Nicolas Jelinski, personal communication). Dr. Jelinski has conducted free soil lead screening sessions in several Twin Cities neighborhoods, including the Phillips Neighborhood. Residents are invited to bring soil samples from lawns and gardens in for free lead testing, interpretation of the results, and advice on remediation or land use decisions. Dr. Jelinski reports that the Phillips Neighborhood (along with central Powderhorn and Uptown) is one of the higher risk neighborhoods with respect to lead contamination of soils in the Twin Cities. The most common sources of urban soil lead contamination are lead-containing paints and leaded gasoline. It is also possible that a portion of the lead contamination may have come from the CMC Heartland Lite site if they were producing lead arsenate pesticides.

Current Contamination Status of the Roof Depot site

12. Because the Roof Depot building was constructed 9 years after Reade Manufacturing Company started manufacturing arsenical pesticides on the neighboring CMC Heartland

site, its surface soils were also contaminated with arsenic that had been transported by wind from the CMC Heartland site.

13. The City of Minneapolis contracted with Braun Intertec to conduct 4 analyses of the Roof Depot site to assess the site prior to their proposed demolition of the site and construction of the Hiawatha Campus Expansion. These include a Phase I Environmental Site Analysis (2014), a Phase II Environmental Site Analysis (2015), a Test Pit Analysis (2016), and an Additional Investigation Report (2020). They addressed possible contamination of the soil, underlying groundwater, fill materials, and soil vapor.
14. Results of these analyses indicate that soil materials beneath the Roof Depot building and the bituminous parking areas and roadways that surround it are contaminated with arsenic in multiple locations at concentrations in excess of the MPCA's Screening Soil Leaching Value. There appears to be no specific spatial pattern to the sites of highest contamination (Fig. 1), which makes it more difficult to predict how well the samples selected represent the arsenic concentrations of the soil and fill materials beneath the Roof Depot building and the bituminous parking areas and roadways on site. Analyses also showed elevated concentrations of polyaromatic hydrocarbons (PAHs) and gasoline range organics (GRO)
15. Fill materials from the test pits contained large amounts of debris, including concrete, slate, metal, brick, ash, slag, porcelain, and glass. An asbestos-containing material was also collected from Test Pit 1. Fill materials collected from boreholes contained coal fragments, undoubtedly due to the operation of a coal yard on site in the early half of the 20th century. Debris constituted as much as 80% of some of the test pit samples, suggesting a number of unknown materials or contaminants may exist under the Roof Depot Building..

Recognized Environmental Conditions (RECs)

16. The MPCA recognizes the following RECs for the Roof Depot Site:
 - Its historical use as a coal storage yard (1912-1944)
 - Its historical use as a machining and automotive repair business (southwest corner of the site)
 - The adjacent property was historically used as a railroad yard, a lumber yard with a machine shop, a bulk petroleum storage facility, and as an arsenic-based agricultural pesticide manufacturing business which has contributed to an area-wide arsenic release to groundwater and soils.
 - Expired roofing materials such as glues, resins, adhesives, and other hazardous waste were buried on site.

17. In addition to the above RECs, the Roof Depot Site was contaminated by multiple chemicals, including:
- Arsenic concentrations exceeded the MPCA's Screening Soil Leaching Value (5.8 ppm) at multiple sites under the building and under bituminous roadways and parking areas.
 - Arsenic hot spots may exist on site wherever surface waters running across impermeable surfaces infiltrate into the ground. These spots, which might be highly contaminated, would not necessarily be easily recognized.
 - Tetrachloroethylene was detected in sub-slab soil vapor at a concentration greater than 33 times the MPCA's Industrial Intrusion Screening Value (ISV),
 - Concentrations of BaP Equivalent (155.7 and 12.1 ppm) exceeded Industrial SRVs (3 ppm) in 2 of the 4 test pit sites. Benzo(a)pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of carcinogenic PAHs (Minnesota Pollution Control Agency; 2009).
 - A groundwater plume contaminated with arsenic (10.8 to 737 ppb) and antimony (6.9 and 13.7 ppb) exists under the Roof Depot site. The potential source for the antimony has not been identified in reports we have read; it is possible it may be on site in an undiscovered location.

Potential for Further Contamination of the Phillips Neighborhood

18. The Roof Depot Site has a number of Recognized Environmental Conditions. A number of other contaminants and contaminated materials have also been identified on site. Demolition of the Roof Depot Building may expose contaminated materials and contaminants to transport from the Roof Depot Site to residences in the neighborhood via wind dispersal during demolition, loading, and transport of contaminated soils and other media offsite. Vehicles moving on and off site may also track contamination off site and onto roads and streets in the Phillips Neighborhood where it may be resuspended and dispersed into residential areas.
19. Once soil contaminated with arsenic is disturbed, it is easily dispersed. Wind can pick up and carry contaminated dust, leaving it to settle on and around the nearby residences. Vehicular traffic on and off of the demolition site will track contaminated soil and dust into the neighborhood, depositing toxins along the way. These toxins may then be further dispersed by vehicular traffic and wind. Extraction and removal of the buried 12,000-gallon oil tanks will further expose soil and groundwater to the toxins. Based on knowledge that there are high concentrations of arsenic and other hazardous substances in the area around and under the Roof Depot building, and lack of knowledge of spatial distribution or magnitude of high concentrations of soil contamination by arsenic, antimony, and multiple other contaminants on the Roof Depot site, it is *inevitable* that demolition will carry with it the unintended consequence of dispersing these contaminants around East Phillips.

20. Soils in the residential neighborhood, remediated by the EPA to 25 mg/kg, already exceeds the MPCA's Soil Reference Value by a factor of 2.8. Demolition of the Roof Depot site is likely to relocate arsenic and other known hazardous materials and will further contaminate East Phillips residences in excess of MPCA standards. For residential areas, soils having greater than 3 ppm arsenic are generally considered in excess of acceptable risk standards. Dispersion of arsenic from the demolition may result in residential soil contamination exceeding these standards.
21. The operation of the proposed facility also has the potential to contribute additional and on-going pollution from diesel exhaust and particulate matter to an already polluted neighborhood.

Human Health Risks

22. Arsenic is a chemical element that is potentially toxic to humans through acute (short term, high concentration) or chronic (long term, lower concentration) exposures. It is also a known carcinogen. As such, exposure to any amount of arsenic increases the risk of the exposed individual(s) to developing cancer. Because it is an element, arsenic will not degrade over time. Consequently, arsenic-contaminated soils remain potentially toxic unless remediated, and can be potential sources of contamination if disturbed at any time in the future.
23. Soils in residential sites in the Phillips neighborhood were remediated to 25 ppm arsenic. This remediation value is more than 4 times MPCA's Screening Soil Leaching Value for arsenic (5.8 ppm). For carcinogenic chemicals, risk is calculated as the exposure multiplied by the concentration of the chemical multiplied by the carcinogenic slope factor for that particular chemical. The generally-recognized standard for acceptable risk is that the product of these calculations does not exceed 1 excess incremental cancer per 100,000 individuals. Because exposure varies in different settings (e.g., residential vs. industrial) due to the relative amount of time an individual spends in these settings and the activities they perform that may cause exposure to the contaminated materials, different concentrations of the carcinogen may be considered acceptable in different settings. The Industrial Soil Reference Value for arsenic is 20 ppm, based on industrial exposure to the chemical, and this was the remediation goal used by the MDA for non-residential sites.
24. Risk analysis calculations demonstrate that soils having ≤ 3 ppm arsenic would produce an acceptable residential risk of 1 excess incremental cancer per 100,000 individuals. Statistical analysis of arsenic contamination in the Phillips neighborhood indicates that background concentrations of arsenic are < 10 ppm. Therefore, a remediation goal of 3 ppm was unreasonable as it would require remediation of sites that were not

contaminated. The EPA selected a remediation goal of 25 ppm for residences in the Phillips Neighborhood, due in part to the high cost of remediation. Where soil arsenic concentrations were less than 25 ppm, residences were not remediated. Consequently, residential soil arsenic concentrations in the neighborhood currently range from very low to 25 ppm. This equates to human health risk in the neighborhood ranging from less than 1 excess incremental cancer per 100,000 residents to approximately 8 excess incremental cancers per 100,000 residents, or 8 times the acceptable standard.

25. If individuals are exposed to more than one carcinogenic substance, the risks for each individual carcinogen are considered additive unless it can be clearly shown that the carcinogens affect different organs. The standard for acceptable risk for the sum of all individual risks is still 1 excess incremental cancer per 100,000 individuals since the potential effects of the carcinogenic chemicals are also considered additive. Consequently, residents of the Phillips neighborhood who are exposed to other carcinogens may have risks higher than 8 excess incremental cancers per 100,000 individuals.
26. The Roof Depot Site has recognized contamination from arsenic and other carcinogens, including a number of PAHs, collectively termed BaPs. Diesel exhaust, which is one of the major contributors to poor air quality in the Phillips Neighborhood, is also recognized as carcinogenic to humans. Other carcinogens may also be present on the Roof Depot Site, as well as from other pollution sources affecting the Phillips Neighborhood, such as vehicular emissions, the Smith foundry, and others.
27. Arsenic in the soil can also be taken up by plants, with most plant varieties retaining the majority of arsenic in their roots. Consequently, human consumption of root vegetables from arsenic-contaminated soil can lead to harmful levels of arsenic in animals and humans. Human ingestion of soil, especially by children, is another potential pathway of contamination. Arsenic in the air can deposit to plant surfaces, thereby contaminating leaves, fruits, and other aboveground plant parts. Ingestion of contaminated plant tissues by humans or other animals can contribute to elevated arsenic levels, and direct ingestion of contaminated dust from other surfaces is an exposure pathway for children.
28. Determining the potential cumulative impact of pollution from a number of sources is a difficult and complex process. When multiple carcinogens are potentially present, it is even more difficult. A full and detailed cumulative environmental impact analysis should be conducted to determine the human health risks associated with this project against the background of existing pollution and human health risks.

Conclusions

29. The Roof Depot Site has a number of recognized environmental conditions. It is also contaminated by arsenic, carcinogenic PAHs, and gasoline range organics. Demolition of the site and construction of new facilities on site has the potential to release these known contaminants and possibly other contaminants which have not yet been identified. Operation of the proposed Hiawatha Campus Expansion will increase the number of vehicles, including diesel-powered vehicles, operating in the neighborhood.
30. The Phillips Neighborhood is already contaminated by arsenic, lead, and an array of atmospheric pollutants from multiple sources. It is recognized as an environmental justice neighborhood. The proposed project has the potential to contribute significant additional pollution to an already heavily-polluted neighborhood. A full, detailed, and thorough analysis of the cumulative impacts of all current and potential contaminants and contaminant sources should be conducted under the auspices of the Minnesota Pollution Control Agency prior to any further planning or progress on the Hiawatha Campus Expansion.

I declare under penalty of perjury that everything I have stated in this document is true and correct.

DATE: March 8, 2021

/s/ Edward Nater

References

Groundwater Monitoring Report, Hiawatha Business Center, 2020 East 28th Street, Minneapolis, Minnesota, prepared by Peer Engineering, Inc., MDA Case File No. 95-0100B, dated October 2007 to February 2014 (Hiawatha Groundwater Monitoring Reports).

Phase I Environmental Site Assessment, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota, prepared by Braun Intertec, Project Number B1500394, dated April 6, 2015 (2015 Phase I ESA).

Phase II Environmental Site Assessment, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota, prepared by Braun Intertec, Project Number B1500394, dated April 21, 2015 (2015 Phase II ESA).

Test Pit Investigation Report, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota, prepared by Braun Intertec, Project Number B1500394.00, dated January 5, 2016 (2016 Test Pit Investigation Report).

Additional Investigation Report, Roof Depot Site, 1860 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota. Prepared by Braun Intertec, MPCA Project No. VP34190, and MDA Project No. PTH101093455, dated May 15, 2020 (2020 Additional Investigation Report).

Public health assessment for south Minneapolis neighborhood soil contamination NPL site, Hennepin County, Minnesota. Agency for Toxic Substances and Disease Registry (ATSDR). EPA Facility ID: MNN000509136. July 29, 2008. (available at: https://www.health.state.mn.us/communities/environment/hazardous/docs/sites/hennepin/smplsp_ha0708.pdf)

CH2M Hill, 2007. *Surface soil statistical evaluation*. South Minneapolis Soil Contamination Site, Minneapolis, MN. WA No. 016-RICO-B5By, Contract No. EP-S5-06-01

Appendix A: Figures and Tables

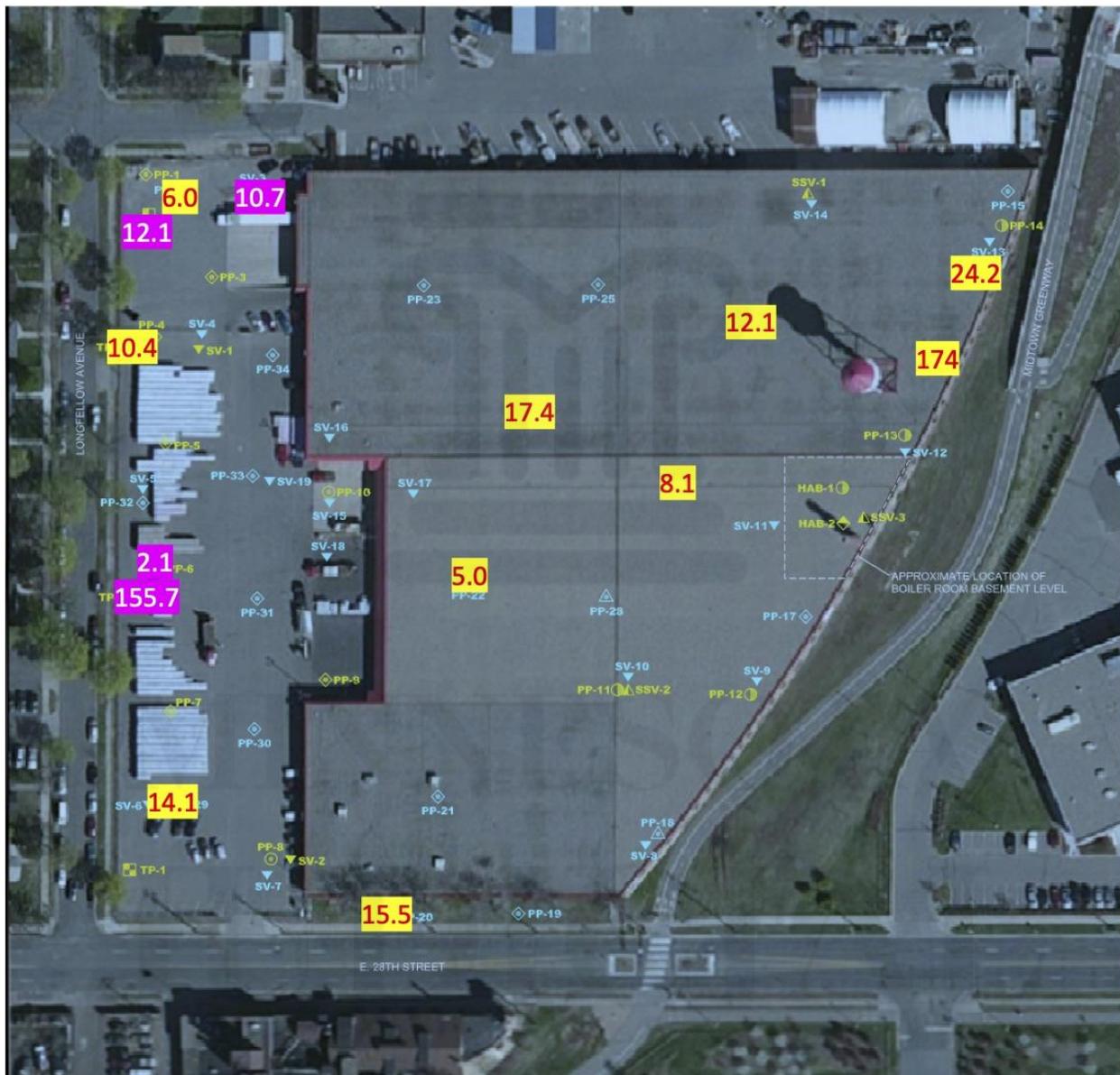


Figure 1. Roof Depot Contamination. Numbers with yellow backgrounds represent soil arsenic concentrations (ppm) that exceed the MPCA Screening Soil Leaching Value (5.8 mg/kg) at those locations under the Roof Depot building. Numbers with pink backgrounds represent concentrations (ppm) of BaP equivalents (carcinogenic polycyclic aromatic hydrocarbons) that exceed the MPCA Screening Soil Leaching Value (1.4 mg/kg) under the bituminous parking areas next to the Roof Depot building.

| Concentration (mg/kg) | < 10 | 10-20 | 20-30 | 30-60 | 60-95 | >95 | Total |
|--------------------------|-------|-------|-------|-------|-------|------|-------|
| Total Samples | 5177 | 417 | 232 | 349 | 141 | 195 | 6511 |
| Total Properties | 2598 | 302 | 127 | 231 | 120 | 197 | 3575 |
| % Properties | 72.7% | 8.4% | 3.6% | 6.5% | 3.4% | 5.5% | |

Table 1. Residential soil arsenic concentration ranges in the South Minneapolis Residential Soil Contamination Superfund Site. Soils ranged from 0.11 to 2,880 ppm. Initial remediation efforts removed contaminated soil in the 197 properties where arsenic concentrations exceeded 95 ppm. The remediation goal was later reduced to 25 ppm and residences having arsenic concentrations that exceed that remediation goal were also remediated.

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