

Health Consultation

Four Metals in Soil on Off-site Residential Properties

FORMER NL INDUSTRIES SITE
(a/k/a NL INDUSTRIES INCORPORATED/BUFFALO PLANT)

DEPEW, ERIE COUNTY, NEW YORK

EPA FACILITY ID: NYD980531636

JUNE 8, 2004

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

Health Consultation: A Note of Explanation

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

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

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Prepared by:

New York State Department of Health
Center for Environmental Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

The Agency for Toxic Substances and Disease Registry (ATSDR) produced this Health Consultation to assist the United States Environmental Protection Agency (US EPA) in the evaluation of soil sampling data in off-site residential properties downwind, to the north, of the former NL Industries Site in Depew, Erie County, New York. The purpose of this Health Consultation is to evaluate the public health implications of exposure to four metals (beryllium, cadmium, chromium, and nickel) in the contaminated residential soils, and to determine whether remedial action is necessary because of contamination by these metals. This consultation is an extension of the Health Consultation performed on the same residential area for investigation of lead contamination from the same site [1]. The New York State Department of Health (NYS DOH) prepared this Health Consultation under a cooperative agreement with ATSDR. A draft of this Health Consultation was released for public review and comment from April 13, 2004 through May 7, 2004. No comments were received.

A. Site Description and History

The former NL Industries site at 3241 Walden Avenue in the Village of Depew is an inactive lead processing facility formerly operated by National Lead Company, which was later renamed NL Industries. It currently houses Metro Waste Paper Recovery, a subsidiary of Norampac of Kingsey Falls, Quebec. According to state, local and company records, metal-working operations at this location started in 1872 and ceased in 1972. Past on-site activities have included brass foundry operations, smelting operations carried out in the early 1900's, and the processing of metal alloys used for ball bearing surfaces. The rectangular 7.5-acre site contains one main building located on the east side of the property. The site is immediately bordered by an active, high speed CSX railroad track on the south and commercial parcels on the west and east. Across Walden Avenue to the north lies a residential area of single family homes and several multi-family dwellings. In April 2000, after the purchase of Metro Waste Paper Recovery and subsequent acquisition of the 3241 Walden Avenue property, Norampac applied to enter the New York State Department of Environmental Conservation (NYS DEC) Voluntary Cleanup Program (Site #V00353-9) to allow Norampac to address on-site contamination from past NL Industries operations on the site.

In August 2001, XCG Consultants, on behalf of Norampac, conducted surface soil sampling for metals analysis of 28 samples from an area of 12 residential properties. In April 2002, 51 surface and 43 subsurface samples were collected from 21 residential properties (generally, adjacent properties farther downwind of the site), one of which was previously tested in 2001. This sampling occurred with the oversight of NYS DOH and NYS DEC staff.

The results from these samples indicated surface soil contamination on residential yards downwind, across Walden Avenue and to the north of the facility. Initially, based on the levels detected in these samples, in relation to normal background levels and public health comparison values, lead was the only identified contaminant of concern. This Health Consultation was

undertaken at the request of the US EPA to provide a further review of four other metals (beryllium, cadmium, chromium, and nickel) in the samples.

B. Site Visit

Staff from the NYS DOH and NYS DEC visited the former NL Industries site and surrounding residential area many times during 2001 and 2002 and hand-delivered the public review copy of the Health Consultation on lead contamination to residents of the affected area in 2003. The site is on Walden Avenue west of Transit Road, both of which are heavily traveled corridors. Predominate land use is commercial and industrial, with a large residential area to the north across Walden Avenue.

Chain-link fencing encloses the former NL Industries parcel, with a sliding gate allowing Metro Waste Paper Recovery truck traffic to enter and exit the property. A building occupies nearly 1.5 acres of the site and is in fair condition with paving immediately surrounding it. The central portion of the site serving as the truck yard is covered with stone, and the western portion is covered with clean imported soils; both coverings were part of remedial measures performed in 1999 to prevent off-site airborne migration of contaminated dust to downwind residential properties. The soil cover supports vegetative growth that further minimizes dust migration. The paved areas are in good condition and also serve to minimize exposure to contaminated soils.

NYS DOH staff inspected the downwind residential areas, across Walden Avenue and to the north, during the 2001 and 2002 residential soil sampling events and had the opportunity to speak with several residents. All residential yards appeared well maintained, and many residences have extensive flowerbeds and evidence of outdoor recreation (picnic tables, chairs, pools, play sets). Most properties had bare spots in the grass, especially under large trees and in shady areas. Areal distribution of lead and other metals contamination noted in the residential soil sample results suggests the former NL Industries site as an upwind source based on prevailing winds which come from the southwest.

C. Demographics

According to 2000 United States Census Bureau data, approximately 16,500 people live in the Village of Depew. Of the 16,500 persons, 98.7% are Caucasian, with less than one percent each African-American, Native American, Asian, multi-racial, Hispanic, and classified as other.

DISCUSSION

A. Environmental Contamination

In August 2001, a consultant for Norampac, under the supervision of the NYS DEC and NYS DOH took 28 surface (0 to 2 inches below any vegetative cover) soil samples from 12 residential yards. In April of 2002, fifty-one surface and forty-three subsurface (6 inches to 8 inches below ground surface) soil samples from twenty-one residential properties downwind of the former NL Industries site were collected. A summary of the sample results is shown in Table 1.

Because surface sample values represent the levels of contaminants with which human contact is

most likely, these data are presented in the summary. Results from each sampling period are shown separately because the analytical Method Detection Limit (MDL) changed for three metals between the periods, affecting data consistency. The change in MDL from 0.2 mg/kg to 1.0 mg/kg for cadmium resulted in 20 reports of no detection, the only such reports in this study. Where there are duplicate samples, the results from the tests are averaged, and the average value is counted as one sample result. Cadmium values were reported as 1.0 mg/kg in cases where the measurement was less than the Method Detection Limit.

Beryllium was found in all samples [2,3] in a range of 0.3-0.7 milligrams/kilogram (mg/kg) with a geometric mean of 0.5 mg/kg in both sample periods. These mean and maximum values are consistent with typical background level in soil in New York State (<1.0-1.5 mg/kg) and below the health comparison value of 390 mg/kg.

Cadmium was found in all samples [2,3] above detection limit in 2001 samples, and in 31 of 51 samples in 2002. The samples ranged from 0.4-4.8 mg/kg of cadmium with geometric means of 1.4 mg/kg, in the first sampling occasion and 1.3 mg/kg in the second. The geometric means are consistent with normal background levels, although a few samples slightly exceeded background levels. The average and maximum values were below the health comparison value of 28 mg/kg.

Chromium was found in all samples [2,3] in both periods in an overall range of from 11 to 45.7 mg/kg. The geometric mean was 20.2 mg/kg in 2001 and 18.6 mg/kg in 2002. The geometric means and all sample points were within the range of the typical background levels. The maximum values and the geometric means were below the non-cancer comparison value of 16,000 mg/kg. This value is a default skin irritation threshold used when the calculated health comparison value exceeds the level that might cause skin irritation. We did not assume that the chromium detected in these soil samples was the more toxic hexavalent form. Hexavalent chromium is generally produced by industrial processes and a review of information about NL Industries [4] indicated that chromium was not used in their industrial processes.

Nickel was found in all 2001 samples [2] and in 50 of 51 samples from 2002 [3] at a level above the Method Detection Limit. The overall range of sample results was from 3 to 58 mg/kg, and the geometric means were 20.4 and 20.3 mg/kg respectively for the first and second sampling periods. These means are within the typical background level range, and 16 of the 79 total samples were above the high end of the typical background levels (25 mg/kg). These average and maximum values are below the non-cancer comparison value of 3900 mg/kg.

B. Exposure Pathways

Observations made during the NYS DOH site visits indicated that exposure to site-related contaminants is likely in residential yards. Residents maintaining gardens and flower beds or using their yards for seasonal recreational purposes could be exposed to levels of these four metals from incidental ingestion of contaminated soils and/or inhalation of contaminant-containing soil or dust.

C. Public Health Implications

Because levels of beryllium, cadmium, chromium, and nickel in soils of residential yards are below health comparison values, adverse health effects from exposure to these four metals in the soil are not expected.

D. Community Health Concerns

Several residents have inquired about the health effects of lead and other metals in the soil and the appropriateness of performing maintenance or landscaping activities on their properties. NYS DOH staff have spoken with residents by telephone and in person to answer their questions and have provided letters that share information and advice. Area residents, public officials and technical personnel from several regulatory agencies reviewed the health consultation [1] that analyzed and reported the health risks associated with lead contamination in residential yards prior to its issuance in September 2003. That health consultation and letters to homeowners and residents whose yards contain lead at levels above the health comparison values provide recommendations for minimizing potential contact with lead-contaminated soil. Also, the health consultation recommended that measures be taken to prevent or reduce human exposure to the lead-contaminated soils. Because levels of the four metals analyzed in this study are below health comparison values in residential yards, additional guidance related to these four metals is not necessary.

Some residents expressed concerns about possible contamination of groundwater. Groundwater contamination is limited to the former NL Industries site, and no off-site groundwater impacts have been noted. The area is served by public water; therefore, exposure to contaminants in groundwater is not expected. No other community health concerns have been brought to the attention of NYS DOH or NYS DEC.

A draft of this Health Consultation was released for public review and comment from April 13, 2004 through May 7, 2004. No comments were received.

CONCLUSIONS

The levels of beryllium, cadmium, chromium, and nickel in soil in residential yards downwind of the former NL Industries site are below health comparison values. Therefore, based on the sampling data, exposure to these metals in soil is no apparent public health hazard and no public health actions are needed.

RECOMMENDATIONS

The NYS DOH, in consultation with the ATSDR, recommends that no additional remedial actions (beyond those already planned because of lead levels) be taken on the sampled residential properties based on the sample results for these four metals.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan for the off-site residential properties downwind of the former NL Industries site contains a description of actions taken or to be taken by ATSDR, US EPA and/or the NYS DOH following completion of this health consultation. There were no public health hazards identified in this health consultation from the four metals reviewed. Therefore, the Public Health Action Plan is as follows:

1. Following agency review, residents were provided with a copy of this Health Consultation.

Certification

This Health Consultation was prepared by the New York State Department of Health (NYS DOH) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It has been produced in accordance with approved methodology and procedures existing at the time the Health Consultation was begun.

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The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Health Consultation and concurs with its findings.

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ATSDRREFERENCES

1. ATSDR (Agency for Toxic Substances and Disease Registry). 2003. Health Consultation, Off-site Residential Properties, Former NL Industries Site, Village of Depew, Erie County, New York.
2. XCG Consultants. 2001. Off-site Surficial Soil Investigation, Residential Properties Near 3241 Walden Ave., Depew, NY, December.
3. XCG Consultants. 2002. Final Supplemental Off-Site Surficial Soil Investigation. Residential Properties Near 3241 Walden Avenue, Depew, New York, July.
4. XCG Consultants. 2002. Final Draft Remedial Investigation/Feasibility Study Former NL Industries Site, 3241 Walden Avenue, Depew, New York, July.

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Table 1
Summary of Sampling Results

Table 1
Summary of Sampling Results, Typical Background Levels and Public Health Assessment Comparison Values
for Four Metals Detected in Surface Soil at Offsite Residential Properties, NL Industries, Depew, Erie County, NY
Two Sampling Periods: 1st on August, 2001 (28 samples), 2nd on April, 2002 (51 samples)
[All values in milligrams per kilogram (mg/kg)]

Sample Period	Geometric		Arithmetic		Range of		Number of		Typical	Health Comparison Values***		
	Mean*		Mean*		Detection		Detections		Background	Noncancer****	Basis	Cancer
	1st	2nd	1st	2nd	1 st	2nd	1st	2nd	Level**			
Beryllium	0.5	0.5	0.5	0.6	0.3 - 0.6	0.3 - 0.7	28	51	< 1 - 1.5	390	EPA RfD	none
Cadmium	1.4	1.3	1.6	1.5	0.4 - 4.8	<1.0 - 4.0	28	31	< 0.5 - 1.5	28	NYS RfG	none
Chromium	20.2	18.6	21.6	19.3	13 - 45.7	11 - 43	28	51	10 - 60	16,000 ^a	EPA RfD	none
Nickel	20.4	20.3	23.1	21.2	3 - 58	11 - 40	28	50	< 5 - 25	3,900	EPA RfD	none

* The geometric mean is often considered a more appropriate measure of the “average” value than the arithmetic mean for environmental samples. This is true when the majority of values are grouped at the low end of the range, and there are a few high readings that skew the arithmetic mean to the high side (log normal distribution). However, for this sample data, the geometric and arithmetic means are similar.

**** References:**

Clarke, L., C. Hudson, G. Laccetti, W. Stone and B. Ungerman. 1985. Study of metal concentrations in soil and surface sand of seven New York counties. Albany: New York State Department of Health, Bureau of Toxic Substance Assessment. September 1985.

Connor, J., N.F. Shimp and J.F. Tedrow. 1957. A spectrographic study of the distribution of trace elements in some podzolic soils. Soil Science 83: 65-73.

Dragun, J. 1988. The Soil Chemistry of Hazardous Material. Hazardous Materials Control Research Institute. Silver Springs, Maryland.

McGovern, E.C. 1988. Background concentrations of 20 elements in soils with special regard for New York State. Albany, NY: New York State Department of Environmental Conservation.

Seiler. 1988. Handbook of Toxicity of Inorganic Compounds. Page 632.

Shacklette, H.T. and J.G. Boerngen. 1984. Element concentrations in soil and other surficial materials of the conterminous United States. U.S. Geological Survey Professional Paper 1270. Washington DC: U.S. Government Printing Office.

Table 1, continued

***** Comparison Values (CV):** CVs are used as screening tools for evaluating the health significance of environmental sampling results. The cancer comparison value is the concentration that is estimated, on long-term exposure, to result in an increased lifetime cancer risk of one-in-one million. The noncancer comparison value is an estimate of a concentration that is likely to be without an appreciable risk of noncancer health effects on long-term exposure.

Noncancer comparison values: assume a 13.2 kg child ingests 80 milligrams of soil per day, 5 days per week, 6 months per year and 40 milligrams of indoor dust with an outdoor soil source per day, 7 days per week, 12 months per year.

****** Basis for Comparison Values:**

Environmental Assessment

EPA RfD: United States Environmental Protection Agency Reference Dose

NYS RfG: New York State Department of Health Risk Reference Guideline

^a – Because the chronic comparison value for this contaminant in soil may not protect against skin irritation, a recommended default skin irritation threshold level of 16,000 milligrams per kilogram should be used, provided that the actual threshold level of the contaminant for skin irritation is not known.