UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

39191

DATE: FEB 13 1997

SUBJECT: Grand Street Mercury Site
EPA Visit to GE Lighting Facility
February 6, 1997

FROM: John F. Hansen
Project Manager

TO: Grand Street Mercury Site file

On February 6, 1997, EPA visited General Electric ("GE") Lighting Corporate Headquarters in Nela Park, Ohio, to discuss remedial alternatives at Mercury contaminated industrial sites. GE requested that EPA conduct such a visit, as GE claims to have successfully remediated several mercury contaminated industrial buildings to levels considered safe for industrial and/or commercial occupation. GE desired to share this information with EPA, and provided three examples of such remedial project success, namely mercury lamp processing facilities in Jackson, MS, Newark, NJ, and Nela Park (Cuyahoga), OH.

Persons present at the meeting included:

EPA: Lisa Jackson, Chief, NNJRS
John Hansen, SNJRS
Cathleen Garypie, Regional Counsel

GE: Kevin Holtzclaw, Senior Program Manager, Environmental Remediation
Ronald Cotman, General Manager, Lighting and Environmental
Albert Zielinski, Senior Technical Leader, Industrial Hygiene
Dennis Correia, Environmental Project Leader
Tom Harlan, RCRA Environmental Specialist
Jane Gardner, Senior Environmental Counsel
Matthew Tanzer, Environmental Counsel

All documents provided by GE at the meeting are attached to this memorandum.

GE initiated the meeting with a historical description of its involvement in light bulb manufacturing. Lighting manufacturing operations at the Nela Park facility commenced in approximately 1910 as part of the National Electric Lamp Association's ("NELA") research facility, named Nela Park. GE claimed that electric lamps were manufactured continually at the Nela Park facility through 1984 when all manufacturing operations were closed. GE stated that all its electric lamp manufacturing operations are now conducted at fourteen (14) off-site locations. GE stated that it produces a variety of mercury- and non mercury-containing incandescent, fluorescent, halogen and other lighting lamps for industrial, commercial and private use. GE claimed it presently controls approximately one-third of the global electric lamp manufacture market. Additionally, GE claimed that historically, though difficult to state unilaterally, each mercury-containing lamp contains between approximately fifty (50) and 300 milligrams of mercury.

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Jackson Lamp and Glass Plants

GE then briefly described remedial efforts undertaken by GE at the Jackson ("Jackson") Lamp and Gas Plants located in Jackson, MS. Jackson operated from 1940-1985 as a fluorescent lamp assembly plant adjoining a glass tube manufacturing facility. The building was predominantly a single concrete-floored facility with a second wood-floored section in some areas. Widespread mercury, beryllium, cadmium, and arsenic contamination was identified by GE to exist throughout the building. GE explained that mercury contamination was prevalent in the building due to spillage and vaporization of elemental mercury during the manufacture of mercury vapor fluorescent lamps. Mr. Cotman stated that the toxicity of mercury was not appreciated in the 1950's and 1960's, the care and handling practices for mercury were not as stringent as they are today. Therefore, he continued, mercury droplets would fall to cracks and crevices due to spillage. GE explained that beryllium and cadmium contamination were prevalent in the building due to the presence of those compounds in phosphor, which, in this case, is the white powder placed on the interior surface of fluorescent lamps which excites and releases light in the presence of an electrical field. GE explained that arsenic contamination was prevalent in the building as it was used as an additive to the glass making process which renders the glass finer by reducing the potential for gases to get trapped and form bubbles in finished glass.

In 1985, GE decided to remediate the building to below industrial health standards, with a targeted goal of $< 1 \mu g/m^3$ in air. Because the second floor was constructed primarily of wood, and provided no structural support, it was removed entirely and shipped off-site for disposal. Finished flooring was vacuumed to collect visible mercury and handled as hazardous waste. The paper layer between the finished floor and sub-flooring ("paper") was vacuumed and handled as an asbestos containing material ("ACM"). GE claimed that no testing was conducted to determine if the paper contained appreciable concentrations of mercury, though representatives indicated that elemental mercury appeared not to absorb into the paper, but remain suspended on its upper surface as droplets and pools. The sub-floor was stated to not have been tested and disposed of as non-hazardous waste. GE representatives stated that dusts and oils naturally generated in any manufacturing process adsorb to brick, wood, and concrete surfaces over time, covering those surfaces with a grimy ("grime") organic substance. They continued by stating that elemental mercury would vaporize when heated by various parts of the manufacturing process, and, due to its affinity to adsorb onto organic compounds, would adsorb onto that grime. Therefore, after removal of the second floor, GE stated that all remaining walls and the ceiling was power washed with a grease-cutting tri-sodium phosphate ("TSP") cleaning solution to remove the mercury containing grime. Finally, the concrete floor and ceramic tile were etched with a 20% nitric acid solution to remove the surficial portion most likely to have contacted and absorbed mercury.

GE indicated that sewer lines were contaminated at the site and that the sewer was hydrojetted to remove mercury deposits. No mention was made as to whether this was done under the supervision of Mississippi or Federal authorities. GE further indicated that mercury contamination in sewers is a pervasive problem at many GE facilities, and that due to the

difficulty associated in removing the mercury threat, GE has developed an encapsulating technology to reline sewers, leaving sediments in place without disturbing them.

No data was provided by GE to substantiate the long term effectiveness of the remedial activity at the Site, though GE representatives stated that they believed that the goal was achieved initially. GE stated that remediation of exterior soils was not considered at this facility. GE approximated the remediation cost at $2 million. The Jackson facility, claimed to be "much larger" than the Hoboken Lamp Plant (see below), was then sold by GE and is currently occupied by an electrical contractor and an automobile parts store. GE indicated it had no knowledge if later occupants were informed of the historic use of mercury at the facility.

Newark Lamp Plant

GE went on to describe remedial efforts undertaken at the Newark Lamp Plant ("Newark Lamp") in Newark, NJ. GE stated that the Newark Lamp facility was built around 1907, and served as an incandescent lamp assembly plant from 1907-1984. Mercury contamination was stated to have been prevalent at Newark to volatilization of mercury from mercury vacuum pumps used to create negative pressure inside incandescent light bulb casings.

GE stated that the facility is a 482,000 square foot multi-storied, wood floored brick building. In order to sell the building, GE had to comply with the New Jersey State Environmental Responsibility and Clean-up Act ("ECRA"). GE stated that in order to comply with ECRA, it was ordered to remediate mercury contamination in the building. The remedial process included the removal of all process equipment, all office partitions, ductwork, lighting, many electrical fixtures, floor tile and some sections of wood floor. In one areas, the finished wood floor remained, was vacuumed, and encapsulated and sealed. Throughout the building, general plumbing and heating fixtures remained (except ductwork). Mr. Correia recalled that greatest attention was paid to areas where vacuum pumps had been in use, due to a greater likelihood of spillage during mercury replacement. In areas where wood was not present, walls, ceilings and floors were power-washed with TSP, while some floors were sanded to remove surficial contamination. All concrete floors were etched with acid and sealed with a polymeric compound. A waste-water treatment plant was constructed on the premises to treat wash water. After treatment, all water was discharged to the local sewer. All sludge was pressed and fixed on-site with lime, then shipped off-site for disposal as a hazardous waste..

GE claimed that ECRA set a goal of $1\mu g/m^3$ which GE failed to meet during the first monitoring event. GE recleaned several areas in the facility and claims it was able to meet the health standard on the second monitoring event. The total length of time to remediate was claimed by GE to be approximately three (3) years. GE estimated the interior renovation to cost approximately $1.7 million. GE stated that it was not required to conduct any further monitoring, and the sale of Newark Lamp was approved by the State of New Jersey.

Cuyahoga Lamp Plant

GE continued the presentation with the Cuyahoga Lamp Plant ("Cuyahoga") facility in Nela Park, OH. The remediated building was also the site of this meeting. The building was constructed from 1919 to 1921, and operated as lamp assembly plant form 1921 to 1985. GE stated that in 1985, GE closed the assembly plant and decided to convert to building to office space for its employees at Nela Park. GE revealed that the 108,000 square foot multi-storied wooden-floored brick building was pervasively contaminated with mercury, cadmium, thorium and asbestos. GE explained that mercury contamination was prevalent in the building due to spillage and vaporization of elemental mercury during the manufacture of mercury vapor lamps. GE explained that cadmium contamination was present in the building due to spillage of phosphor. GE did not indicate why Thorium contamination was present, though it did reveal that it had had a permit for use on-site. GE stated that asbestos was present on-site in flooring paper, roofing material, and around piping as insulation.

GE stated that in order to renovate the facility, it determined that all process equipment, ductwork, piping, plumbing, natural, nitrogen and hydrogen gas lines, and all non-structural partitions required removal. During the removal of this equipment, GE identified numerous areas under said equipment containing free phase elemental mercury. GE stated that this mercury was vacuumed, and then all floors, including the concrete floored and walled basement were vacuumed. Each of the three wood floors was encapsulated, sealed and covered with plywood. All walls, ceilings, and the floor in the basement were coated with an elastomeric polymer as an encapsulant. Finally, carpeting and drop ceilings were installed. GE claimed that the remedial effort was restricted in part by the fact that the building was listed on the National Historic Register, and could therefore not be significantly modified without approval.

GE claimed it was able to remediate Cuyahoga to $< 1\mu g/m^3$, which was an internal goal. GE stated that except for a few non-reproducible instances, detection equipment (with detection limit of $1\mu g/m^{3)}$ has not recorded levels of mercury in the office space. GE estimated that the cost of this remedial effort to be approximately $2 million, which does not include the finishing fixtures on the third floor, as it was not completed until a later date.

Discussion of Hoboken Lamp Plant

GE then initiated discussion of the Hoboken Lamp Plant ("Grand St.") facility in Hoboken, New Jersey. GE stated that the building was constructed in the 1910's, and was operated as, in whole or in part a mercury vapor lamp and electrical connector switch manufacturing plant from approximately 1910 to 1964. Therefore, as at other lamp production facilities, mercury contamination is widespread. GE stated that the construction of Grand St. was very similar to that of Cuyahoga, and as such, GE was very encouraging that a successful remedial effort could be undertaken at the Site to restore the property to its original and intended use as an industrial or commercial facility. GE stated that asbestos in flooring paper is another contaminants of concern. Though it did not anticipate beryllium or cadmium to be a problem

at the site, GE did indicate that those contaminants could possibly be present due to use of phosphor after GE sold its interest in 1948.

GE was positive that the building could be remediated for approximately $2 million, and reiterated that it would willingly participate in the remediation of the building to industrial/commercial standards. GE proposed the following remedial steps: removal of some flooring where mercury has been observed; power washing and painting of interior walls; encapsulation of floors; installation of new flooring and renovation of interior to new wall surfaces. GE admitted that the rough estimate provided did not take soils investigation or containment under negative pressure into account.

410 Eighth Street

GE willingly provided a historical account of this facility in Hoboken, NJ, which is located across the street from the Grand St. facility. GE stated that this property was built in 1926 for mercury vapor lamp manufacture. GE also indicated that it suspected that mercury may have been distilled from cinnabar ore on the premises. GE claimed that from 1926 to 1948 GE manufactured mercury vapor lamps at the facility. GE claimed that it sold the building in 1948 to Cooper Hewitt 2. Cooper Hewitt 2 then sold the building in 1949, allegedly moving all mercury related operations to Grand St.

GE stated that the brick and concrete building is presently being used as an industrial/commercial property, and that the New Jersey Department of Environmental Protection refused a residential conversion in 1988. GE claimed that air monitoring in the building has revealed that mercury is present below worker health standards, but that workers all wear mercury vapor detection badges. Ms. Garypie indicated that she believed another residential conversion effort is presently underway. GE stated it had no knowledge of such an effort.

Discussion and Q&A Session

GE iterated that it was aware that a criminal investigation by the U.S. Attorney's office was presently underway with regard to zoning issues in the city of Hoboken. EPA stated that it did not have knowledge of such.

GE stated that EPA's estimate for fire damage was overly conservative in the following areas:

- meteorological data not specific to Hoboken and should be
- overall volume of mercury in the building
- assumes building stands alone without influence of other buildings nearby on wind patterns and contaminant plume dispersal
- EPA burn rate too fast, does not consider influence of asbestos containing paper between floors
- response time for authorities too long

GE offered to assist EPA in preparation of new model based on parameters it claims are closer to actual than those in the EPA Model.

Relevant mercury vapor standards were discussed. GE claimed that the present OSHA eight (8) hour time weighted average standard of $100\mu g/m^3$ likely should be lower, because of adverse of health effects which arise between 50 and $100\mu g/m^3$.

Relevant soil standards were also discussed, and EPA stated that the exterior soil area at Grand St. will likely have to be investigated to determine the extent of mercury contamination, if any.

GE asserted repeatedly throughout the discussion its opinion that the building not be demolished. It claimed that the building should never have been converted to residential use, and indicated its willingness to assist EPA in the remediation of the building to industrial/commercial use health standards.

cc: Lisa Jackson, 2ERRD-NNJRS
Catherine Garypie, 2ORC