

Health Consultation

COS COB POWER STATION
GREENWICH, FAIRFIELD COUNTY, CONNECTICUT

JULY 21, 1999

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

COS COB POWER STATION

GREENWICH, FAIRFIELD COUNTY, CONNECTICUT

Prepared by:

Connecticut Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

The conclusions and recommendations in this health consultation are based on the data and information made available to the Connecticut Department of Public Health and the Agency for Toxic Substances and Disease Registry. The Connecticut Department of Public Health and the Agency for Toxic Substances and Disease Registry will incorporate additional information if it becomes available. The incorporation of any additional data could change the conclusions and recommendations listed in this document.

Background and Statement of Issues

The Environmental Protection Agency (EPA) has requested that the Connecticut Department of Public Health (CT DPH) determine whether the existing friable asbestos conditions at the Cos Cob Power Plant site present a public health threat. This health consultation is being conducted through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). As specifically requested by EPA, the CT DPH will evaluate the health hazard posed by the potential release of asbestos from the vacant Cos Cob Power Plant to inhabited areas surrounding the site.

Site Location and Demographics

The Cos Cob Power Plant site is located in Greenwich, Connecticut on Sound Shore Drive. The site covers approximately 12 acres. The site consists of the main building where power generation occurred and a number of smaller buildings. The town uses a southern portion of the site for storage of fill and crushed rock.

The Metro North Railroad tracks border the site to the north and are approximately 20 feet from the northern facade of the main building. The Mianus River lies to the east and south. Two large substations are located on the western side of the site, beyond which are located the Waterford Condominiums at 4 Sound Shore Drive. The Cos Cob Train Station and parking lots are located across the train tracks to the northwest and an office building is located to the northwest on the same side of the train tracks as the site. (See Appendix A for Site Map.)

Trespassers can access the site on foot from the railroad tracks and the Mianus River shore. Vehicle access to the site can occur through a driveway on South Shore Drive.

The estimated population residing within one-mile of the site is approximately 6800. The surrounding area is residential and commercial. Condominium complexes are located to the north and west. The closest residential area is the condominium complex approximately 400 feet north on the other side of the railroad tracks.

According to the National Weather Service, the prevailing winds in this area are out of the south, south-east toward the closest residential area.

Site History

The facility operated from 1907 to 1986 as a power plant dedicated to providing electricity to the New York, New Haven and Hartford Railroad. Coal powered the facility until the 1970's, when it was converted to oil. The operation consisted of twelve boilers and three generators that were originally rated at 3,000 kilowatt/11,000 volts/25 cycles per second. Improvements had been made to the facility in the early 1910's which had increased its capacity to 500,000 kilowatts/day during its peak operation in the 1940's.¹

The main building consists of east and west boiler rooms, a turbine room, a control/bus room and a main bus room. The east boiler room still contains six, 60 foot tall boilers, the west boiler room area includes tool and equipment rooms and locker and shower rooms.

The site was decommissioned in September of 1986 and was permanently closed in October of that same year. The property has remained vacant since that time. The town of Greenwich acquired most of the property in 1988 from the CT Department of Transportation by a Special Act of the Connecticut General Assembly. The CT Department of Transportation retained a portion of the site adjacent to the railroad tracks.

Site Visit

A site visit was conducted on June 16, 1999 by Jennifer Kertanis, CT DPH; Beth Timm, ATSDR; and representatives from EPA, Emergency Planning and Response Branch, and Osprey Environmental Engineering, consultant for the town of Greenwich (see Site Visit Photographs in Appendix B). Access to the main building was achieved through a locked door on the northern face of the building. Most of the lower level windows have been boarded up by the town to prevent trespassers from entering the site. No posted signs warning of environmental hazards were observed; No Trespassing signs have been posted.

The site visit focused primarily on the interior of the main building with special emphasis on the existence of asbestos containing materials and the conditions of those materials. Thermal insulation and fire resistant materials containing asbestos are present throughout the building. Piping insulation is present in very large quantities particularly in basement piping and the boiler rooms. Transite board, a cementitious material containing chrysotile asbestos cast into flat and corrugated panels and conduits, is present throughout the main building as well.

It is obvious that the building has not been maintained and significant damage to the building and its contents have occurred as a result of aging, weathering and vandalism. Throughout the site visit, we observed evidence of wall and roofing failure, including missing sections of roof and cement and roofing materials on floors. Many windows

were broken. Stairwells and catwalks were rusting and in some instances were missing. Numerous tripping hazards were identified, as well as holes in the walking surfaces that could result in falls.

Evidence of water infiltration and saturation of thermal insulation materials was observed throughout the building, but particularly in the west boiler room where the tops of the boilers are open to the environment. In the west boiler room, six boilers that originally had been coated with trowelled-on insulation have received extensive weather damage and the insulation material is falling off these surfaces onto catwalks, stairs and floors below. It is obvious that this material is in a friable condition and in some areas is many inches thick. A similar condition was observed in the basement. Insulated pipes have become water damaged and insulating material is falling onto floor surfaces. During heavy rain events, materials are washed from first and second floors to the basement area as evidenced by the insulation dripping from stairwells. Trenches exist in the building that were used for cooling water intake and outflow from the Mianus River. These trenches now contain asbestos-containing material which can be released into the River.

A number of observations indicated that trespassers have frequented the site in the past. Graffiti was observed on interior walls and soda cans were observed in a few areas of the building. In the basement we observed clothing hanging from a railing. It is unclear if this clothing was from previous workers or transients actually using the site for shelter.

Throughout the building transformers of various sizes were observed. The transformers had been emptied. Floors appeared to be stained in some areas. Standing water at a depth of approximately 2.5 feet was observed in the basement area of the main building.

Asbestos-containing tar paper, shingles and corrugated transite were observed in various states of deterioration on the roof of the facility. In one area, this deteriorated material, in the form of a fine powdery-like substance, has collected along the edge of the roof. We observed trees that had seeded themselves and were actually growing out of asbestos containing insulation materials on the roof.

Discussion

Environmental Condition-Main Building

During operation of the facility, coal and in later years, oil were burned to generate steam. This thermal energy was converted to electrical energy. Thermal insulating materials containing asbestos were used to retain heat. These were applied to boilers, piping, generators, tanks and cables. Fire resistant construction materials, also containing asbestos, were used to prevent the spread of fires and can be found in gaskets, panel boards, cabinet doors, cable conduits, caulking materials and floor tiles. Some external building materials including shingles, corrugated transite siding, and corrugated metal asphaltic coatings also contain asbestos.

On June 10, 1999 EPA conducted its initial site visit, at which time samples were collected for asbestos analysis. Two samples were collected in the basement beneath turbines. The material was described as powdery and white with many fibers. These samples were found to contain 80% chrysotile asbestos. One sample was collected from the east boiler room piping. This sample was found to contain 90 % chrysotile asbestos. Two samples of roofing material were sampled. One sample was collected from the ground on the north side of the main building and one sample was collected from the ground on the south side of the main building. These samples were described as dark, thin fibrous material. Each sample was found to contain 70% chrysotile asbestos. Gasket material found on the north side of the main building on the ground was analyzed and found to contain 70% chrysotile asbestos. One last sample was collected from insulation on a small tank located outside the building. This sample was found to contain 25% chrysotile and 5% crocidolite asbestos.

The infiltration of precipitation into the building through failed roofs and broken windows has caused significant deterioration of asbestos-containing materials. Very substantial amounts of insulating materials containing asbestos are in a friable condition. Some of the most significant examples of this are on the tops of the boilers. This is of particular concern because the potential for heavy winds to carry asbestos fibers from this roof top location into the surrounding community is great. Prevailing winds in this area are out of the south and southeast making the nearest condominium complex just north of the site a primary receptor for any airborne contamination that may emanate from the site.

External building materials containing asbestos are also deteriorating and will continue to be a potential source of asbestos fibers.

Exposure Pathways

As a result of the large quantities of friable asbestos within the main building, people who access this building are at risk of exposure to asbestos. There is evidence that trespassers have accessed the site in the past. While access has been made more difficult by locking and boarding up windows and doors, trespassers may still find ways to enter this building.

Residents living adjacent to the site are at risk of exposure to asbestos as a result of sporadic releases from the site. While the friable condition of the asbestos and the exposure of friable asbestos materials to the ambient air increase this risk, such exposures are likely to be sporadic and at low levels. The theoretical increase in risk to nearby residents is likely to be low given the sporadic potential for these events and given background exposure to asbestos.

It is possible that large quantities of asbestos fibers would be released from the Cos Cob Power Plant's main building in the event of a storm, fire or building collapse. Residents in areas surrounding the Cos Cob Power Plant site would be exposed to asbestos fibers during this type of event and potentially for an extended period of time following the

event as a result of asbestos contamination in the surrounding environment. These exposures would increase the risk of developing lung cancer and mesothelioma.

Given wind dispersion and other site conditions, it is not possible to determine the concentration of asbestos to which residents may actually be exposed during sporadic releases or following a major storm, fire or building collapse. However, the quantity of asbestos that could be released from the site is considerable. Sampling has shown that much of the asbestos-containing material consists of as much as 80-90% asbestos. Since asbestos is a human carcinogen and an increase in exposure for nearby residents would likely result in an increased risk of developing cancer, it is critical that any release of asbestos from this site be prevented.

Toxicology Evaluation-Adult and Children's Health

Asbestos is a group of naturally occurring fibrous minerals. Asbestos was used in more than 3,000 products due to its strength and resistance to heat and chemicals. Because asbestos does not evaporate, dissolve, burn or easily undergo reactions, it remains in the environment.

The primary route of exposure to asbestos is through inhalation. Inhalation exposure to asbestos increases the risk of developing lung cancer and mesothelioma, a cancer of the thin membrane that surrounds the lung and other internal organs.¹ Breathing air contaminated with asbestos can also cause scarring of the lung tissue called asbestosis. It may take 10 to 30 years after the exposure for health effects to appear. CT DPH and ATSDR have considered children's health in this evaluation. Because children have a higher respiratory rate their exposures may be greater. In addition, exposure that occurs during childhood could result in disease at a younger age even after a latency of 10-30 years.

Information on the health effects of asbestos in humans comes mostly from studies of people who were exposed to high levels of asbestos in the work place. Inhalation studies that evaluated several concentrations of airborne asbestos fibers have shown an excess cancer risk. Adverse health outcomes associated with exposure are affected by the size of the asbestos fibers. Fibers that range in size from 0.5 to 5 microns in diameter with a length to width ratio of 3:1 are most likely to be deposited in the lung.¹

The health effects from swallowing asbestos are unclear. There is some evidence that ingestion of asbestos fibers may lead to an increased risk of gastrointestinal cancer.

Conclusions

Current conditions at this site pose a public health hazard. Asbestos-containing materials in a friable condition are present throughout the main building. A significant amount of this material is present on the tops of the boilers which, as a result of roof failure, are open to the elements. In addition, a variety of building materials containing asbestos,

including transite board, roofing shingles and tar paper, are on the exterior of the main building and are in various states of deterioration. Current and past exposures are likely due to sporadic airborne releases of asbestos that may occur or have occurred in the past from friable asbestos materials being exposed to ambient air. Trespassers have and will continue to be exposed to asbestos if they access the main building.

The most significant exposure would likely result in the event of a storm, fire or building collapse. This presents an urgent public health hazard. The asbestos emissions associated with any of these events would likely result in significant exposures and widespread environmental contamination.

The main building is deteriorating and numerous physical hazards exist.

Additional hazards may be present at this site. Other chemical wastes associated with power generation and associated equipment may be present on site or may have been disposed of on site. In addition, coal ash, that may contain heavy metals, was used as a fill material in major portions of the site. Further evaluation of the site needs to be conducted to evaluate the potential presence and distribution of additional environmental contamination associated with this type of industrial facility.

Recommendations

The asbestos-containing materials need to be removed in a controlled manner that prevents the release of asbestos to surrounding residential and business areas. This removal needs to occur as soon as possible. There may be on-going, sporadic releases of asbestos currently taking place. In addition, no one can predict when a weather condition, fire, building collapse or other event may liberate and disperse the friable asbestos into the surrounding community. Physical hazards need to be fully evaluated and addressed.

Additional measures should be taken to further restrict site access.

Public education and outreach to nearby residents needs to occur to inform them about the risks associated with exposure to asbestos and trespassing on the site or in the buildings.

The public health significance of other hazards associated with the site (asbestos discharges to the Mianus River, coal ash, PCB releases and storage and/or disposal of hazardous materials) should be evaluated in a follow-up health consultation.

References

1. The New York, New Haven & Hartford Railroad, Cos Cob Power Plant. Historic American Engineering Record, HAER No. CT 142A. August, 1993.
2. Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Asbestos," August, 1995.

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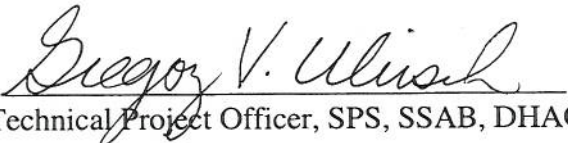
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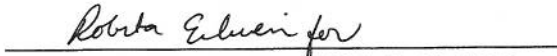
CERTIFICATION

The Health Consultation for the Cos Cob Power Plant site was prepared by the Connecticut Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.



Technical Project Officer, SPS, SSAB, DHAC

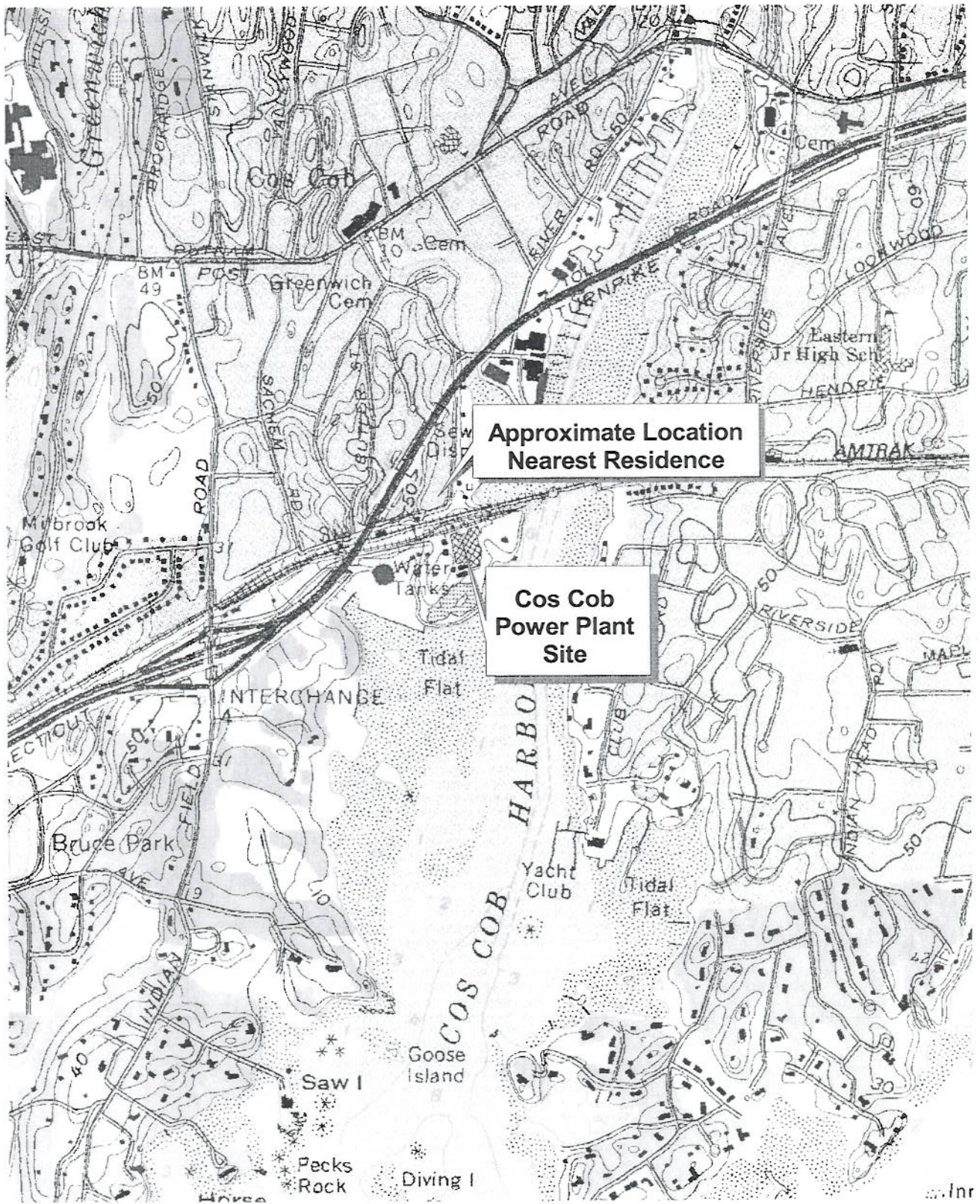
The Division of Health Assessment and Consultation, ATSDR, has reviewed this Health Consultation and concurs with its findings.



Chief, SPS, SSAB, DHAC, ATSDR

APPENDIX A

Site Map



APPENDIX B
Site Visit Photographs

