ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Public Health Assessment for

NORLITE CORPORATION
628 SOUTH SARATOGA STREET
COHOES, ALBANY COUNTY, NEW YORK
EPA FACILITY ID: NYD080469935
DECEMBER 2, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment 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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PUBLIC HEALTH ASSESSMENT

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Prepared by:

U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Exposure Investigation and Consultation Branch

Foreword

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the Superfund law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, the U.S. EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment process allows ATSDR scientists and public health assessment cooperative agreement partners' flexibility in document format when presenting findings about the public health impact of hazardous waste sites. The flexible format allows health assessors to convey to affected populations important public health messages in a clear and expeditious way.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might be exposed to it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data are needed.

Health Effects: If the review of the environmental data shows that people have or could be exposed to hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high-risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicological and epidemiologic studies and the data collected in disease registries, to evaluate the possible health effects that may result from exposures. The science of environmental health is still developing, and sometimes, scientific information on the health effects of certain substances is not available.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals, and community groups. To ensure that the report responds to the community's health concerns, an

early version is also distributed to the public for their comments. All the public comments that relate to the document are addressed in the final version of the report.

Conclusions: The report presents conclusions about the public health threat posed by a site. Ways to stop or reduce exposure are recommended in the public health action plan. ATSDR is primarily an advisory agency, so these reports usually identify what actions are appropriate to be undertaken by EPA or other responsible parties. However, if there is an urgent health threat, ATSDR can issue a public health advisory to warn people of the danger. ATSDR can also recommend health education or pilot studies of health effects, full-scale epidemiology studies, disease registries, surveillance studies, or research on specific hazardous substances.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Manager, ATSDR Record Center Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E-60), Atlanta, GA 30333.

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Summary and Statement of Issues

A representative of the community action group Citizens Halting Risks of Norlite's Industrial Contaminants (CHRONIC) and Robert G. Prentiss, the Assemblyman for the 109th District of the state of New York requested that the Agency for Toxic Substances and Disease Registry (ATSDR) evaluate the community's exposure to contaminants from the Norlite facility [1,2]. Norlite Corporation is located in Albany County at 628 South Saratoga Street, Cohoes, New York. Members of the community are primarily concerned about their exposure to metals and certain organic chemicals in the air, water, and soil resulting from burning hazardous waste as fuels in the company's two aggregate kilns. We have also included in our review data that are available on particulate matter, dioxins, and furans.

Discussions with staff from the New York State Department of Environmental Conservation (NYSDEC) revealed that the Norlite facility in the past was very dusty and that the kilns burned coal and emitted black soot [3]. Prior to environmental regulations, in the early 1950's and 1960's, the facility lacked the current pollution control equipment and operating conditions and the community was exposed to more emissions from Norlite than at present. However, we were not able to find specific sampling or monitoring data to document which chemicals were present in the particulates and soot that were observed in the community. It is therefore not possible to determine if adverse health effects might have occurred due to past emissions from Norlite.

Data from a series of trial burns during 1999 through 2001 and in 2004 indicate that current stack emissions from the facility are below levels in the residential areas around the facility that are known to cause adverse health effects. This conclusion is based on (1) modeling of stack emissions from the two lightweight aggregate kilns and (2) facility compliance with state-imposed operating conditions derived from the stack tests. Air sampling data from nearby residential areas are not available for comparison with the modeled values.

Analyses of shale and clinker (raw materials and product) indicate that fugitive particulates from the processing of these materials may expose nearby residents to particulate concentrations that could cause health effects. However, existing data are insufficient to give a clear answer; therefore, ATSDR recommends air sampling at the fence-line or in residential areas under conditions likely to produce maximum fugitive emissions.

Dust control is extremely important at Norlite because their processing equipment creates dust. NYSDEC has an on site compliance monitor at Norlite to make sure they are complying with their permits and dust control plan [4].

Background

Community Health Concerns

In September 2003, a representative of CHRONIC requested that ATSDR perform a public health assessment for their community [1]. The letter stated that occupants of 14 homes within a mile of the site reported the following health problems: asthma, Bowen's disease, cancer, chronic headaches, skin rashes and sores, bronchitis, respiratory problems, sinus problems, and emphysema. The community is concerned about exposure through the air, surface water, and soil pathways to the chemicals antimony, arsenic, barium, benzene, beryllium, cadmium, chlorine, chromic acid, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and toluene.

The letter from CHRONIC informed us that an elementary school (Maplewood School) is approximately 1 mile from the site and a low-income apartment complex is next to the fence line of the facility. Members of CHRONIC told us that they are also concerned about many children with attention-deficit hyperactivity disorder in the elementary school.

In December 2003, Assemblyman Prentiss wrote ATSDR on behalf of his constituents living in the Maplewood neighborhood of Colonie [2]. He requested that ATSDR conduct a health assessment of the communities surrounding the Norlite facility and a block-by-block study of residents with ailments. He said residents in this area have voiced numerous complaints about (1) repeated exposure over the years to black dust from the burning of hazardous waste, (2) heavy truck noise late at night, (3) pollution of a local stream where presumably treated wastewater is sent, and (4) possible airborne toxic contaminants. They have also reported (5) continual coatings of dust on their homes and vehicles, (6) a high rate of cancer cases for their zip code, (7) an increase in respiratory problems such as pediatric asthma and emphysema, plus (8) sores and skin rashes from contact with contaminated water.

During the public comment period on a draft of this document, community members also expressed concerns about non-Hodgkin lymphoma, multiple myeloma, autism, and silicosis.

ATSDR Approach

ATSDR's approach to evaluating sites is first to gather information about the chemicals, their location and concentrations in the environment, and ways in which local residents could be exposed to the chemicals. If we determine that people are exposed to chemicals from the site, we then evaluate the toxicology of those chemicals to determine if they can cause adverse health effects at the concentrations to which the residents are exposed. Finally, we provide a summary of the data reviewed and our conclusions and recommendations in a document called a public health assessment.

Public Health Assessment Process

Review available environmental data at a site.

Identify ways people might come in contact with chemicals, such as through water, air, soil, sediment, etc.

Determine if people are being exposed.

If exposure occurred, determine if its effect on public health:

- Is not harmful;
- Cannot be determined; or
- Is harmful.

Provide conclusions and recommendations.

If ATSDR concludes that people are exposed to chemicals at concentrations expected to cause adverse health effects, the health assessment will contain our recommended public health follow-up actions. Actions may include such things as conducting an exposure investigation to determine more accurately the concentration of chemicals to which residents are exposed, additional toxicological research, educational seminars for local physicians on how to evaluate and treat patients who may be exposed to chemicals from the site, or other health studies and activities as deemed appropriate. If we conclude that the concentrations of site-related chemicals in residential areas are not likely to cause adverse health effects, then further health actions are not usually recommended.

Factors Considered in Determining Exposure

Who are the exposed people?
How were these people exposed?
How often did the exposures occur?
How much of the chemical were people exposed to?
How long did the exposures last?

If you are ***not exposed*** to a chemical, ***It won't make you sick.***

In response to the two requests we received concerning the Norlite site, ATSDR evaluated the available environmental data and information provided by the petitioners, Norlite Corporation, and the state of New York. This document discusses the information we reviewed and our conclusions and recommendations.

Site Location

The Norlite plant is located in Albany County. Approximately 40 acres of the site are within the city limits of Cohoes. The facility straddles the line between Cohoes and Colonie. It is one mile west of the Hudson River and about one mile south of the Mohawk River, where it joins the Hudson. The area immediately north of the plant is a mixed residential and commercial area of the city of Cohoes. A railroad track forms the eastern boundary of the site, followed by a small mixed residential, commercial, and industrial area between the railroad and state Route 32 and Interstate 787 (I-787). The Hudson River lies further to the east and the city of Troy is on the far side of the river. About a mile of undeveloped land is on the west-side of the plant, followed by agricultural land, a farm with about 30 dairy cattle, and some new subdivisions. There is another farm about 1 mile north of the dairy farm [5]. See Figure 1.

Undeveloped land lies immediately south of the plant followed by the city of Watervliet and Route 7. Further to the south are Interstate 90 and the northern suburbs of Albany. On the southeast corner of the plant are residential and commercial areas close to the major highways: I-787, Route 7, and Route 32. On the southwest corner are residential and undeveloped lands. Land use within a 3-mile radius of the plant is predominantly rural [5].

Approximately 15,462 people live within a 1-mile radius of the site, according to the 2000 US Census. Several homes and low-income apartment buildings are within 20 to 100 feet from Norlite's fence line. The population of the area is predominantly white (92.7%) with 3.2% black and 2.5% Hispanic or Latino. See Figure 2 for additional demographic information.

From the plant to the Hudson River, the land is relatively flat; however, there are several small hills north and west of the site. Small hills and ridges occur on both sides of the Hudson and Mohawk rivers and ground elevations are generally between 50 and 300 feet above sea level within 1-2 miles of the plant. About 5 miles northwest of Norlite, the elevations rise to 600-700 feet. The prevailing winds blow up and down the Hudson River Valley. However, about 25% of the time each year winds blow towards the east/southeast where the Troy air monitoring station is located. Terrain elevations were taken into account in the modeling that was preformed [5].

Facility Description

The Norlite Corporation aggregate plant has been in existence since 1956. It is a 221 acres site located on the southern boundary of the city of Cohoes, New York. Norlite has been issued permits by the state for (1) incineration and storage of hazardous waste (RCRA permit), (2) water discharges (SPDES permit), (3) air emissions, and (4) mining. The company mines shale from on-site quarries and transports it to the plant area using dirt-moving equipment and dump trucks. The shale is heated in two dry-process rotary kilns to produce expanded shale aggregate, also know as lightweight aggregate, that is used in the manufacture of lightweight building materials and construction products [6,7].

Both kilns are 11 feet in diameter and consist of a steel shell lined with 6-inch refractory brick. Refractory brick is an insulating material similar to firebrick in a fireplace, and serves the same purpose. Kiln #1 is 175 feet long and kiln #2 is 180 feet long. Each kiln has a rated capacity of about 25 tons per hour of clinker (expanded shale aggregate). Fuel oils (#2, #4, or #6), used oil, natural gas, and liquid low-grade fuel (LLGF) are used to heat the burning zone of both kilns to 2200ºF–3000ºF. LLGF varies from batch to batch because it is a mixture of organic waste materials that have fuel value, such as used solvents and liquid hazardous wastes. Norlite uses natural gas, fuel oils, or specification used oil during start up and shut down and as needed during production to maintain the required operating temperature. Solid waste materials are not burned in the kilns.

The burning zone of the kilns is 2200ºF to 3000ºF.

The shale is fed into the kilns at the opposite end from where the fuels are fed (known as countercurrent flow). The rotating kilns are on a slight decline so that the shale tumbles slowly down the length of the kiln toward the flame. The temperature of the shale raises as it moves toward the flame until the trapped internal gases expand (like popped corn), thus creating voids in the clinker (the product) that is lightweight when it cools.

Both kilns have identical emission control systems consisting of both wet and dry devices for the collection of particulate matter, hydrogen chloride (HCl), metals, and other gaseous species. The gases leaving the kilns (flue gas) first pass through a multiple cyclone unit (multiclone) to remove large particulate matter. A cyclone causes the gases to spin in a spiral pattern, slinging the larger, heavier particles against the walls of the unit where they slide to the bottom and are removed. These large particles, called “fines,” are transferred by conveyors to the two smaller silos where the fines are stored. The multiclone is similar in action to a lettuce spinner that slings the water from the lettuce head so that the water runs down the sides and accumulates in the bottom.

The flue gas then passes through an air to air heat exchanger that lowers the gas temperature from approximately 1000ºF to 400ºF–460ºF. The heat exchanger works like an air conditioner except that ambient air rather than Freon is circulated through the coils to cool the hot combustion gases. If necessary, ambient air is also injected at the heat exchanger outlet to cool the flue gas to 400ºF (or less) before it enters the baghouse [6].

The baghouse (also called a fabric filter) operates much like a vacuum cleaner. A fan (induced draft fan) draws the flue gas through fabric bags made of Teflon-impregnated woven fiberglass so they will not catch fire at the 400ºF operating temperature. Lime is injected into the flue gas immediately before it enters the baghouse to control sulfur dioxide and to neutralize any sulfuric acid and hydrogen chloride mist that may be in the flue gas. The baghouse contains many rows of these bags to continuously filter the flue gas. To keep the bags clean, they are “pulsed” or shaken one row at a time. The baghouse dust is collected and stored in the large silo [6]. Baghouses are designed to remove very small particulates.

The flue gas next enters a venturi high-energy wet scrubber for removal of any remaining acid gases. A mixture of water and sodium carbonate or sodium hydroxide (maintained at pH 7.9 or higher) is sprayed through nozzles at the top of the venturi scrubber to neutralize the acid gases and effectively wash any remaining particulates out of the flue gas [6].

To capture entrained droplets of caustic solution the flue gas next passes through a mist eliminator. The mist eliminator consists of baffles and mesh pads that are flushed with water to washed away the solids [6].

The scrubbed flue gases exit the pollution control system through a 48-inch diameter fiberglass-reinforced plastic stack the top of which is 120 feet above the ground. The stack gases exit at 130ºF and contain 15% moisture. Each stack has two access platforms for stack sampling [6].

The clinker (expanded shale) is ground and screened to make two sizes of aggregate (⅜ inch and ¾ inch). Norlite's product, called block mix, is made in the Finishing Plant, the large building near the kilns. Block mix is a custom blend of aggregate and "dust" (fines, baghouse dust, and wastewater sludge) and water that is blended per each customer's specifications. It is typically 88% dust and 12% aggregate. Block mix is stored in piles on the south side of the silos near the railroad tracks. Block mix that is scheduled for shipment by rail cars or trucks is stored in these "short-term piles." Block mix that is being stock piled for later shipment is moved from these short-term piles to a long-term storage pile near the truck entrance to Norlite.

Fuel Storage and Blending

Liquid low-grade fuels (LLGF) are stored in storage tanks or a container storage area, both of which are diked to contain spills that might occur. Each load of LLGF is sampled and analyzed upon receipt. The tank is locked while being filled and is kept locked until the PCBs, metals, specific gravity, and halogen contents have been established and shown to be below permit limits [6]. The fuels are then sent to the kilns in pipes that are enclosed in an overhead tunnel which provides containment should a leak occur.

Waste Generation and Handling

Fines, the large particulates removed from the flue gas, accumulate in hoppers under the multiclones. The smaller particles removed in the baghouses, called dust; also accumulate in hoppers under the baghouses. The fines and dust from both sets of hoppers are air conveyed to separate silos and later combined with the lightweight aggregate from the kilns to become the final Norlite product [6]. The fines and dust are wastes that are beneficially used to make a product.

The caustic water solution used in the venturi scrubber and the water flushing the pads in the mist eliminator flow together into the recycle tank and are reused in the venturi scrubber. To prevent salt build-up that would plug the spray nozzles in the venturi, a portion of the liquid is discharged to the Norlite wastewater treatment plant. City water is added to the recycle tank to maintain a constant level [6]. After the wastewater is treated and tested as required by their state water discharge permit, Norlite discharges the wastewater through a pipe into the Mohawk River [8]. Sludge which forms in the wastewater treatment plant is filtered from the water and blended with the aggregate, fines, and bag house dust to make block mix.

Sanitary wastes flow directly to the sanitary sewer; they are not treated on site. Storm water runoff and quarry water are discharged to Salt Kill Creek as allowed by Norlite's water discharge permit [8].

Four gaseous waste streams are generated in the plant area. The first stream is the vent from the LLGF storage tanks. Any gaseous vapors produced during the filling of the storage tanks are

vented through a closed loop system to the burner end of the kilns. The second stream comes from the drum handling operations where drums are emptied via a vacuum system. The vacuum system gases combine with general drum area vapors that are collected in the negative ventilation system. This drum process-vent stream is mixed with ambient air and is used as the primary combustion air for the burners in the kilns [6]. Tank trucks are parked so the tank hatch opens under a hood for sampling and inspection. Vapors from the open hatch are drawn into the hood and through a carbon filter to remove the organic chemicals present in this third gaseous waste stream.

The fourth gaseous stream is the flue gas generated in the two kilns. As discussed earlier, this waste stream goes through a series of air pollution control devices before it is discharged through the stacks into the air 120 feet above ground level.

Discussion

This section discusses the exposure pathways for the site, that is, how chemicals from Norlite get off-site where people may be exposed to them and whether those exposures could cause adverse health effects. The three exposure pathways the community mentioned are air, water, and soil. The air pathway does not appear to be a public health hazard. Modeling of stack emissions measured during tests in 1999 through 2001 and in 2004 shows that ground-level concentrations in the neighborhoods around the plant would not be at concentrations that would cause health effects. The soil, sediment, and water in Salt Kill Creek are not likely to be a health hazard if there is skin contact or it is accidentally ingested. However, additional data are needed on the concentrations of particulates in the air to evaluate the public's exposure to fugitive dust, which blows off site. The following sections discuss in detail each exposure pathway.

Air Pathway

The ambient air is impacted by the Norlite facility by emissions from their two kiln stacks and by fugitive emissions from blasting, mining, hauling, and processing of shale; the storage and processing of waste-derived fuels; and the processing, hauling, and storage of their products. This section discusses separately stack emissions and fugitive emissions.

Stack Emissions

To determine the potential impact of Norlite stack emissions on the residents and area around the plant, NYSDEC required Norlite to conduct a series of test burns on both kilns and prepare a multi-pathway risk assessment [5]. EPA risk assessment protocol requires the use of models to predict the maximum-ground-level concentrations of stack emissions at various locations around a plant. ATSDR staff reviewed the Norlite Corporation 2002 Update Report, Multi-pathway Risk Assessment, Light-Weight Aggregate Kilns [5]; we agree with the New York State Department of Health (NYSDOH) and NYSDEC staff that the report provides a reasonable estimate of the impact of the Norlite stack emissions on the community.

During March to July 2004, stack emissions of both kilns were retested to determine the operating conditions necessary to meet the new EPA regulations for hazardous waste combustors—the MACT rules, or the maximum achievable control technology requirements under the Clean Air Act [9].

During 1999–2001 and again in 2004, several sets of test burns were conducted to determine the operating conditions necessary for each kiln to meet the state and federal hazardous waste regulatory standards. The test burns were conducted using worst-case operating conditions, a fact that is evident because the company failed to meet the regulatory standards during the first two sets of test burns and had to keep adjusting their operating conditions until they demonstrated during the third test the operating conditions necessary to comply with the regulations. NYSDEC used the operating conditions from the third set of 1999–2001 trial burns to set permit conditions to assure that the kilns would continuously meet the regulatory limits. Table 1 lists the combined stack emissions for both kilns and the corresponding average ground-level air concentration of each chemical at the off-site location where modeling predicts the highest air concentrations will occur. This maximum impact location is called the maximum exposed individual's residence (MEIR) location, even if no one lives at that location.

A meteorologist at ATSDR reviewed the models and modeling that Norlite did for the 2002 Norlite Risk Assessment [5] and concluded that the modeling results would be appropriate for estimating human exposure via the air pathway. Air dispersion models EPA recommended (ISCST3 Version 99155 and COMPLEX I) were used to project the ground-level concentration of the chemicals detected in the Norlite stack emissions. These models are designed to be conservative and are generally recognized as over-estimating the ground-level air concentrations of stack emissions. Elevations for the area obtained from the US Geological Survey were used to determine the effects of variations in the terrain around the site. Five years of meteorological data from the Albany airport weather station were used to estimate the maximum annual, 24-hour, and 1-hour air concentrations for each of the five years. The 5 yearly maximums were averaged to give the 5-year average ground-level concentrations at the MEIR location. For a more detailed description of the models and input data see Chapter 3 of the 2002 Norlite Risk Assessment [5].

Table 1 compares the maximum ground-level air concentrations to the relevant health screening values for air. The predicted ground-level concentrations of the combined stack emissions from both kilns are below screening levels. Since the levels that cause health effects are much higher than the screening levels, inhalation of stack emissions are not expected to cause adverse health effects.

Table 2 provides the stack data and modeled ground-level concentrations for the two most toxic dioxins and furans (2,3,7,8-dioxin and 2,3,7,8-furan) and the combined toxic equivalents (TEQ) for all dioxins and furans detected in the stack samples. The first 2 rows of the table evaluate the combined emissions for kilns 1 and 2 from the compliance tests used to set the kiln operating conditions. The last 2 rows evaluate separately the maximum concentrations of dioxins and furans measured during the most recent 3 test burns, the 2004 tests. The combined dioxin/furan maximum concentrations measured in the stack emissions in any test of kilns 1 and 2 are less than half the air screening value. We therefore conclude that no adverse health effects would occur in the community from inhalation of the dioxin and furan emissions during these tests. That said, we concur with the NYSDEC and EPA MACT regulations requiring facilities that burn hazardous wastes to operate at conditions that will maintain the dioxin and furan emissions at the lowest achievable levels.

Adverse health effects would not occur in the community from inhalation of the dioxin and furan emissions during the 2004 stack tests.

In the 1999–2001 tests, NYSDEC required the Norlite Corporation to conduct a test burn during which the stack emissions were sampled and analyzed for an extensive list of chemicals. We compared the concentration of each chemical in the stack to its air health screening values. If the concentration in the stack exceeded the relevant health screening value then that chemical was listed in Table 3 to evaluate its ground-level air concentration. Fifteen chemicals required evaluation of their predicted maximum ground-level concentrations. The 5-year maximum predicted concentration of one chemical (1,3-butadiene) exceeded the health-screening values in areas of potential public exposure. A continuous lifelong exposure (70 years at 24 hours/day) to the projected concentration of 1,3-butadiene would cause an inhalation cancer risk of less than 1 person in 100,000. ATSDR considers this exposure a low increased risk and a low probability of developing cancer. The predicted air concentration of 1,3-butadiene (0.26 µg/m^3) is below the EPA Reference Air Concentration (RfC) of 2 µg/m^3 for noncancer health effects; therefore, it is not considered to be a public health concern for either cancer or noncancer health effects.

Table 4 evaluates the 3 chemicals detected in an air sample taken by CHRONIC on October 31, 2003, and sent to Columbia Analytical Services, Inc. for analysis [10]. The air concentrations of the 3 chemicals detected at that time were well below health and environmental comparison values established by ATSDR, EPA, and the State of New York. However, this was a grab sample that only indicates what volatile organic chemicals may have been present in the air at that time. It should not be used to draw conclusions about the general air quality in the area.

Based on modeling of Norlite stack emissions, ground-level concentrations are not a public health hazard.

ATSDR concludes that the estimated ground-level concentrations of Norlite stack emissions are currently not a public health hazard and at the time CHRONIC took air samples in the community in 2003, the chemicals detected were not a health hazard. If the facility complies with their permit conditions, we do not expect adverse health effects due to emissions from the Norlite kiln stacks.

The air in the Albany-Troy-Cohoes area is impacted by emissions from numerous local and distant industries and vehicular traffic. In fact, EPA categorizes the capitol area as a "nonattainment area" due to occasional high ozone levels. The Division of Air Resources of NYSDEC has monitored air pollution levels in Troy since December 1998 as a part of a statewide air toxics monitoring system [11]. NYSDEC found that

One smog alert days, the air in the Cohoes area could cause respiratory health effects.

> Benzene is the one compound that shows significant annual average concentrations above its AGC (annual guideline concentration) at all sites, indicating a ubiquitous source of this compound throughout the state. The principle source of benzene is the automobile, both from direct emissions and related gasoline storage and handling. The concentrations of benzene observed reflect the relative amounts of automobile traffic at the various sites [11].

The Troy monitoring station is located about two miles southeast of Norlite. The air monitoring station is generally upwind from Norlite, but it is downwind about 25% of the time, i.e., when the wind blows from the northeast. Nevertheless, it does not measure the worst-case air impacts from the Norlite plant.

Modeling of the Norlite stack emissions shows that the highest ground-level concentrations will occur at the Norlite fence line north of the plant [5]. The air in the residential areas north and east

of the plant are also impacted by locomotive, car, and truck emissions from traffic on I-787, Route 7, and Route 32 and from truck traffic in these mixed residential and industrial neighborhoods.

Fugitive Emissions

Four types of particulate matter are generated at the Norlite plant: (1) fugitive particulate matter from blasting, mining, transporting, screening, and crushing shale from the quarry (shale fugitives); (2) fugitive particulate matter from the kilns and air pollution control equipment (kiln fugitives), (3) fugitive particulates from clinker or aggregate transporting, processing, and storage (product fugitives); and (4) stack emissions. Stack emissions are discussed in the previous section and in Tables 1-3.

Blasting in the quarry is conducted about once each month. Fugitive particulates from the quarrying and processing (screening and crushing) of naturally occurring shale are generally large, not easily inhaled particulates that would not pose a chemical hazard, but could be a nuisance dust to the community.

Kiln fugitives are likely to be very small particulate, possibly small enough to be inhaled. Kiln fugitives would be analytically similar to baghouse and multiclone dust samples shown in Table 5. Fugitive particulates from the processing and transporting of the clinker or aggregate are generally large and not easily inhaled.

In the public comment draft of this public health assessment ATSDR recommended that "dust and product samples or off-site soil samples be analyzed quantitatively for metals to determine if incidental contact with or ingestion of these materials is a health hazard." In response to that recommendation, in June 2005 NYSDEC sampled the on-site shale, dusts, and product. Because temperatures in the kiln are high enough to destroy organic chemicals (2200ºF to 3000ºF), ATSDR did not recommend that the samples be analyzed for organic chemicals.

Table 5 contains the concentrations of 15 metals that are present in the shale, clinker, block mix, and process dusts (the fines, multiclone and baghouse dusts) at Norlite. NYSDEC staff mixed several samples of each of these materials to obtain composite samples representative of each material. A portion of each composite sample was given to Norlite for analysis. The total metals analytical data from the NYSDEC and Norlite laboratories are shown in Table 5, which compares the concentrations of the 15 metals found in Norlite materials to health comparison values for soil [12,13].

In Table 5, "U" designates metals that were undetected by NYSDEC at the specified concentration and the less-than sign (<) indicates metals undetected by the Norlite lab at its detection limit. The letter "B" identifies data that may not be accurate because those metals were also present in the blank samples analyzed by NYSDEC. Although there may appear to be major differences between the NYSDEC and Norlite laboratory data to someone unfamiliar with analytical chemistry and the difficulty of thoroughly mixing and analyzing solid materials, these results actually complement each other. One lab had higher detection limits for one metal and the other lab had higher detection limits for another. Similarly, one lab found higher concentrations of a metal in one sample while the other lab found higher concentrations of another metal in that sample.

The analyses showed that most of the metals present in the shale, waste oil, and LLGF fuels end up in the multiclone or baghouse dust; therefore, metals are the primary public health concern for inhalation of fugitive particulates. However, neither laboratory found metals at concentrations in these samples known to cause adverse health affects in adults or children—even if they came into contact with these materials. Because access to the site is limited for both adults and children, there is no apparent health hazard from either dermal exposure or ingestion of these materials.

Metals were not at concentrations known to cause adverse health affects in adults or children—even in the unlikely event that they came into contact with these materials.

Table 6 lists the pounds per hour of each metal that Norlite is currently allowed to feed into the kilns in the shale and in the fuel under their current NYSDEC permits. Barium is the metal present in the highest concentration in the shale and in the dust samples (Table 5), but it would have to be 4 times higher than the maximum measured baghouse dust concentration before ATSDR would recommend further evaluation. Zinc is the second highest metal concentration in kiln feed (10.24 lb/hr), but it is also below concentrations of health concern.

We need fence-line air samples. Even though metal concentrations were found to be below levels of concern for their toxicity, the particulate could be an inhalation hazard if concentrations exceed the National Ambient Air Quality Standards (NAAQS). We need to know the concentration of particles smaller than 10 microns and 2.5 microns in diameter. Particles smaller than 10 microns are easily inhaled and irritate the nasal passages and airways; particles smaller than 2.5 microns pass through the bronchi into the alveoli in the lungs and are readily absorbed directly into the bloodstream. Vigilance in maintaining dust control at Norlite is necessary to protect public health because residences are at the boundaries of the Norlite facility.

Additional data are needed to make a public health decision regarding inhalation of fugitive particulates from Norlite.

Members of the community have requested the placement of an air monitoring station in their community to determine if Norlite is causing their health problems and should be shut down. While an air monitoring station in that neighborhood would provide data that could be used to evaluate exposures to the particulate and various chemicals that the residents are breathing, it probably could not distinguish the source of those chemicals. Because of the volume of vehicular traffic in this mixed industrial and residential area, it may not be possible to identify the source of each chemical detected in air samples. Air monitors on the north and east fence lines of Norlite would be more likely to capture impact on the community of the company's maximum stack and fugitive emissions.

Particulate concentrations and particle sizes in the air in residential areas are needed to evaluate the public health hazard of fugitive emissions.

In summary, air quality data from the NYSDEC air-monitoring stations in the capitol region show that this region (which includes Cohoes) has high ozone levels several days a year. Breathing the outside air on those days for an extended period may cause adverse health effects in asthmatics and other individuals with respiratory conditions. However, we do not have sufficient data regarding the air quality in neighborhoods close to the Norlite facility to determine if fugitive emissions from blasting, mining, and materials handling at Norlite or if emissions from upwind sources are major contributors to air pollution in the Cohoes area.

Water and Sediment Pathway

Norlite has permits from the state to discharge process water (after it has been treated and tested) into the Mohawk River. They also have a permit to discharge storm water runoff and groundwater that accumulates in the quarry into the Salt Kill Creek [8]. Because many industries and cities discharge wastewater and storm water into the Mohawk and Hudson Rivers, it is not possible to evaluate the likelihood of public exposure to only the Norlite discharges into those rivers. If the public complies with all state-issued fishing and swimming advisories, there should be no adverse health effects from exposure to the water in the Mohawk and Hudson Rivers during recreational activities.

The petitioners report that the Norlite discharges have caused silt build-up in the Salt Kill Creek. The silt has half filled the culverts under the road and causes flooding in the yards of homes along the creek when there are heavy rains. The NY State Department of Transportation (NYSDOT) dredged the Salt Kill Creek at the culvert (end of Tibbits Place) and 100 feet north and south of the culvert in February 2005. Additional dredging of the creek is anticipated later in 2005. According to the Mayor of Cohoes, Norlite and the City of Cohoes have completed dredging their portions of the creek [14].

It appears that the Salt Kill Creek is not used for recreational purposes and contact with the water seldom occurs. However, members of the community reported occasional, past burning or stinging when they put their hands in Salt Kill Creek while they had cuts or sores. We found no chemical data for water samples taken from the Salt Kill Creek to evaluate the potential for adverse health effects from contact with the creek water. However, NYSDEC and the Norlite Corporation independently conducted macroinvertebrate studies in the Salt Kill Creek in July 2004, and both concluded that the water quality in the Salt Kill Creek is only slightly impacted by Norlite. Two sites were sampled by the state: one immediately upstream of Norlite, and one at the downstream edge of the Norlite property. The water quality at both sites was slightly impacted. Compared to the upstream site, all measurements were slightly worse at the downstream location, but none exceeded Biological Impairment Criteria. The consensus was that both sites exhibited effects of upstream urban runoff and nonpoint-source nutrient enrichment [15,16]. Macroinvertebrates are sensitive to water and sediment pollution and are a good indicator of water quality.

According to macroinvertebrate studies in Salt Kill Creek, the creek is only slightly impacted.

Frequent human contact with the sediments in the Salt Kill Creek does not appear to occur; therefore, sediment is not considered to be a completed exposure pathway. In October 2004, the NYSDOT sampled sediment in the Salt Kill Creek at 12 locations, beginning downstream from Highway 32 (near the Hess service station) to about 800 feet south of Tibbits Avenue [17]. One creek water sample was taken near the culvert at Tibbits Place. The preliminary data from the sediment samples are in Table 7. The sediment samples were analyzed for 7 PCB mixtures, metals (7 leachable and 12 total), 74 semi-volatile and 46 volatile organic chemicals (leachable and total), cyanide, and pH. All samples were neutral to slightly alkaline (pH of 7.3–7.7). No PCBs, semi-volatiles, or cyanide were detected in any of the samples. The only volatile organics detected were acetone and methylene chloride; however, the concentrations were more than 1000 times lower than the levels of concern [18]. These two solvents are commonly used in laboratories and the low concentrations found are probably due to laboratory contamination.

We question the DOT preliminary analytical data for antimony, barium, and mercury. One sample had an antimony concentration 10 times higher than the rest of the samples and the antimony detection limits were high. Two samples had high barium concentrations (2–3 times higher than the other samples), but all barium concentrations were below levels that might be a health hazard. Mercury was only found in the composite samples taken near the Hess service station and those taken downstream from Tibbits Avenue. The mercury concentrations in these two samples were about 10 times higher than the detection limit for the samples taken between these two locations.

ATSDR considers occasional contact with the water and sediment in Salt Kill Creek as no apparent public health hazard.

In summary, because residents are not routinely exposed to the water or sediments in Salt Kill Creek, ATSDR does not consider this a completed exposure pathway. Furthermore, recent macroinvertebrate studies show that the water quality of the stream is only slightly impacted; therefore, ATSDR considers current occasional contact with the water and sediment in Salt Kill Creek as no apparent public health hazard.

Soil Pathway

Numerous spills of small quantities of chemicals have occurred at the Norlite plant [19], but there are no reports of major spills at the Norlite site that could have run off the site and contaminated soils in areas accessible to the public. Contamination of sediments along Salt Kill Creek is addressed in the previous section. This evaluation will only consider off-site soil contamination resulting from air deposition of particulate matter from the site and the public's exposure by skin contact (dermal exposure) and ingestion.

ATSDR concludes that the soil pathway is no apparent public health hazard.

Particulate matter from Norlite settles on the soil and homes in residential areas near the plant, where it is mixed with the soil and particulates that have settled from other industrial and transportation sources in the area (autos, trucks, trains, boats, etc.). The concentrations of the chemicals present in the soil would be lower than their concentrations in the clinker and aggregate samples because the dust that settles on the ground is mixed with naturally occurring soil and particulates from other area sources. There are no data from soil samples taken in residential areas to determine the potential for health effects due to the soil. However, the data (Table 5) indicate that it is unlikely that dust from Norlite settling off-site poses a public health hazard if accidentally ingested or contacted by children, given that contact with the on-site process dusts and products at Norlite itself are not a public health hazard. See the Fugitive Emissions section for a discussion of the data in Table 5.

Community members reported that NYSDEC and Norlite have taken dust samples from automobiles, picnic tables, house siding, and other surfaces in the residential areas near the plant and asked us to review those data. Samples were taken in August 2003, June 2004, and April 2005. These samples are a mixture of all particulate sources in the area—not just Norlite. The dust samples were analyzed visually using a scanning electron microscope (SEM) and energy dispersive x-ray fluorescence (EDXRF) or energy dispersive spectrometer (EDS) and Fourier transform infra-red spectrometer (FTIR) to determine the major elemental constituents. NYSDEC and Norlite contractors agreed about some samples and disagreed about others. ATSDR staff reviewed the reports by both groups and concluded that the data are not suitable for making a public health decision. The analytical methods identified only the major elements

present—not their concentration; therefore, the potential exposure to those elements cannot be determined from the community dust samples taken by NYSDEC and contractors for Norlite.

There are no analytical data to determine if contact with dust or soil can cause adverse health effects. However, based on analyses of product and fugitive dust sources at Norlite, ATSDR has concluded that contact with or ingestion of the dust and soil off-site pose no apparent public health hazard.

In summary, ATSDR staff reached the following conclusions:

Pathway	Time Period		
	Past	**Present**	**Future**
Air	No available data to estimate community exposure prior to installation of air pollution control equipment.	Stack emissions do not appear to be a health hazard in the neighborhoods around Norlite. Insufficient data on particle sizes and concentrations to determine if inhalation of fugitive emissions are a health hazard.	If Norlite operates in accordance with their hazardous waste and air permits and regulations, stack emissions should not exceed health-based standards at nearby residences. Insufficient data to determine if fugitive emissions are a future health hazard
Water & Sediment in Salt Kill Creek	A 1990s macroinvertebrate study showed adverse impact on water quality in the creek and the water was reported to have burned cuts and skin, but no data on past public exposure to chemicals in the creek. If no direct contact with the creek, no health effects would have occurred.	Incidental ingestion or contact with the creek does not appear to pose a health hazard. 2004 macroinvertebrate studies indicate that the water and sediments in Salt Kill Creek are only slightly impacted by Norlite.	Future incidental ingestion or contact with the creek does not appear to pose a health hazard. 2004 macroinvertebrate studies indicate that the water and sediments in Salt Kill Creek are only slightly impacted by Norlite.
Soil and Dust	Past exposure to dust is an unknown health hazard because data are not available on the concentrations of chemicals in dust and soot from Norlite before addition of air pollution control equipment. Past exposure to soil poses no apparent health hazard.	Available data indicate that contact with and incidental ingestion of soil or dust poses no apparent public health hazard.	Available data indicate that incidental ingestion or contact with dust and soil are not likely to pose a future health hazard.

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults require special consideration. Children could be at greater risk than adults from certain kinds of exposure to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their potential for exposure. Because children are shorter than adults, they may breathe dust, soil, and vapors close to the ground and children's lower body weight and higher intake rate can result in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, access to medical care, and identification of hazards. Therefore, adults need as much information as possible to make informed decisions regarding their children's health.

In this health assessment, we use health-screening values that are protective of children who play outside and occasionally eat dirt. From the limited site and environmental data that are available, we conclude that inhalation of ground-level concentrations of stack emissions, incidental contact with the Salt Kill Creek, and contact with dust and soil in the neighborhoods around Norlite are no apparent public health hazard.

In the capitol region of New York, ozone levels occasionally exceed ambient air standards during the summer months. These unhealthy air conditions are due to a number of air pollution sources in the area, with auto and truck emissions being the predominant ones. On days when state or local officials declare a smog alert, parents and teachers should keep children inside as much as possible to minimize their exposure to outside air. Ozone exposure can cause adverse health effects in children and adults in the area.

Community Health Concerns

The community's health concerns are grouped into the general categories of cancers, respiratory diseases, silicosis, attention deficit hyperactivity disorder (ADHD), autism, skin rashes and sores, and headaches. The limited data suggest that Norlite Corporation is not the only air pollution source in the area. On days that exceed EPA National Ambient Air Quality Standards, air pollution can contribute to respiratory illnesses. While the limited data suggests that the other adverse health conditions are not due to Norlite's current operations, the data are not sufficient to give a definite answer. Therefore, we looked for data on whether the health conditions of concern occur at rates that are normal for this area of the country or whether the rates are elevated and may be related to environmental causes. The NY State Department of Health (NYSDOH) web site's extensive library of health statistics (www.nyhealth.gov) is the primary source of the data presented here.

> The limited data suggest that the adverse health conditions the community is concerned about are not due to Norlite's current operations.

Cancer

Many factors contribute to the incidence of cancer including heredity, age, lifestyle (like smoking and diet), and exposures to certain chemicals, x-rays, sunlight, and tobacco smoke. Cancer develops slowly in people, usually appearing 5–40 years after exposure to a cancer-

causing agent or repeated long-term contact that occurs for many years. This is one reason why cancer occurs most often in middle-aged and older people. It is common to have many of your friends and neighbors develop cancer, as they get older. One in 3 people will be diagnosed with cancer at some time in their life. In New York state, nearly 1 in 4 deaths is due to cancer [20]. Cancers of the prostate, lung, and colon are the most common types in adult males, whereas breast, lung, and colon cancers are the most common among women. When cancer spreads from its primary site to other tissues (metastasizes), it commonly spreads to the liver or brain. Basal and squamous cell skin cancers are actually the most common form of cancer for both men and women, but are usually not placed in the same category with other cancers since they are rarely fatal and usually do not require hospitalization [21].

Cancer occurs in 3 out of every 4 families in the US.

Because most people move and change jobs several times during their lives, it is difficult to link exposures to cancer-causing agents to where a person currently lives or works. Even if cancer-causing chemicals are present at a site, it does not necessarily mean that people are exposed to them. Carcinogenic chemicals cannot cause cancer if people are not exposed to them [22].

Even if cancer-causing chemicals are present at a site, if people are not exposed to them they cannot cause cancer.

NYSDOH recommends,

> If you are concerned about your risk for getting cancer, there are things you can do. First, talk with your health care provider about your personal risk factors. Talk with your relatives about your family history of specific types of cancers. You should share this information with your health care provider. You may also want to find out about cancer screening programs that are available in your community and discuss them with your health care provider [20].

NYSDOH has reviewed and published cancer incidence rates by county and in some cases, by zip code. Table 8 summarizes the New York State Cancer Registry data for cancers of community concern in the Cohoes zip code area. Table 9 compares the cancer rates in Albany County with the cancer rates of all of New York State, excluding New York City. Cancers of particular community concern were skin cancer, brain cancer, leukemia, non-Hodgkin lymphoma, and multiple myeloma. The most frequently diagnosed types of skin cancer (basal and squamous cell carcinomas) are not reportable to the New York State Cancer Registry or any other cancer registry. Rates of the less common malignant melanoma of the skin are significantly lower in Albany County than in upstate New York. Rates of brain cancer, leukemia, and non-Hodgkin lymphoma are similar in these areas [23]. For the years 1997–2001, the rates in Albany County for all cancers combined were lower for women than the state rate, but the rates for men were higher. We found no evidence that Norlite is emitting chemicals at levels that would cause cancer in the community.

NYSDOH offers the following tips for lowering your cancer risk [20]:

- Stop smoking or using tobacco of any kind.
- Get regular health check-ups.
- Eat high-fiber, vitamin-rich foods each day (fruits, vegetables, whole grain bread, and cereal).

- Eat foods low in fat (fruits, vegetables, cereals, lean meat, and low-fat dairy products).
- Exercise regularly.
- Drink alcoholic beverages only in moderation.
- Avoid unnecessary x-rays.
- Avoid too much sunlight; wear protective clothing and use sunscreen.
- Discuss the risks and benefits of hormone replacement therapy with your doctor.
- Be aware of health and safety rules at work and follow them.

Respiratory Disease

Asthma is a chronic disease characterized by airway inflammation that causes recurrent, intermittent episodes of wheezing, shortness of breath, chest tightness, and coughing. What causes a person to develop asthma is unknown, but genetic and environmental factors probably both play a role. Many factors are known to trigger asthma attacks, such as, tobacco and wood smoke, pollen, dust mites, animal dander (from cockroaches, rats, cats, dogs, birds, etc.), chemicals and strong odors (from perfume, paint, hair spray, etc.), cold air, mold spores, and colds, flu, or other respiratory illness [24,25].

Outdoor air pollution can trigger or worsen respiratory diseases.

In 1996, NYSDOH began collecting data on the prevalence of asthma in the state. Data available for 1996, 1997, and 1999–2003 show that the prevalence of asthma has generally increased over the years. In 1996–1997, the combined rate for New York State was 6.5%. In 1999–2000, the prevalence was 7.0%, and in 2001–2002, it was 7.6%. In 2003, the state asthma rate remained at 7.6%. Among children, asthma prevalence is higher for males, but in adults, the rate for women is almost double that of men. In 2001–2002, the state rate was 9.5% for women and 5.5% for men, which is consistent with national ratios [24,26,27]. The New York rates are a little higher than the US prevalence for asthma. In 2001, the US asthma rate for adults was 7.3% and in 2002, the US adult rate was 6.8% while that of children was 12.2% [27]. In 2002, CDC reported that 15% of children younger than 18 years of age in the Northeast had been diagnosed with asthma.

According to CDC's National Center for Health Statistics, in 2002, 14.2% of US adults were diagnosed with sinusitis, 8.9% had hay fever, and 1.5% had emphysema. In the Northeast region of the US, 7.5 % of adults had asthma, 13.5% had sinusitis, 9.5% had hay fever, and 1.5% had emphysema [28].

Ozone exposure has been linked with adverse health effects such as nose and throat irritation, respiratory symptoms, and decreases in lung function even in healthy persons. Respiratory symptoms include shortness of breath, chest pain, and coughing. Animal studies have shown that ozone damages sensitive lung tissue and these effects may continue for some time after exposure has ended [29].

When ozone levels are high, NYSDOH recommends limiting strenuous outdoor physical activity.

Small particles and ozone are the principal components of smog that is produced from the action of sunlight on things like the exhaust from cars and factories, smoke, and road dust. Ozone levels are most likely to be elevated on hot, sunny, summer days from noon through early evening. Each summer weekday, NYSDEC staff review the morning ozone monitoring and

meteorological data to determine whether an ozone advisory is warranted for that day or the next day for each region in the state. NYSDOH and NYSDEC issue an ozone health advisory to alert the public when ozone levels are expected to be elevated in a particular area. When ozone levels are high, NYSDOH recommends limiting strenuous outdoor physical activity. This is especially important for people who are more sensitive like young children and those with pre-existing respiratory problems like asthma [26]. According to NYSDEC staff the ozone problem in the Cohoes area of New York is due primarily to mobile sources, such as cars and trucks—not local industries.

To help reduce the ozone levels in your area, EPA recommends the following precautions on ozone advisory days [30]:

- Instead of driving, share a ride, walk or bike.
- Take public transportation.
- If you must drive, avoid excessive idling and jackrabbit starts.
- Do not refuel your car or only do so after 7:00 PM.
- Avoid using outboard motors, off-road vehicles or other gasoline-powered recreational vehicles.
- Defer mowing your lawn until late evening or the next day. Also, avoid using gasoline-powered garden equipment.
- Postpone chores that use oil-based paints, solvents or varnishes that produce fumes.
- If you are barbecuing, use an electric starter instead of charcoal lighter fluid.
- Limit or postpone your household chores that will involve the use of consumer products.
- Conserve energy in your home to reduce energy needs.

Silicosis

Silicosis is a lung disease caused by over exposure to respirable (very small particles), crystalline silica dust. Silica is the second most common mineral in the earth's crust and is a major component of glass, sand, rock, and mineral ores. Typical sand found at the beach does not pose a silicosis threat [31].

Silicosis occurs mainly in people who work in sandblasting, mining, grinding, and those who work in foundries or other industries who receive heavy exposure to silica dust if they do not wear respiratory protection. Acute or accelerated silicosis occurs after exposure to large amounts of crystalline silica over a short time period. Nodules of inflammation and scarring in the lung tissues and chest lymph nodes occur. In acute silicosis the lungs become very inflamed and may fill with fluid, causing severe shortness of breath and low blood oxygen levels [31,32]

It is unlikely that concentrations of crystalline silica in the community are large enough to cause silicosis. However, just to make sure, we have recommended that air samples be collected at the Norlite fence-line or in the community and analyzed for the concentration of respirable dust particles.

Attention Deficit Hyperactivity Disorder

Statistics are not available on the incidence of attention deficit hyperactivity disorder (ADHD) in New York State. Therefore, we do not know how the ADHD rate in the Cohoes area compares to the New York state rate. According to data collected by CDC the percent of children with ADHD by region of the US was Northeast 7.9%, Midwest 6.7%, West 5.0%, and South 8.4% [33].

CDC's National Health Interview Survey of 2002 indicated that the factors having a strong influence on the occurrence of ADHD were sex, number of parents in the household, and household income. Almost 4 million children (7.2%) ages 3–17 had ADHD. Boys were more than twice as likely as girls to have ADHD (10% versus 4%). Children in single-mother families were almost twice as likely as children in two-parent families to have ADHD (10.4% versus 6%). In families with an income of less than $35,000, the percent of children with ADHD was 9% versus 6% of children in families with an income of $75,000 or more [33].

Autism

Public health departments in the US do not require doctors to report cases of autism, so data are not available on the past or current autism rates in the state of New York or in the US. Therefore, we cannot verify if there is an increase in the rate of autism in Albany County. However, it is widely acknowledged that the number of children with autism is far higher than was previously believed. Autism is a developmental disorder that affects the ability to communicate, form relationships, and function socially.

On the basis of studies conducted in the US before 1990, CDC estimated that there were roughly 3 autism cases per 10,000 children. The most recent figures indicate that as many as 1 in 166 children in the US are autistic or have an autism-related disorder, such as Asperger syndrome. This is in line with another recently reported CDC investigation from New Jersey and studies from the United Kingdom and Canada.

The definition of autism was expanded to include a wider spectrum of disorders, including Asperger syndrome and pervasive developmental disorder. In February 2005, CDC launched a major public health initiative to promote early diagnosis by raising awareness about child development milestones. "By recognizing the signs of developmental disabilities early, parents can seek effective treatments which can dramatically improve their child's future," CDC Director, Dr. Julie Gerberding, said in a news release.

According to CDC testimony before the Committee on Government Reform, US House of Representatives [34].

> The cause of autism remains unknown for most children. Several studies support an underlying genetic mechanism for autism. …Autism tends to occur more frequently than expected among individuals with certain medical conditions such as Fragile X syndrome, untreated phenylketonuria, congenital rubella syndrome, and certain seizure disorders.
>
> A scientific literature review has identified limited evidence that certain agents ingested by pregnant women such as lead, alcohol, and the prescription drug thalidomide may cause autism in their children. Such evidence, as well as prevailing theories about autism etiology, suggests that events during development in utero, especially in the earliest stages, play a

> substantial role in the cause of autism. Less information is known about postnatal exposure and autism. Little research has been done in the area of environmental contaminants and more is needed…."

Robert Byrd, PhD, MPH, an epidemiologist and autism researcher at the University of California at Davis says, "The findings suggest that researchers need to intensify efforts to understand the causes of autism. Many of us still believe there is a significant genetic component to autism. However, if we are seeing a tripling of the numbers, it is hard to understand how genes could change that quickly. If something is causing this that we could do something about, we need to know that" [35].

A NYDOH report noted that many different types of research support the concept that autism is a biologically based developmental disorder. Various types of investigations including imaging, electroencephalographic, electro physiologic, and tissue studies on autopsy material, and neurochemical studies have demonstrated abnormalities in many cases of autism, although a clear pattern has yet to emerge [36].

While research so far has not uncovered the primary cause(s) of autism, it has not linked autism to air pollution.

Skin Rashes and Sores

Skin rashes or sores can occur as an allergic reaction to numerous things. Different individuals are allergic to different things, so one individual may get a rash when they contact an item while another person is unaffected. CDC reported that in 2002 there were 11.8 million doctor-office visits for skin rash on a national basis [28].

One or two members of the community reported a burning sensation and a rash developing after contact with Salt Kill Creek water in the past. There are no data that suggest the Salt Kill Creek currently contains chemicals in concentrations that would cause a burning or tingling sensation and skin rash.

Skin cancer is addressed in the cancer discussion section and in Table 9.

Headaches

Headaches are associated with a wide array of causes, including allergies, stress, many illnesses, side effects of medicines, and odors, to name just a few such triggers. If a person has frequent, persistent, or severe headaches, they should consult their personal physician to discuss the causes and treatment options.

Blood Disorders

We were not able to find data on the incidence of the blood disorder that a community member mentioned: low white blood cells. Since only one case was mentioned, it would not suggest an environmental cause. If that person's physician suspects an environmental cause and would like to consult with an ATSDR physician or toxicologist, they can contact one of the authors or technical advisors of this document to arrange for a consultation. ATSDR's toll free number is listed at the front of this document.

Conclusions

There are insufficient data to determine if the public's inhalation of airborne dust from Norlite is a current health hazard; therefore, ATSDR classifies fugitive dust inhalation as an indeterminate health hazard. However, the limited data that do exist indicate that exposure via this pathway is unlikely to cause acute health effects.

Incidental contact with the Salt Kill Creek water and sediments poses no apparent public health hazard.

Contact with and incidental ingestion of soil and dust in the community pose no apparent public health hazard.

Based on modeling, ground-level air concentrations of Norlite stack emissions pose no apparent health hazard to local residents.

Air monitoring data from the state of New York's statewide air monitoring network indicate that the capitol region, which includes Cohoes and Colonie, has unhealthy ozone air conditions several days a year. This air pollution results from a number of sources, including industry, cars, and truck traffic.

Recommendations

ATSDR recommends that air samples be collected and analyzed to determine the sizes and concentrations of particulates and particulate-bound metals coming from Norlite into nearby residential areas and that the results be evaluated to characterize potential exposures to residents. We recognize that it will be difficult to attribute the concentrations measured to a particular source; therefore, the design and implementation of this monitoring program need to be well-planned and carried out so that useful information is obtained. We recommend that NYSDEC and NYSDOH provide input into the plan that is developed to collect data that will be used to evaluate the community's exposure to particulates.

On ozone advisory days, active children and adults and people with lung disease, such as asthma, should reduce prolonged or heavy outdoor exertion. All residents are urged to follow EPA guidelines for reducing emissions that contribute to ozone formation.

Norlite is encouraged to maintain existing procedures and look for additional ways to control dust migration from their property. We recommend that Norlite, with the cooperation of NYSDEC, evaluate the effectiveness of existing measures.

Public Health Action Plan

The NY State Department of Health (NYSDOH) will continue to work with the NY State Department of Environmental Conservation (NYSDEC) to make residents and school systems in the state aware of the importance of limiting outside activities on days when there are regional air pollution advisory conditions.

NYSDOH is willing to work with NYSDEC and Norlite to develop an air-sampling program to collect data that can be used to characterize the public's exposure to fugitive particulates from Norlite and to determine whether additional mitigation measures are needed.

ATSDR and NYSDOH physicians and toxicologists will continue to provide consultation to private physicians who are concerned that a patient may be having adverse health effects due to environmental exposures.

NYSDEC and EPA Region II will continue their regulatory oversight and inspection of Norlite Corporation to assure compliance with environmental laws and permit conditions and protection of public health.

If additional environmental data become available that could affect ATSDR's conclusions and recommendations in this public health assessment, ATSDR or NYSDOH will review such data and provide public health advice if asked to do so and it is appropriate.

Authors and Technical Advisors

Betty Willis, MS
Senior Environmental Health Scientist
Division of Health Assessment and Consultation
Exposure Investigation and Consultation Branch

David Fowler, PhD
Senior Toxicologist
Division of Health Assessment and Consultation
Exposure Investigation and Consultation Branch

Loretta Bush, BA
Community Involvement Specialist
Division of Health Assessment and Consultation
Community Involvement Branch

Arthur Block
Senior Regional Representative
Office of Regional Operations
ATSDR Region II

Greg Zarus, MS
Meteorologist
Division of Health Assessment and Consultation
Exposure Investigation and Consultation Branch

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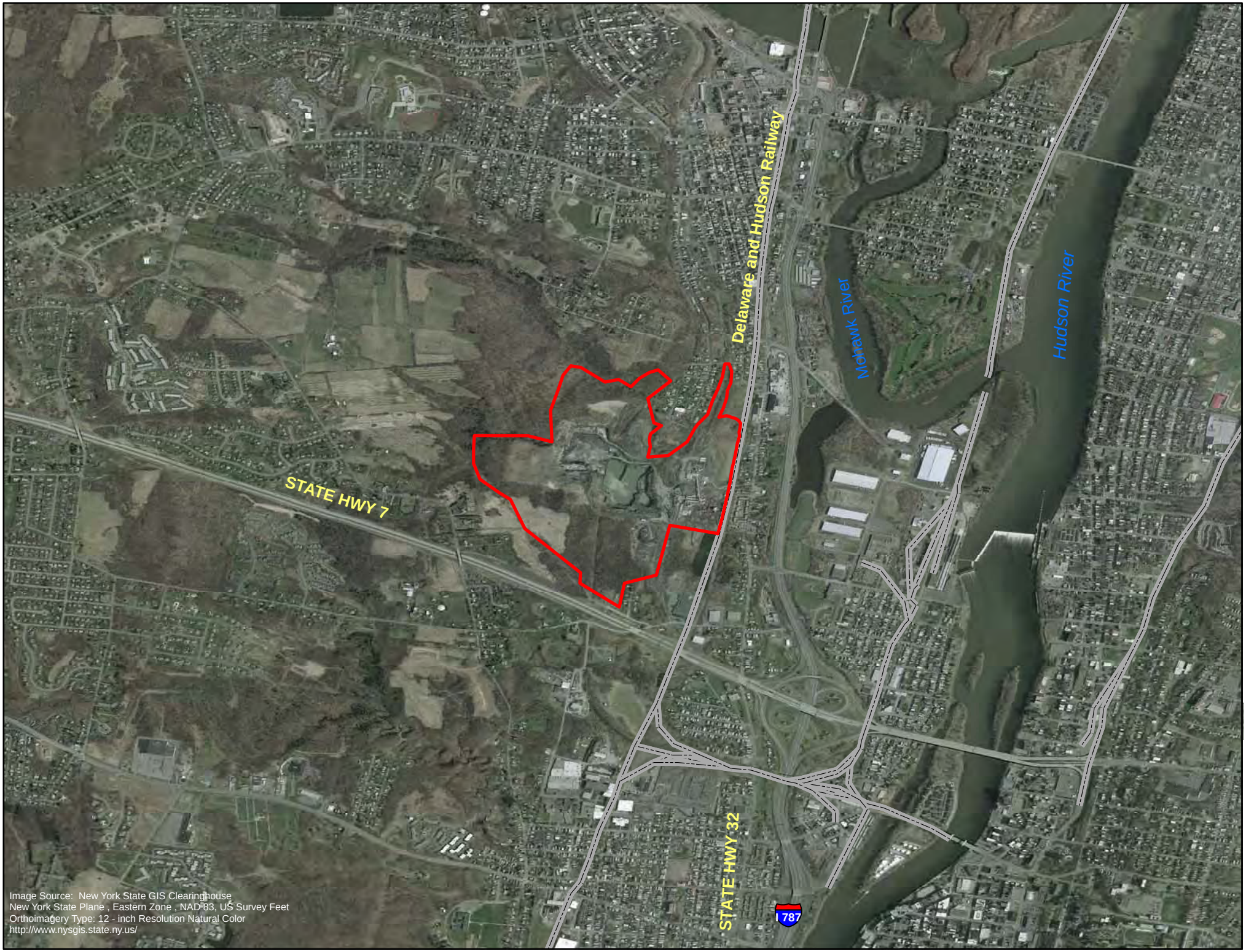
Appendices

Appendix A – Figures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Delaware and Hudson Railway
Mohawk River
Hudson River
STATE HWY 32
I 787
Image Source: New York State GIS Clearinghouse
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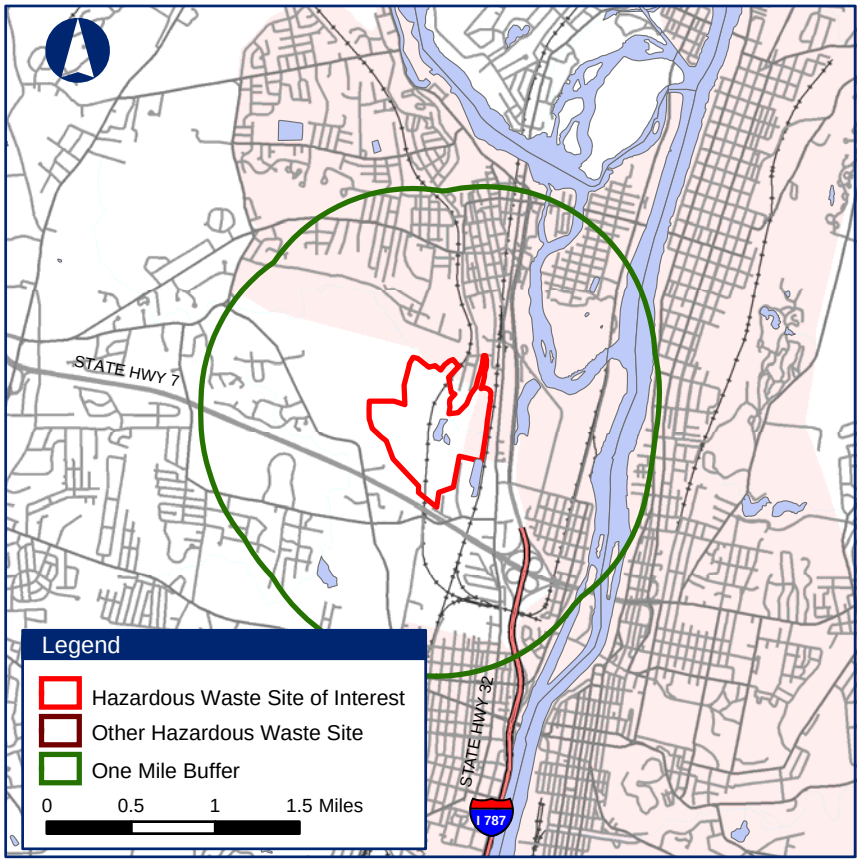
Norlite Corporation

Cohoes, NY

EPA Facility ID: NYD080469935



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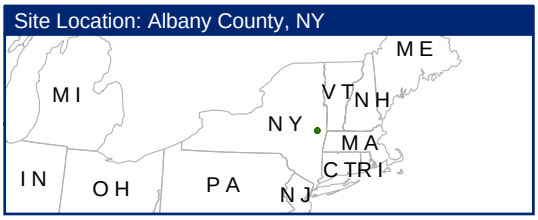
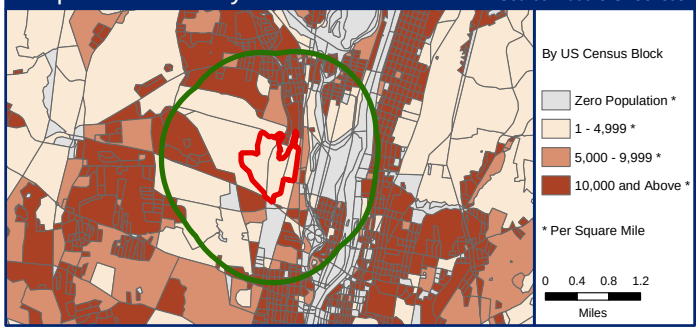


Demographic Statistics
Within One Mile of Site*

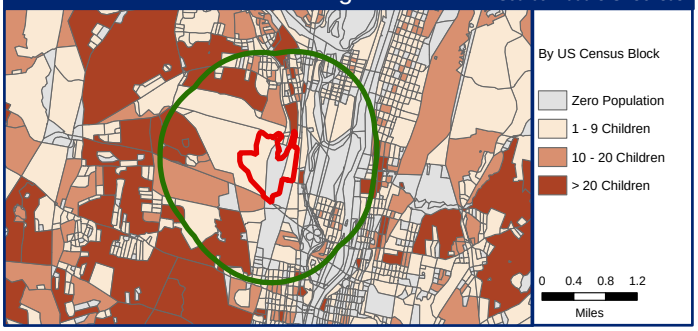
Total Population	15,462
White Alone	14,331
Black Alone	488
Am. Indian & Alaska Native Alone	33
Asian Alone	241
Native Hawaiian & Other Pacific Islander Alone	6
Some Other Race Alone	142
Two or More Races	221
Hispanic or Latino**	382
Children Aged 6 and Younger	1,446
Adults Aged 65 and Older	2,368
Females Aged 15 to 44	3,471
Total Housing Units	7,955

Demographics Statistics Source: 2000 U.S. Census
* Calculated using an area-proportion spatial analysis technique
** People who identify their origin as Hispanic or Latino may be of any race.

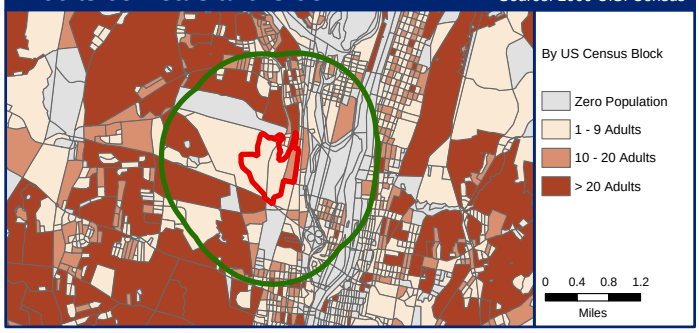
Population Density
Source: 2000 U.S. Census



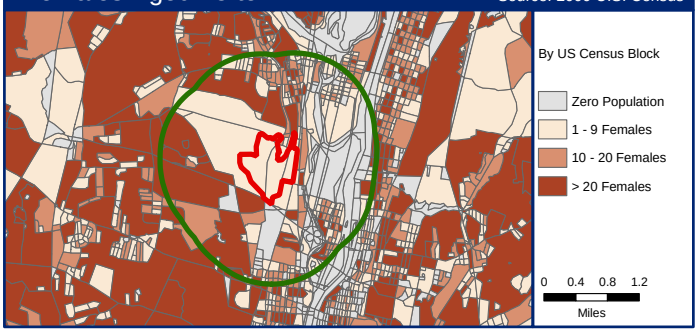
Children 6 Years and Younger
Source: 2000 U.S. Census



Adults 65 Years and Older
Source: 2000 U.S. Census



Females Aged 15 to 44
Source: 2000 U.S. Census



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Appendix B - Tables

Table 1: Evaluation of Modeled Maximum Off-site Ground-level Concentrations of Combined Stack Emissions

Chemicals	1999-2001 Tests		2004 Tests		Air Screening Values		Conclusions
	Total Emissions g/sec †	Ground Level µg/m³	Total Emissions g/sec ‡	Ground Level µg/m³	Value µg/m³	Source	
Particulate Matter	0.36	1 annual	0.058	0.2 annual	50 150	NAAQS annual NAAQS PM10	Ground-level air concentrations are below levels of public health concern.
		6 24-hr		1 24-hr	10,000	NAAQS 24-hr PM10	
Hydrogen Chloride	2.32	8 annual	0.9	3 annual	20 20 21	AGC RfC EPA 3 - noncancer	Ground-level air concentrations are below levels of public health concern.
		38 24-hr		15 24-hr	2100	SGC	
Chlorine	0.013	0.04 annual	0.0015	0.005 annual	0.2 0.2 0.21	AGC RfC Intermediate EPA 3 – noncancer	Ground-level air concentrations are below levels of public health concern.
		0.2 24-hr		0.02 24-hr	290	SGC	
Carbon Monoxide	NA	NA	1.296	89 1-hr	14,000 40,096	SGC NAAQS 1-hr average	Ground-level air concentrations are below levels of public health concern.
Arsenic	0.000062	0.0002 annual	<0.0000066	<0.00002 annual	0.00023 0.0002 0.0004	AGC CREG (A) EPA3 Cancer	Ground-level air concentrations are below levels of public health concern.
Beryllium	<0.0000035	<0.00001 annual	<0.0000034	<0.00001 annual	0.00042 0.0004 0.02 0.00075	AGC CREG (B1) RfC EPA3 – cancer	Ground-level air concentrations are below levels of public health concern.
		<0.00006 24-hr		<0.00009 24-hr	1.0	SGC	
Chromium*	0.0000196	0.00006 annual	0.00019	0.0006 annual	1.2 5500	AGC EPA 3 (Cr+3) noncancer	Ground-level air concentrations are below levels of public health concern.

Chemicals	1999-2001 Tests		2004 Tests		Air Screening Values		Conclusions
	Total Emissions g/sec †	Ground Level µg/m³	Total Emissions g/sec ‡	Ground Level µg/m³	Value µg/m³	Source	
Cadmium	0.0000134	0.00004 annual	0.0000048	0.00002 annual	0.0005 0.0006 0.0011	AGC CREG (B1) EPA6 cancer	Ground-level air concentrations are below concentrations of public health concern.
Lead	0.0000165	0.00005 annual	0.000014	0.00005 annual	0.38 1.5	AGC NAAQS quarterly	Ground-level air concentrations are well below concentrations of public health concern.
Mercury	0.00043	0.001 annual	0.00044	0.001 annual	0.3 0.2 0.3 0.31	AGC Chronic EMEG RfC EPA3 - noncancer	Ground-level air concentrations are well below concentrations of public health concern.
		0.007 24-hr		0.007 24-hr	1.8	SGC	

This table lists the chemicals emitted from the two Norlite kiln stacks that were above air screening values in the stack. The values in the Total Emissions columns are the average concentrations measured in the stacks when the kilns were operating in compliance with the state regulations. These values were used to calculate the ground-level air concentrations of each chemical at the off-site location which models showed the maximum air concentrations would occur. The maximum ground-level air concentrations of each chemical were then compared to NY State Air Guidelines and Federal health screening values to see if any of the chemicals exceeded these screening values, i.e., we compared the first two shaded columns with the third shaded column. Since none of the projected ground-level air concentrations exceeded the screening values, we concluded that they would not cause adverse health effects since health effects occur at much higher concentrations then any of the State or Federal air screening values.

The EPA models predicted that for every gram per second (g/sec) of a chemical coming out of the Norlite kiln stacks the maximum continuous 12-month air concentration (annual) would be 3.28 micrograms per cubic meter (µg/m^3) at ground level where people could breathe it. The models predicted that the maximum 24-hour ground-level air concentration of any chemical would be 16.56 µg/m^3 for each gram per second coming out of the stacks. The air concentration of a chemical at ground level per gram per second coming out the stack that is predicted by the EPA models is called a dispersion factor. The numbers in the Ground Level columns are calculated by multiplying the Total Emissions times the appropriate dispersion factor (annual or 24-hour).

† Total emissions are based on the two kilns operating simultaneously. The data used in this column are from Tables 4-7 and 4-11 in the Risk Assessment [5].

‡ Total emissions are based on the two kilns operating simultaneously. The data used in this column are from Tables 7-13 and 7-18 in the August 2004, Final MACT Notification of Compliance and CPT Report for Lightweight Aggregate Kilns 1 and 2 [9].

* Only total Chromium was analyzed for in stack emissions. We do not know what the concentration of hexavalent chromium may have been.

g/sec grams per second.

µg/m^3 micrograms per cubic meter.

NA	Data not available as an emission rate.
AGC	Annual Guideline Concentrations from NYSDEC Air Guidelines.
PM10	particulate matter that is smaller than 10 microns in diameter.
NAAQS	National Ambient Air Quality Standards (EPA).
SGC	Short-term Guideline Concentrations (one-hour) from NYSDEC Air Guidelines.
RfC	Reference air concentration (EPA).
CREG (B1)	Probable human carcinogen based on limited human, but sufficient animal studies. It is the cancer risk evaluation guide set by EPA for a one in a million excess cancer risk.
EMEG	Environmental media evaluation guide (ATSDR).
EPA 3	Health screening values set by the US EPA, Region 3 for cancer and noncancer health outcomes.
EPA 6	Health screening values set by the US EPA, Region 6 for cancer and noncancer health outcomes.
Cr+3 or Cr+6	Chromium with a 3 or 6 positive charge.

Table 2: Evaluation of Maximum Modeled Annual Dioxin and Furan Emissions during Norlite Compliance Tests

Chemicals	2,3,7,8-Dioxin		2,3,7,8-Furan		Dioxin/Furan TEQ		Air Screening Values		Conclusions
	Stack Emissions ng/sec	Ground Level pg/m^3	Stack Emissions ng/sec	Ground Level pg/m^3	Stack Emissions ng/sec	Ground Level pg/m^3	Value pg/m^3	Source	
2001 Test Kiln 1+ Kiln 2*	0.26	0.0009	6.6	0.02	4.14	0.01	0.03	AGC‡	Ground-level air concentrations are below concentrations of public health concern.
2004 Test Kiln 1+ Kiln 2†	None Detected	Not Detectable	0.00176	0.000006	0.0252	0.00008	0.03	AGC	Ground-level air concentrations are below concentrations of public health concern.
2004 – Kiln 1 Max Emissions†	0.28	0.0009	5.3	0.02	2.8	0.009	0.03	AGC	Ground-level air concentrations are below concentrations of public health concern.
2004 – Kiln 2 Max Emissions†	0.22	0.0007	4.2	0.01	2.4	0.008	0.03	AGC	Ground-level air concentrations are below concentrations of public health concern.

This table shows the emission rates of what many people consider the most toxic dioxin (2,3,7,8-dioxin), the most toxic furan (2,3,7,8-furan) and the total emissions of all dioxins and furans detected in the Norlite stack tests during the 2001 and 2004 compliance tests. The 2,3,7,8-dioxin and the 2,3,7,8-furan emission rates are the actual emission rates (columns 2 and 4). However, when calculating the total dioxin and furan emission rates (column 6), the concentration of each congener was multiplied by its toxicity factor to give the dioxin/furan toxicity equivalent (TEQ). In the 2001, tests there were no "none detected" congeners. In the 2004 tests, several dioxin and furan congeners were not detected in the stack emissions. When calculating the Dioxin/Furan TEQ, zero was used in the calculations when a congener was not detected.

The first two rows in this table show the emissions measured during the tests when the kilns complied with State and Federal dioxin emission standards. The dioxin and furan stack emissions were much lower in the 2004 tests than during the 2001 tests. The last two rows of this table show the maximum emissions measured in each kiln stack during the 2004 compliance tests. Inhalation of even the maximum measured dioxin and furan stack emissions would not cause adverse health effects. This conclusion is based on the modeled maximum ground-level air concentration at the maximum exposure point off-site., i.e., by comparing the first three shaded columns with the last shaded column. The same annual dispersion factor (3.28 $\mu g/m^3$ per g/sec stack emission) was used to calculate the maximum ground-level air concentration as was used in preparing Table 1.

* Total emissions are based on the two kilns operating simultaneously. The data used in this row are from the Risk Assessment Table 4-1a and b. We doubled the values in Table 4-1b to estimate total emissions, i.e., the Dioxin/Furan TEQ [5].

† The 2004 data are from the ENSR Final MACT Notification of Compliance Report [9]. The data in the row labeled Kiln 1+Kiln 2 are from Table 7-16. We doubled the values in Table 7-16. The emission rates in the rows labeled Kiln 1 Max Emissions and Kiln 2 Max Emissions are from tables in Appendix B of the report [9]. The Kiln 1 Max Emissions were the total front half and back half of the sampling trains during compliance test 2, test condition 1. The Kiln 2 Max Emissions were the total front half and back half of the sampling train during compliance test 1, test condition 2.

ng/sec nanograms per second.

pg/m^3 picograms per cubic meter.

‡ NY State Department of Environmental Conservation's Air Annual Guideline Concentration (AGC). AGCs are set to protect the public and are concentrations at which adverse health effects are not likely to occur if inhaled continuously for a year. EPA's regulatory limit for hazardous waste burners is 0.2 ng/m^3 (200 pg/m^3) dioxin TEQ as measured in the stack and corrected to 7% Oxygen.

Table 3: Evaluation of Modeled Ground-level Air Concentrations of Other Chemicals Measured in 1999-2001 Emissions Tests

Chemicals	1999-2001 Tests		Air Screening Values		Conclusions
	Stack Emissions g/sec	Ground Level µg/m^3	Value µg/m^3	Source	
Metals					
Nickel	0.00017	0.0006 annual	73 0.004	EPA 3 - noncancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
		0.003 24-hr	6.0	SGC	
Copper	0.000049	0.0002 annual	150 0.02	EPA 3 - noncancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
		0.0008 24-hr.	100.0	SGC	
Maximum Measured Organic Compounds					
1,3-Butadiene	0.0804	0.26 annual	2.0 0.063 0.03	RfC EPA 3 - cancer CREG (2A)	Ground-level air concentrations are not at concentrations of public health concern, since health effects occur at higher concentrations than the air screening values.
1,4-Dichlorobenzene	0.0000574	0.0002 annual	0.28 0.09	EPA 3 - cancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
Di-n-octyl phthalate	0.0000704	0.0002 annual	150 0.42	EPA 3 - noncancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
2,6-Dinitrotoluene	0.0000704	0.0002 annual	3.7 0.011	EPA 3 - noncancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
2,4-Dinitrotoluene	0.0000704	0.0002 annual	7.3 0.011	EPA 3 - noncancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
4-Nitrophenol	0.000282	0.0009 annual	29 0.1	EPA 6 - noncancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
Hexachlorobenzene	0.0000888	0.0003 annual	0.0039 0.0022	EPA 3 - cancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
Hexachlorobutadiene	0.00001408	0.00005 annual	0.08 0.045	EPA 3 cancer AGC	Ground-level air concentrations are well below concentrations of public health concern.

Chemicals	1999-2001 Tests		Air Screening Values		Conclusions
	Stack Emissions g/sec	Ground Level µg/m^3	Value µg/m^3	Source	
Hexachlorocyclopentadiene	0.000282	0.0009 annual	0.21 0.2	EPA 3 - noncancer RfC	Ground-level air concentrations are well below concentrations of public health concern.
Hexachloroethane	0.00001408	0.00005 annual	0.45 0.25	EPA 3 - cancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
Pentachlorophenol	0.000282	0.0009 annual	0.052 0.20	EPA 3 - cancer AGC	Ground-level air concentrations are well below concentrations of public health concern.
Phenanthrene	0.00000246	0.000008 annual	110 0.02	EPA 3 – non cancer PAHs AGC	Ground-level air concentrations are well below concentrations of public health concern.
2,4,6-Trichlorophenol	0.000204	0.0007 annual	0.63 0.32	EPA 3 cancer AGC	Ground-level air concentrations are well below concentrations of public health concern.

This table lists the chemicals detected in the Norlite stack samples taken during the risk burns that were above air screening values in the stack. The values in the Stack Emissions column are double the maximum emission rates in the 1999-2001 tests. The metal emission rates are from Table 4-2 in the Risk Assessment. The organic compound emission rates are from Table 4-9 in the Risk Assessment [5]. These values were used to calculate the ground-level air concentrations of each chemical at the off-site location which models showed the maximum air concentrations would occur. The maximum ground-level air concentrations of each chemical were then compared to NY State Air Guidelines and Federal health screening values to see if any of the chemicals exceeded these screening values., i.e., we compared the third column with the fourth column. Since none of the projected ground-level air concentrations exceeded the screening values, we concluded that they would not cause adverse health effects since health effects occur at much higher concentrations then any of the State or Federal screening value concentrations.

We used the same calculation method and dispersion factors as used in Table 1 to calculate the ground-level air concentrations in this table. The numbers in the Ground Level column were calculated by multiplying the Stack Emissions times the appropriate dispersion factor (annual or 24-hour).

g/sec grams per second.

µg/m^3 micrograms per cubic meter.

EPA 3 Health screening values set by the US EPA, Region 3 for cancer and noncancer health outcomes.

EPA 6 Health screening values set by the US EPA, Region 6 for cancer and noncancer health outcomes.

AGC Annual Guideline Concentrations from NYSDEC Air Guidelines.

SGC Short-term Guideline Concentrations (one-hour) from NYSDEC Air Guidelines.

RfC Reference concentration.

PAHs Polycyclic aromatic hydrocarbons

CREG (2A) Cancer risk evaluation guide for one in a million excess cancer risks. The "2A" indicates that the chemical is designated by the International Agency for Research on Cancer (IARC) as probably carcinogenic to humans based on limited human evidence, but sufficient evidence in animal studies.

Table 4: Air Sample Taken by Citizens Environmental Coalition on October 31, 2003

Chemical	Concentration(ppb)	Air Health Screening Values		Conclusions
		ppb	Source	
Chloromethane	2.6	50	Chronic EMEG	Air concentrations at that time were well below levels of public health concern.
		500	Acute EMEG	
		95	EPA 3 – noncancer	
Toluene	5.0	80	Chronic EMEG	Air concentrations at that time were well below levels of public health concern.
		1000	Acute EMEG	
		420	EPA 3 - noncancer	
m,p-Xylene	1.3	100	Chronic EMEG	Air concentrations at that time were well below levels of public health concern.
		1000	Acute EMEG	
		110	EPA 3 – noncancer (all xylenes)	

This table compares the analytical data for the three chemicals detected in the air sample taken by CHRONIC to health screening values. The laboratory report [10] stated that the sample was not analyzed within the prescribed EPA method holding time, so the data may not be accurate. Exceeding the holding time can result in the loss of some chemicals or reactions between chemicals and production of chemicals not originally present. Actual air concentrations and chemicals **may** have been different from those shown here. However, if the actual concentrations were even 10 times higher than the concentrations detected, the concentrations would still not be a public health hazard.

ppb	parts per billion
EMEG	ATSDR environmental media evaluation guidelines used by health assessors to select environmental contaminants for further evaluation.
	Health screening values SHOULD NOT be used as predictors of adverse health effects. Media concentrations less than an EMEG are unlikely to pose a health threat.
Chronic	Exposures that last longer than 365 days at that concentration.
Acute	Exposures that last a maximum of 14 days at that concentration.
EPA 3	Health screening values set by the US EPA, Region 3 for health outcomes.

Table 5: Analyses of 2005 Samples of Norlite Process Materials and Products

Sample Identification		Total Metals Concentrations in Solid Materials and Dusts at Norlite (ppb)														
Data Source	Type	Sb	As	Ba	Be	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Tl	V	Zn
2005 NYSDEC [12]	004 Shale	370 U	3100	146,000	360 B	30 U	10,500	30,500	9400	4 U	15,000	760 B	120 U	460 U	11,800	32,500
	003 Shale	420 U	9,000	134,000	450 B	40 B	13,800	35,300	15,400	8 B	24,100	1,400 B	140 U	520 U	15,300	53,900
	Baghouse dust	1300 B	28,900	1,220,000	1,000	2,700	54,000	263,000	89,100	781	48,600	4,800	7,500	1,300	41,000	722,000
	Multi-clone dust	360 U	21,900	456,000	830	560	31,100	120,000	29,300	21	33,800	1.900 B	1,600	440 U	30,600	266,000
	Finishing plant dust	400 U	5,800	42,500	190 B	30 U	3,500	32,900	3,300	13 B	12,100	670 U	130 U	500 U	5,900	24,7OO
	Clinker	340 U	4,700	31,700	140 B	20 U	2,100	25,400	1,800	3 U	9,400	570 U	160 B	420 U	4,300 B	23,900
	Block mix	630 B	9,500	172,000	360 B	220 B	14,800	57,600	20,300	65	20,800	1,400 B	870 B	520 U	12,900	115,000
2005 Norlite [13]	Shale	< 40	< 70	231,650	500	< 30	18,140	50,170	34,380	< 100	33,420	< 40	< 40	< 50	24,920	110,540
	Baghouse dust	18,580	43,610	1,058,890	640	7,070	50,660	266,820	101,570	1,130	49,610	< 40	6,280	< 50	34,490	629,250
	Multi-clone dust	< 40	< 70	404,360	650	< 30	31,110	138,090	50,510	< 100	38,670	< 40	< 40	< 50	31,050	286,300
	Fines	< 40	< 70	40,170	< 10	< 30	3,250	33,890	< 40	< 100	13,990	< 40	< 40	< 50	5,680	46,230
	Clinker	< 40	< 70	24,230	110	< 30	1,290	39,300	< 40	< 10	13,310	< 40	< 40	< 50	5,680	25,080
	Block mix	< 40	< 70	189,930	270	< 30	16,810	76,150	33,930	< 100	23,450	<40	840	<50	15,880	186,810
Health Values	Soil (ppb)	RMEG 20,000 child 300,000 adult	c-EMEG 10,000 Pica 20,000 child 200,000 adult	RMEG 4,000,000 child 50,000,000 adult	c-EMEG 100,000 child 1,000,000 adult	c-EMEG 10,000 child 100,000 adult	RMEG for Cr+6 200,000 child 2,000,000 adult	i-EMEG 20,000 pica 500,000 child 7,000,000 adult	CDC 500,000 child	PRG EPA Reg.6 23,000	RMEG 1,000,000 child 10,000,000 adult	c-EMEG 300,000 child 4,000,000 adult	RMEG 300,000 child 4,000,000 adult	PRG EPA Reg.9 5,200	i-EMEG 6,000 pica 200,000 child 2,000,000 adult	i-EMEG 600,000 pica 20,000,000 child 200,000,000 adult

Sample Identification		Total Metals Concentrations in Solid Materials and Dusts at Norlite (ppb)														
Data Source	Type	Sb	As	Ba	Be	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Tl	V	Zn
	Conclusions	Well below levels of health concern.	PICA children could be at health risk if they ate sufficient amounts of APC dusts.	Well below levels of health concern.	Well below levels of health concern.	Below levels of public health concern	If assume it is all Cr+6 it is still well below levels of health concern.	PICA children could be at health risk if they ate sufficient amounts of Norlite materials.	Occasionally high levels of lead are found, but still below levels of health concern.	Well below levels of health concern.	Well below levels of health concern.	Well below levels of health concern.	Well below levels of health concern.	Well below levels of health concern.	PICA children could be at health risk if they ate sufficient amounts of Norlite materials.	PICA children could be at health risk if they ate sufficient amounts of Norlite bag house dust.

Table 5 shows the total metals concentrations in composite samples of Norlite shale, air pollution control equipment (APCE) dusts, clinker, and product. Direct physical contact with these Norlite materials would not be a health hazard for adults and most children. PICA children might suffer health effects if they played in and ate sufficient amounts of some of the materials on-site due to high concentrations of arsenic and zinc in baghouse dust and copper and vanadium in all the materials on-site.

< or U	Less than the number shown, i.e., undetected at this concentration		
ppb	parts per billion	Sb	Antimony
As	Arsenic	Ba	Barium
Be	Beryllium	Cd	Cadmium
Cr	Chromium	Cu	Copper
Pb	Lead	Hg	Mercury
Ni	Nickel	Se	Selenium
Ag	Silver	Tl	Thallium
V	Vanadium	Zn	Zinc

RMEG	Reference Dose Media Evaluation Guide (ATSDR).
c-EMEG	Chronic (greater then one year)-Environmental Media Evaluation Guide (ATSDR).
i-EMEG	Intermediate (14 days to one year)-Environmental Media Evaluation Guide (ATSDR).
Pica	Children who crave to eat nonfood items, such as dirt, paint chips, and clay.
APC	Air pollution control.
Cr+6	Hexavalent chromium.
CDC	Centers for Disease Control and Prevention.
PRG	Preliminary Remedial Goals (set by EPA).

Table 6: Current Maximum Permitted Metal Feed Rates

Metal	Fuel (lb/hr)	Shale (lb/hr)	Total (lb/hr)
Arsenic	0.0400	0.500	0.5400
Beryllium	0.0040	0.044	0.0480
Cadmium	0.0950	0.320	0.4150
Chromium	2.1600	1.320	3.4800
Copper	1.8800	2.700	4.5800
Lead	1.3400	1.980	3.3200
Barium	0.7200	11.450	12.1700
Mercury	0.0035	0.007	0.0105
Nickel	0.4800	1.620	2.1000
Antimony	0.1130	0.130	0.2430
Selenium	0.1200	0.044	0.1640
Silver	0.0700	0.044	0.1140
Thallium	0.2100	0.044	0.2540
Zinc	3.0000	7.240	10.2400

This table contains the current feed rates in the Norlite hazardous waste permit issued by New York State Department of Environmental Conservation. Some metal feed rates are higher in the draft permit.

lb/hr pounds per hour

Table 7: Metals in Sediment of Salt Kill Creek in Parts Per Million (ppm)

Metal	Sample 1–3	Sample 4	Sample 5–6	Sample 7–9	Sample 10–12	Background Eastern USA	Soil Screening Values		Conclusions
							ppm	Source	
Antimony	ND (43)	ND (50)	160	38	ND (35)	NA	Background 20 300	NY RSCO Child RMEG Adult RMEG	We question this data—one outlier & inconsistent detection limits.
Arsenic	5.1	7.3	6.3	4.8	4.2	3 – 12	7.5 or Background 10 20 200	NY RSCO Pica c-EMEG Child c-EMEG Adult c-EMEG	Not a public health hazard.
Barium	72	150	69	40	120	15 – 600	300 or Background 4,000 50,000	NY RSCO Child RMEG Adult RMEG	We question this data—but concentrations are not a public health hazard.
Cadmium	2.0	1.7	2.3	1.9	1.2	0.1 – 1	1 or Background 10 100	NY RSCO Child c-EMEG Adult c-EMEG	Not a public health hazard.
Chromium	19	19	16	17	30	1.5 – 40			Within normal background range.
Chromium +6	ND (0.29)	ND (0.34)	ND (0.25)	ND (0.25)	ND (0.24)	NA	10 or Background 200 2,000	NY RSCO Child RMEG Adult RMEG	Not a public health hazard.
Lead	16	29	17	ND (12)	20	200 – 500 urban	Background 500	NY RSCO CDC to protect blood levels	Not a public health hazard.
Mercury	2.61	ND (0.337)	ND (0.25)	ND (0.25)	2.84	0.001 - 0.2	23 0.1	EPA Reg 6-noncancer NY RSCO	We question the data—but concentrations are not a public health hazard.
Nickel	28	23	21	22	25	0.5 – 25	13 or Background 1,000 10,000	NY RSCO Child RMEG Adult RMEG	Not a public health hazard.
Selenium	2.7	2.2	1.6	1.4	1.6	0.1 – 3.9	2 or Background 300 4,000	NY RSCO Child c-EMEG Adult c-EMEG	Not a public health hazard.
Silver	ND (7.1)	ND (8.4)	ND (6.2)	ND (6.2)	ND (5.9)	NA	Background 300 4,000	NY RSCO Child RMEG Adult RMEG	Not a public health hazard.

Metal	Sample 1–3	Sample 4	Sample 5–6	Sample 7–9	Sample 10–12	Background Eastern USA	Soil Screening Values		Conclusions
							ppm	Source	
Thallium	ND (0.43)	ND (0.5)	ND (0.37)	ND (0.37)	ND (0.35)	NA	Background 5.2	NY RSCO PRG Reg 9 noncancer	Not a public health hazard.
Vanadium	ND (43)	ND (50)	ND (37)	ND (37)	ND (35)	1 – 300	150 or Background 6 200 2,000	NY RSCO Pica i-EMEG Child i-EMEG Adult i-EMEG	Not a public health hazard.
Zinc	78	110	66	59	99	9 – 50	600 20,000 200,000	Pica i-EMEG Child i-EMEG Adult i-EMEG	Not a public health hazard.

This table compares the preliminary NY State Department of Transportation [18] analytical data to State soil clean-up values, Federal health screening values, and background concentrations of the metals typically found in soils of the eastern USA. It indicates that incidental contact with creek sediments would not be a public health hazard. We question the quality of some of the DOT analytical data.

ppm	parts per million.
ND	Not detectable at the concentration in parenthesis.
NA	Not available.
Background	Site background concentration.
NY RSCO	NY Recommended Soil Cleanup Objective (http://www.dec.state.ny.us/website/der/tagms/prtg4046e.html/).
RMEG	Reference Dose Media Evaluation Guide (ATSDR).
c-EMEG	Chronic exposure (one year or longer)-Environmental Media Evaluation Guide (ATSDR).
i-EMEG	Intermediate exposure (14 days to one year)-Environmental Media Evaluation Guide (ATSDR).
Pica	Children who crave to eat nonfood items, such as dirt, paint chips, and clay.
EPA 6	Health screening values set by the US EPA, Region 6.
CDC	Centers for Disease Control and Prevention.
PRG Reg 9	Preliminary remedial goals set by EPA Region 9.

Table 8: Cancer Cases in Zip Code 12047 (Cohoes)

Cancer Type	1993–1997			
	Females		Males	
	Observed	Expected	Observed	Expected
Lung & Bronchus	49	34	74*	38.5
Breast-female	57	71.1		
Prostate†			68	65.3
Colorectal	23	35.8	38	29.7

Data from the NYSDOH web site accessed on 03/16/2005. http://www.health.state.ny.us/

Blank box means data not available.

* The number of cases of lung cancer among men in the Cohoes ZIP code is statistically significantly higher than the expected number. All other cancers are within the range that is likely to occur due to random variation according to staff at the NY State Department of Health (NYSDOH).

† Prostate cancer cases are for the years 1994-1998.

Table 9: Cancer Rates in Albany County, New York

Cancer Type	Albany County (1997–2001)			
	Females (cases per 100,000)		Males (cases per 100,000)	
	County	NY Rate	County	NY Rate
Lung & Bronchus	61.8	60.8	95.0	92.3
Breast-female	130.8	139.0		
Prostate			165.7	166.7
Colorectal	54.3	55.0	70.3	75.2
Leukemia	10.8	10.2	15.2	17.3
Brain & Nervous System	5.8	6.3	8.0	8.8
Melanoma of Skin*	6.2	10.0	11.5	15.8
Non-Hodgkin's Lymphoma	16.8	17.4	23.0	23.6
Thyroid	12.1	12.3	4.8	4.4
Urinary Bladder	14.3	12.7	47.6	46.2
Multiple Myeloma	3.8	4.7	6.5	7.2
All Cancers (Malignant Tumors)†	423.6	453.7	583.1	587.5

Data are from the NYSDOH web site accessed on 03/16/2005. http://www.health.state.ny.us/ The rates are age-adjusted to the 2000 U.S. population. The NY Rate is the rate for NY State excluding New York City.

Blank box means data not available.

* Albany County melanoma rates are statistically significantly lower than the NY rates.

† Albany County rate for all cancers among women is statistically significantly lower than the NY rate.

Other than the three rates noted above, according to NYSDOH staff, all other cancer rates for Albany County are within the range that is likely to occur due to random variation.

Appendix C - Glossary

Acute	Occurring over a short time [compare with chronic].
Acute exposure	Contact with a substance that occurs once or for only a short time (up to 14 days) [compare with intermediate duration exposure and chronic exposure].
Adverse health effect	A change in body function or cell structure that might lead to disease or health problems
Ambient	Surrounding (for example, ambient air).
Background level	An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.
Cancer	Any one of a group of diseases that occur when cells in the body become abnormal and grow or multiply out of control.
Cancer risk	A theoretical risk for getting cancer if exposed to a substance every day for 70 years (a lifetime exposure). The true risk might be lower.
Carcinogen	A substance that causes cancer.
Chronic	Occurring over a long time [compare with acute].
Chronic exposure	Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]
Cluster investigation	A review of an unusual number, real or perceived, of health events (for example, reports of cancer) grouped together in time and location. Cluster investigations are designed to confirm case reports; determine whether they represent an unusual disease occurrence; and, if possible, explore possible causes and contributing environmental factors.
Comparison value (CV)	Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

Completed exposure pathway	[See exposure pathway].
Concentration	The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.
Contaminant	A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.
Dermal	Referring to the skin. For example, dermal absorption means passing through the skin.
Dermal contact	Contact with (touching) the skin [see route of exposure].
Detection limit	The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.
Dose (for chemicals that are not radioactive)	The amount of a substance to which a person is exposed over some period. Dose is a measurement of exposure. Dose is often expressed as milligram (amount) per kilogram (a measure of body weight) per day (a measure of time) when people eat or drink contaminated water, food, or soil. In general, the greater the dose, the greater the likelihood of an effect. An "exposure dose" is how much of a substance is encountered in the environment. An "absorbed dose" is the amount of a substance that actually got into the body through the eyes, skin, stomach, intestines, or lungs.
Environmental media	Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.
Environmental media and transport mechanism	Environmental media include water, air, soil, and biota (plants and animals). Transport mechanisms move contaminants from the source to points where human exposure can occur. The environmental media and transport mechanism is the second part of an exposure pathway.
EPA	United States Environmental Protection Agency.
Exposure	Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [see acute exposure], of intermediate duration, or long-term [see chronic exposure].

Exposure assessment	The process of finding out how people come into contact with a hazardous substance, how often and for how long they are in contact with the substance, and how much of the substance they are in contact with.
Exposure pathway	The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or are exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.
Geographic information system (GIS)	A mapping system that uses computers to collect, store, manipulate, analyze, and display data. For example, GIS can show the concentration of a contaminant within a community in relation to points of reference such as streets and homes.
Hazard	A source of potential harm from past, current, or future exposures.
Indeterminate public health hazard	The category used in ATSDR's public health assessment documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking.
Incidence	The number of new cases of disease in a defined population over a specific time period [contrast with prevalence].
Ingestion	The act of swallowing something through eating, drinking, or mouthing objects. A hazardous substance can enter the body this way [see route of exposure].
Inhalation	The act of breathing. A hazardous substance can enter the body this way [see route of exposure].
Intermediate duration exposure	Contact with a substance that occurs for more than 14 days and less than a year [compare with acute exposure and chronic exposure].
mg/m3	Milligram per cubic meter; a measure of the concentration of a chemical in a known volume (a cubic meter) of air, soil, or water.
Migration	Moving from one location to another.

Minimal risk level (MRL)	An ATSDR estimate of daily human exposure to a hazardous substance at or below which that substance is unlikely to pose a measurable risk of harmful (adverse), noncancerous effects. MRLs are calculated for a route of exposure (inhalation or oral) over a specified time period (acute, intermediate, or chronic). MRLs should not be used as predictors of harmful (adverse) health effects [see reference dose].
Morbidity	State of being ill or diseased. Morbidity is the occurrence of a disease or condition that alters health and quality of life.
Mortality	Death. Usually the cause (a specific disease, a condition, or an injury) is stated.
No apparent public health hazard	A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.
No public health hazard	A category used in ATSDR's public health assessment documents for sites where people have never and will never come into contact with harmful amounts of site-related substances.
Pica	A craving to eat nonfood items, such as dirt, paint chips, and clay. Some children exhibit pica-related behavior.
Point of exposure	The place where someone can come into contact with a substance present in the environment [see exposure pathway].
Population	A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).
ppb	Parts per billion.
ppm	Parts per million.
Prevalence	The number of existing disease cases in a defined population during a specific time period [contrast with incidence].
Prevention	Actions that reduce exposure or other risks, keep people from getting sick, or keep disease from getting worse.

Public availability session	An informal, drop-by meeting at which community members can meet one-on-one with ATSDR staff members to discuss health and site-related concerns.
Public comment period	An opportunity for the public to comment on agency findings or proposed activities contained in draft reports or documents. The public comment period is a limited time period during which comments will be accepted.
Public health action	A list of steps to protect public health.
Public health assessment (PHA)	An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health.
Public health hazard	A category used in ATSDR's public health assessments for sites that pose a public health hazard because of long-term exposures (greater than 1 year) to sufficiently high levels of hazardous substances or radionuclides that could result in harmful health effects.
Public health hazard categories	Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.
RCRA	[see Resource Conservation and Recovery Act (1976, 1984)]
Receptor population	People who could come into contact with hazardous substances [see exposure pathway].
Reference dose (RfD)	An EPA estimate, with uncertainty or safety factors built in, of the daily lifetime dose of a substance that is unlikely to cause harm in humans.
Registry	A systematic collection of information on persons exposed to a specific substance or having specific diseases.

Resource Conservation and Recovery Act (1976, 1984) (RCRA)	This Act regulates management and disposal of hazardous wastes currently generated, treated, stored, disposed of, or distributed.
RfD	[see reference dose]
Risk	The probability that something will cause injury or harm.
Route of exposure	The way people come into contact with a hazardous substance. Three routes of exposure are breathing (inhalation), eating or drinking (ingestion), or contact with the skin (dermal contact).
Safety factor	[see uncertainty factor]
Sample	A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.
Solvent	A liquid capable of dissolving or dispersing another substance (for example, acetone or mineral spirits).
Source of contamination	The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.
Special populations	People who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.
Substance	A chemical.
Surface water	Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs.

Toxicological profile	An ATSDR document that examines, summarizes, and interprets information about a hazardous substance to determine harmful levels of exposure and associated health effects. A toxicological profile also identifies significant gaps in knowledge on the substance and describes areas where further research is needed.
Toxicology	The study of the harmful effects of substances on humans or animals.
Tumor	An abnormal mass of tissue that results from excessive cell division that is uncontrolled and progressive. Tumors perform no useful body function. Tumors can be either benign (not cancer) or malignant (cancer).
Uncertainty factor	Mathematical adjustments for reasons of safety when knowledge is incomplete. For example, factors used in the calculation of doses that are not harmful (adverse) to people. These factors are applied to the lowest-observed-adverse-effect-level (LOAEL) or the no-observed-adverse-effect-level (NOAEL) to derive a minimal risk level (MRL). Uncertainty factors are used to account for variations in people's sensitivity, for differences between animals and humans, and for differences between a LOAEL and a NOAEL. Scientists use uncertainty factors when they have some, but not all, the information from animal or human studies to decide whether an exposure will cause harm to people [also sometimes called a safety factor].
Urgent public health hazard	A category used in ATSDR's public health assessments for sites where short-term exposures (less than 1 year) to hazardous substances or conditions could result in harmful health effects that require rapid intervention.
Volatile organic compounds (VOCs)	Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

Other Glossaries and Dictionaries:

Environmental Protection Agency (http://www.epa.gov/OCEPAterms/)

National Center for Environmental Health (CDC)
(http://www.cdc.gov/nceh/dls/report/glossary.htm)

National Library of Medicine (NIH)
(http://www.nlm.nih.gov/medlineplus/mplusdictionary.html)

Appendix D – Response to Comments

ATSDR received written comments about the Draft Norlite Corporation Public Health Assessment from 12 individuals. The comments related to health issues, the document, or how ATSDR evaluates a site are summarized below. In some cases, we have combined several comments on the same issue. ATSDR's response to each comment is provided below the comment. Comments related to the design or permitting requirements for Norlite will not be addressed by ATSDR. Those comments were sent to NYSDEC for their consideration.

1. I am a Grandmother who lived in the apartments near Norlite for three years in the mid to late 1990s. In May 2004, I was diagnosed with an advanced stage of non-Hodgkin's Lymphoma. I believe the cancer was caused by the carcinogenic chemicals in Norlite's emissions.

Because you have moved several times during your life, it is difficult to link your cancer to exposures that may have occurred where you currently live or work or where you lived or worked at any time in the past. Cancer develops slowly in people, usually appearing 5 to 40 years after exposure to a cancer-causing agent or repeated long-term contact that occurs for many years. Data in the New York cancer registry show that for the years 1997 to 2001 the non-Hodgkin lymphoma (NHL) cancer rates in Albany County were the same as or slightly lower than the New York state rates. ATSDR reviewed Norlite stack emissions data from 1999 to the present and found no evidence that Norlite is emitting currently (or in the last few years) chemicals at concentrations in the community that would cause cancer. With only a few exceptions, cancers are not the result of exposure to a specific chemical emitted by one single company in the community. There are many factors that influence who ends up having cancer, when it develops, and which type of cancer they have. Unfortunately, we do not know enough about NHL to predict who will get it and be able to prevent people from getting it. See Table 9 and the Community Health Concerns section of this health assessment for further discussion on cancer.

2. I live near Norlite. Five people died of cancer in a six-house area.

Many factors contribute to the incidence of cancer, including heredity, age, lifestyle factors (like smoking and diet), and exposures to some chemicals, x-rays, sunlight, and tobacco smoke. Different factors are linked to different kinds of cancer, so the incidence of several different types of cancer in a particular geographical area does not indicate a common cause for the cancers. Cancer occurs in 3 out of every 4 families in the US. In New York, nearly 1 in 4 deaths is due to cancer. The fact that 5 people have died of all types of cancer in 6 homes is not an indicator of a common environmental exposure.

3. Add data on multiple myeloma. I know of 3 cases on the same street that is close to Norlite, this may indicate that multiple myeloma cancer rates are elevated in our area.

The Albany County and New York rates for multiple myeloma cases in the years 1997–2001 were added to Table 9. The Albany County rates for both males (6.5 cases per 100,000) and females (3.8 per 100,000) were slightly lower than the rates for the state of New York. The multiple myeloma rates for New York (excluding New York City) were 4.7 cases per 100,000 females and 7.2 cases per 100,000 males.

4. We have 4 children in Maplewood who have autism. One used to live in Cohoes. I am concerned about the increase of autism in our area.

We added a discussion of autism in the Community Health Concerns section in response to this comment.

5. I have lived here 73 years. My children had problems breathing and were constantly sick. They moved away 8 years ago and now they are in good health with no respiratory problems.

Outdoor air pollution can trigger or worsen respiratory diseases. Ozone exposure has been linked with adverse health effects like nose and throat irritation, respiratory symptoms, and decreases in lung function even in healthy persons. The capitol region of New York is known to occasionally have ozone concentrations that could cause health effects. There are also many indoor triggers for asthma and other respiratory problems, such as tobacco and wood smoke, pollen, dust mites, cockroaches, animal dander, chemicals and strong odors (from perfume, paint, hair spray, etc.), cold air, mold spores, and colds or flu. We are glad to hear that your children's health has improved in their new location(s). It is not possible for us to determine whether their breathing problems were caused by indoor or outdoor air conditions or other factors. Allergy testing during the time they were sick could have helped determine what factors in their environment triggered their breathing problems.

6. You used Norlite's laboratory data. I think that testing should be done by an independent lab.

The laboratory analytical data used in our report are in Tables 1–5 and Table 7. Tables 1–3 are based on data from independent laboratories that were hired to sample and analyze the Norlite stack emissions. The data in Table 4 are from a sample taken by the Citizens Environmental Coalition that was analyzed by an independent lab hired by them. Table 5 is the only table that contains data from the Norlite laboratory. Table 5 also contains analytical data from the NYSDEC laboratory for the same Norlite waste streams. No data from Norlite's lab were used when we did not have additional data from an independent laboratory with which to compare their data. The data in Table 7 was from the New York State Department of Transportation (NYSDOT).

In the text of the Norlite Public Health Assessment, we discuss the laboratory data for dust samples taken in the community by the New York State Department of Environmental Conservation (NYSDEC) and Norlite. The samples taken by Norlite were analyzed by an independent laboratory—not Norlite's lab. The text also discusses two macroinvertebrate studies, one paid for by Norlite but done by an independent laboratory, and one done by NYSDEC laboratories. None of our conclusions and recommendations are based on Norlite laboratory data.

7. You took other people's word and information from different agencies about emissions, etc. ATSDR should do your own testing.

You are correct; ATSDR did not do any environmental testing in the Cohoes area. ATSDR does not have testing laboratories. Our reports are based on data obtained from other agencies and laboratories. ATSDR has chemists on staff who review the data and the laboratory methods that were used to determine whether they are of acceptable quality to use in evaluating public health

effects. As this report discusses in the Water and Sediment Pathway section, the NYSDOT data were of questionable quality. The Soil Pathway section in the public comment draft of this document discussed that the TCLP method used by Norlite and EPA to analyze for metals cannot be used to determine health effects. We requested that total metals analyses be done to determine the metals concentrations that might be in fugitive emissions. NYSDEC and Norlite did these analyses and these new data are in Table 5. The text also notes that the methods used by Norlite and NYSDEC to analyze the community dust samples were not suitable for making public health decisions.

While it is true that we use information from other agencies, it is not true that we "take their word." ATSDR bases the conclusions and recommendations in its documents on staff reviews of all available data on each site and our determination of the quality of these data.

8. I am deeply concerned that people who live near the Norlite facility are inhaling dust every day that contains high concentrations of silica, thallium, mercury, lead, and cadmium. Research studies prove lead and mercury are detrimental to humans, and silica inhalation causes silicosis. Why does your report say the levels of these chemicals are acceptable? Any exposure is too much exposure, like you cannot be "a little pregnant."

ATSDR is also concerned about the public's inhalation of airborne dust from Norlite. That is why we recommended that air samples be collected and analyzed to determine the sizes and concentrations of particulates and metals coming from Norlite. NYSDEC is developing plans to do air monitoring in the neighborhood near Norlite.

NYSDEC took samples of Norlite clinker, bag house dust, multi-clone dust, and finished product and analyzed them for metals. Those data are presented in the revised Table 5. See the Fugitive Emissions section for a discussion of the new data.

It is the concentration of a chemical (the dose) that a person receives that determines whether they will have health effects and what those effects will be. To illustrate this, we repeat the example used by Betty Willis at the ATSDR public meeting in May 2005. If you have a severe headache and take one aspirin, it probably will not affect your headache. If you double the dose (take two aspirins), your headache may become less severe, but not go away. However, if you took four aspirins (a 4-times greater dose), you are likely to get relief from the headache. A few additional aspirin are likely to cause stomach irritation, which is a reversible health effect. However, if you took many aspirins, a stomach ulcer or internal bleeding could occur, and if a large enough dose were taken, it would kill you. There are concentrations of thallium, mercury, lead, and cadmium that will not cause adverse health effects.

Table 5 shows the total metals concentrations in composite samples of Norlite shale, air pollution control equipment (APCE) dusts, clinker, and product. Direct physical contact with these Norlite materials would not be a health hazard for adults and most children. Since access to the site is limited and there were no reports of trespassing onto the site, there is no direct contact with these materials and it is very unlikely that dust blowing from the plant would be a chemical hazard. Air monitoring for particulate concentrations and particle sizes is still needed to determine if the dust is a health hazard.

To address this person's concern about silica, we added a discussion of silicosis in the Public Health Concerns section.

9. How will the dust and chemical residues affect our health?

As discussed in the Soil Pathway section, contact with the dust and soil in the residential areas poses no apparent public health hazards. However, we do not know whether inhalation of the dust particles themselves is a health hazard. We have recommended that air samples be taken at the fence-line or in the neighborhood near the plant.

10. Why don't you recommend that our yards and gardens be sampled?

There are no data at this time to support analyzing soil samples from yards or gardens in the Cohoes area. We recommended a methodical approach to determining what the residential exposures may be to chemicals from Norlite. First, we requested analyses of on-site materials that can blow into residential areas to determine if chemicals are present at elevated concentrations that might cause health effects. Recent analyses of the Norlite dusts and products (see Table 5 and the Fugitive Emissions section) show that the metals present are below concentrations known to cause adverse health effects in adults or children even if they are in contact with the Norlite materials.

We have also requested air monitoring at the fence-line, or in residential areas likely to be impacted by blowing materials, for contaminants of concern as well as particulates. If the data indicate that chemicals from Norlite are blowing off-site at concentrations that might cause adverse health effects, then future documents could recommend targeted soil sampling to determine concentrations of specific chemicals in yards and gardens near the plant.

Under typical growing conditions, fruits and vegetables do not adsorb metals at levels that could cause adverse health effects in humans. If fruits and vegetables are thoroughly washed and root crops are peeled before they are eaten, adverse health effects should not occur.

11. The air modeling used meteorological data from the Albany airport. Local data should be used because Cohoes is in the Hudson River valley and the valley tunnels winds north and south here. Winds at the airport may blow in different directions.

We agree that if local meteorological data are available they should be used. However, the necessary meteorological data are not available in the Cohoes area, so the Albany Airport weather station data were used. The predominant wind directions at the Albany airport are north and south, so the model predicted the air concentrations to be higher north and south of the stacks. The model's predictions of the direction of impacts are in agreement with your local observations.

If the Hudson River Valley "tunnels the wind," one would expect the wind speeds to be higher (faster) than in a flat area. Higher wind speeds disperse pollutants more quickly (dilute the plume) which result in predictions of lower air concentrations. Therefore, if significantly more wind tunneling occurs in the Cohoes area than at the Albany airport, the actual ground-level concentrations would be lower than predicted by the model.

12. The Salt Kill Creek is contaminated by discharges from Norlite. When fish swim up the creek to spawn, they die. I have seen numerous fish kills in the Salt Kill Creek.

According to a macroinvertebrate study conducted by NYSDEC in the 1990s, the Salt Kill Creek at that time was contaminated and did not support aquatic life. The state issued water discharge

permits to Norlite that required them to treat their process wastewaters and to discharge the treated water to the Mohawk River. Currently Norlite is only allowed to discharge stormwater runoff and groundwater that accumulates in the quarry to the Salt Kill Creek. Two macroinvertebrate studies conducted in July 2004 showed that Salt Kill Creek has recovered and none of the measurements exceeded the New York Biological Impairment Criteria. See the Water and Sediment Pathway section for further discussion about Salt Kill Creek.

It would be understandable if the commenter saw fish kills in the 1990s or before but according to NYSDEC staff, no fish kills have been reported in the last few years. As stated at the public meeting, any fish kills should be immediately reported to NYSDEC so they can investigate the cause of death.

13. What will be the health effects if the 18 holding tanks at Norlite all explode?

The materials in the tanks are fuels for the kilns, so an explosion of all the tanks is likely to cause a major fire that might spread to other buildings at the plant and to nearby homes. Health effects from burns and smoke inhalation due to the fire can range from minor, reversible health effects to death. An explosion could also cause pieces of tanks, piping, and buildings to be blown some distance from the tank farm, causing additional injuries or deaths.

US EPA and NYSDEC regulations require Norlite to have a health and safety program and Contingency Plan that contains written emergency procedures and equipment. The Norlite permit application describes the design features and procedures they have in place to prevent fires and explosions. We suggest that NYSDEC and Norlite discuss with the community the fire suppression and safety programs in place at the plant so that residents will have a better understanding of the likelihood that such an event would or would not occur.

14. The report is one-sided. It does not contain the concerns of the community. You ignored the health effects occurring in the seven streets in the neighborhood near the site where there are many kids.

The document was written to address the community concerns that were brought to ATSDR's attention by the two petitioners, Assemblyman Prentiss and the Citizens Halting Risks of Norlite's Industrial Contaminants (CHRONIC). The primary concern was whether health effects noted in the community were due to exposures to chemicals at Norlite. To answer that concern we first looked at the chemicals Norlite is allowed to burn, how they handle, store, and use the chemicals, and what ultimately happens to all the chemicals. Next, we looked at how the community could be exposed to the various kinds of chemicals (air, water and sediment in Salt Kill Creek, and soil). Then we looked for any data that were available to determine to what concentrations of the chemicals people might be exposed and provided our conclusions based on whether those exposures would cause health effects. In addition, the Community Health Concerns section of the report discusses each health condition raised by the petitioners. To further address the community's concerns, we have included in this appendix a response to all health concerns raised by the community during the public comment period. In addition, we added to this document information on autism, silicosis, and multiple myeloma. Every health effect and health concern in the community that was brought to our attention has been addressed in this final document.

15. I felt that ATSDR presented factual information and was not biased to one group.

Thank you.

16. If you made Norlite toe the mark long ago, you would not have all the problems you have now. You probably are paid off by Norlite to turn your heads and see nothing.

ATSDR's only involvement with Norlite Corporation has been to collect data and information to prepare this public health assessment. ATSDR has no regulations or regulatory authority over any industry. ATSDR is a public health agency funded by Congress. We received no money from Norlite Corporation. Furthermore, we were not offered any money "to turn our heads and see nothing." The conclusions in this document are based on ATSDR staff's evaluation of all available data relevant to the public's exposure to emissions from the Norlite plant. Norlite received a copy of this document at the same time as the public.

17. I still do not have an understanding of how to prevent exposure. Is there no final solution?

The data available for the Cohoes area indicate that the community's exposures to chemicals from Norlite are not a public health hazard. However, we need additional sampling data to determine whether inhalation of dust (particulates) that blows off site could be a public health hazard. We recommend that Norlite maintain existing procedures for dust control and look for additional ways to control dust migration off their site. We recommend that all residents follow EPA guidelines for reducing emissions that contribute to ozone formation. We also recommend that on ozone advisory days, active children and adults and people with lung disease, such as asthma, reduce prolonged or heavy exertion outdoors.

18. Local residents burn trash outside and in their woodstoves. Shouldn't they be told that the pollutants created by open burning, especially when there are plastics in it, are worse than the dioxins and other pollutants put out by Norlite?

Open burning does not generate high enough temperatures to get good combustion of wastes and wood, so you are correct that such burning does generate higher concentrations of dioxins, furans, and other pollutants than controlled combustion sources like Norlite. In addition, the emissions from burn barrels, trash piles, and wood stoves are released at ground level in the yards where children and adults can be exposed before much dilution can occur. We recommend that residents not burn trash.