

# Health Consultation

W. R. GRACE SITE  
(a/k/a WR GRACE)

CAMBRIDGE, MIDDLESEX COUNTY, MASSACHUSETTS

EPA FACILITY ID: MAD001409150

MARCH 20, 2001

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

## **Health Consultation: A Note of Explanation**

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

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

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HEALTH CONSULTATION

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Prepared by:

Exposure Investigation and Consultation Branch  
Division of Health Assessment and Consultation  
Agency for Toxic Substances and Disease Registry

## Background and Statement of Issues

The Agency for Toxic Substances and Disease Registry (ATSDR) was requested by the U.S. Environmental Protection Agency, Region I (EPA) to review and comment on results from environmental sampling conducted at the W. R. Grace site in Cambridge, Massachusetts. Specifically, ATSDR was asked whether the asbestos contamination in the surface soil poses an immediate health threat under the current site conditions and usage [1].

The W. R. Grace Site consists of four parcels of land owned by four separate entities, they include; One Alewife Center, Russell Field Park, Alewife T Red Line Head House, and W.R. Grace [2]. The four parcels are treated as one site for public health impact, and encompass approximately 40 acres of land. The site is situated in a densely populated area with residential dwellings located within 200 yards [2]. The W. R. Grace portion of the site encompasses 27 acres and has been utilized for various industrial and commercial operations since the 1800's[2]. The site currently has two large buildings, an asphalt parking lot, open grassy areas, and a pond. One Alewife Center is located north of the Grace site. Russell Field Park and the Alewife T Red Line Head House are located east and southwest of the Grace site, respectively.

Use of asbestos at the Grace site may go back as far as the 1930's as part of a brake lining development program [2]. In addition, research and development activities for asbestos-containing fireproofing occurred in the 1960's and 1970's [2]. Due to past activities at the Grace portion of the site, surface and subsurface soil sampling were conducted in the late 1990's [2]. Samples were analyzed via Polarized Light Microscopy (PLM). Asbestos was detected in the soil at either trace amounts or percentage levels in 5.8% of the samples collected. Asbestos levels in the subsurface soil ranged up to 12% [2].

In the 1980's, soil was excavated at the Grace portion of the site while constructing a subway tunnel. The soil was stored temporarily at what is now Russell Field Park [2]. A layer of top soil up to 3-feet deep was subsequently placed over the park. The top soil served to level areas of the park and reduce the potential exposure to waste [2,3].

EPA conducted additional sampling in the Fall of 2000 to determine any immediate threat posed by asbestos contamination at the site. The sampling focused on asbestos contamination in the surface soil where fibers are likely to be released into the air. Previous sampling results were used to select sampling locations in order to present a worst case scenario with respect to asbestos levels [3]. The EPA collected 52 surface soil samples from the site and analyzed them by PLM [2]. The EPA further analyzed 28 of the 52 samples using the more definitive Transmission Electron Microscopy (TEM) method [2]. During the sampling event, personal air samples were collected from some of the workers to monitor possible exposure to asbestos. All personal samples were analyzed by Phase Contrast Microscopy (PCM) [2]. One of the personal samples was additionally analyzed by TEM [3]. Three bulk samples were also taken from concrete boards present at the site and analyzed by PLM [2].

## **Asbestos Sampling Results**

All 52 surface soil samples (0-3 inches) collected from the site showed asbestos concentrations less than 1%. Approximately 20% of the surface soil samples had a "trace" of asbestos (above the detection limit, but less than 1 estimated volume %) as reported by PLM analysis. TEM analysis of 28 of the surface soil samples verified the low PLM results. TEM asbestos concentrations were all < 0.03% by weight ("trace" levels) [2].

Three bulk analysis samples were taken from concrete board material present on site. The analysis showed the material to contain 15% chrysotile asbestos [2].

Results of personal air samples collected from the breathing zone of workers were all below the applicable OSHA worker standard of 0.1 fibers per cubic centimeter (f/cc). The PCM results ranged from 0.065 to 0.0034 f/cc [2]. TEM verification of the highest personal sampling result (0.065 f/cc) did not detect any asbestos fibers in the sample [3].

## **Discussion**

Asbestos is a general term used to describe a group of six naturally occurring fibrous minerals. Asbestos was used extensively in commercial products due to its high tensile strength, flexibility, durability, and heat insulation properties [4]. However, adverse health effects began to be seen in miners, ship builders, and in other occupations where asbestos exposure occurred. Workers in these occupations displayed increased rates of lung cancer, malignant mesothelioma (a rare cancer affecting the lung lining and abdominal cavity), and pulmonary interstitial fibrosis (asbestosis). Exposure occurred from inhalation of the asbestos fibers, with effects not being manifested until 10 to 20 years or more following initial exposure [4].

Asbestos contamination is ubiquitous in our environment due to its use in brake linings, insulation, and other products. Since asbestos persists in the environment for very long periods of time, samples collected from the soil and air, particularly in urban areas, commonly detect low levels of asbestos fibers. The risk associated with these levels is based on the concentration inhaled and the length of exposure. Smoking, individual susceptibility, fiber type/characteristics, and other factors also play a role [4]. The quantified risk of developing lung cancer and mesothelioma (the most sensitive health endpoints) are based on data from occupational studies.

Past sampling activities at this site have identified asbestos contamination in the soil, particularly in the subsurface or asphalt-covered soil where concentrations have been detected as high as 12% [2]. This most recent sampling event was undertaken to assess the immediate risk to the public, and focused on identifying contamination at the surface where fibers are likely to be released into the air and inhaled. Sampling locations were not randomly selected, but were chosen based on previous sampling results and information provided by area residents to target areas of suspected contamination.

The results of all 52 surface soil samples analyzed by PLM were less than 1% for asbestos. The more definitive TEM analysis of the surface soil samples showed asbestos concentrations to be  $\leq 0.03\%$  (by weight). These results fall into the range of concentrations typically found in surface soils at urban areas throughout the country [4], and suggest that asbestos contamination is not present in the surface soil at levels that would pose a significant health risk. Sufficient concentrations of asbestos fibers, coupled with the right conditions (e.g. dry, windy, exposed soil, etc.) are required to generate air concentrations of health significance. The sampling results indicate that surface soil concentrations are not sufficient to generate significant ambient air levels, even if the environmental conditions are favorable. Indeed, the personal air monitors placed on workers engaged in activities at the site did not detect any asbestos fibers.

Previous sampling detected much higher asbestos levels below the surface. However, unless excavation or other intrusive activities occur at the site, this contamination does not pose an immediate health threat to the public. If site conditions do change such that the subsurface soils are brought to the surface, a re-assessment of the property would be warranted.

The concrete boards and chunks on site containing 15% asbestos are unlikely to pose a threat. The concrete is non-friable (cannot be crushed or pulverized by hand) [3], and the fibers are bound in the matrix. Soil samples purposely collected adjacent to the concrete did not detect any elevated fiber concentrations.

### Child Health Initiative

ATSDR considers the unique susceptibility of children in the evaluation of all hazardous waste sites. Children may have higher levels of exposure since they are more likely to disturb fiber-laden soils while playing. They are also lower to the ground, and have faster breathing rates that may increase the level of exposure to asbestos. In addition, the long-term retention of asbestos fibers in the lung, and the long latency period between exposure and onset of asbestos-related respiratory disease (10 to 40 years), suggest that an individual exposed earlier in life may be at greater risk than those exposed later in life [4].

The levels of asbestos in the surface soil at this site are very low, and within the range of background for an urban environment [4]. Therefore, it is very unlikely that ambient asbestos concentrations could be generated at levels of concern for children.

### **Conclusions**

1. Based on the sampling results provided, the asbestos levels present in the surface soils on site do not pose an immediate or long-term public health hazard.
2. Subsurface asbestos contamination does not pose an immediate health hazard as long as the waste remains buried, and is not brought to the surface.

## **Recommendations**

Re-evaluate the public health impact of the site if conditions change where exposure to the subsurface soil can occur.

## References

1. EPA Memorandum from Mary Ellen Stanton, EPA, To William Sweet, ATSDR, February 15, 2001.
2. Preliminary Assessment/Site Investigation Report for the W.R. Grace Site, Cambridge, MA, 22 August 2000 and 6 & 7 September 2000.
3. Verbal comments to ATSDR from Mary Ellen Stanton, EPA on March 13, 2001.
4. ATSDR Toxicological Profile for Asbestos.

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