

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

INSPECTION REPORT

Report No. 040-01650/96-001
Docket Nos. 040-01650
License No. STB-41 (Retired)
Licensee: Wyman-Gordon Company
244 Worcester Street
North Grafton, Massachusetts 01536-8001
Facility Name: Wyman-Gordon Company
Inspection At: 105 Madison Street
Worcester, Massachusetts 01601
Inspection Conducted: May 29 and August 21, 1996

Inspectors: Mark C. Roberts 9-6-96
Mark C. Roberts
Senior Health Physicist
date

Approved By: Ronald R. Bellamy 9-13-96
Ronald R. Bellamy, Ph. D., Chief
Decommissioning and Laboratory Branch
date

Inspection Summary: Announced radiological survey of a formerly licensed site (NRC Inspection No. 040-01650/96-001).

Areas Inspected: Radiological survey in areas where licensed material was previously used or stored.

Results: All exposure rate measurements in the buildings and outside areas where radioactive material was previously used or stored were indistinguishable from background or were attributable to building materials containing naturally occurring radioactive material.

DETAILS

1.0 Persons Contacted

- * Bradford Middlesworth, Manager of Environmental Engineering,
Wyman-Gordon Company
- James Tharp, Manager, Plant and Environmental Engineering, Wyman-
Gordon Company
- Charlie Peterson, Security, Wyman-Gordon Company

*Denotes those present at exit interview.

2.0 Background

The NRC initiated a program to ensure that licenses for facilities, where activities authorized by the Atomic Energy Commission (AEC) and/or the NRC were conducted, have been terminated in accordance with the NRC's current criteria for release for unrestricted use. As part of this program, the NRC's contractor, Oak Ridge National Laboratory (ORNL), identified License No. STB-41 as a file describing a site that required additional review. NRC Region I staff reviewed the file, and determined that further information on this site was necessary to conclude that the facility meets the current criteria for release for unrestricted use.

The AEC issued a license to Wyman-Gordon Company (Wyman-Gordon) in 1957 for the use of thorium-magnesium alloy containing up to 4% thorium. Activities with thorium-magnesium may have been conducted as early as 1952 or 1953. Parts were forged from thorium-magnesium alloy and shaped into the final products. The activities at this site and a site in North Grafton, Massachusetts were covered by AEC License Nos. C-03829, C-05222, STB-41, STB-592, and STB-840. Five different license numbers were issued since Wyman-Gordon allowed the licenses to expire. The site in North Grafton was used for disposal of waste by burial and is listed on the NRC's SDMP (Site Decommissioning Management Plan). The license was terminated on April 3, 1972. There are no records of any final surveys by the licensee nor any record of a confirmatory survey for the facility.

The site is comprised of over thirty buildings as shown in Attachment 1. Many of the buildings are no longer in use. Some of the buildings are empty and many others contain old equipment and metal scrap. Adjacent to the fenced area of the site are other properties that were not part of the licensed facility in Worcester and do not require any final radiological survey. These are typically properties that were obtained by Wyman-Gordon after the date of the termination of the source material license.

3.0 Instrumentation Used in NRC Confirmatory Surveys

The inspector used two portable radiation survey meters and laboratory equipment to make confirmatory measurements. Ambient gamma radiation levels (exposure rates) were measured with a Ludlum Micro-R meter (NRC # 019634, calibrated on March 14, 1996). Unless otherwise indicated, these measurements were made at a distance of one meter above the ground

or from the surface that was measured. Direct gamma measurements were made at near contact with floor and wall surfaces, scrap and stock material and equipment using a Ludlum Model 44-10 sodium iodide detector with a Ludlum Model 2221 scaler/rate-meter (NRC # 054829, calibrated March 14, 1996). Background gamma determinations were made prior to initiating confirmatory measurements. Ambient gamma radiation in the parking area in front of the guard building ranged from 12 - 16 μ R/hour and from 10,000 - 15,000 cpm (counts per minute). A sample of refractory insulation material from an old furnace door was collected and analyzed by gamma spectrometry in the NRC Region I laboratory.

4.0 Confirmatory Measurements in Interior and Exterior Areas

The inspector made gamma exposure rate measurements throughout nearly every building on the site and direct gamma measurements on numerous objects and structures in the buildings. Buildings that had no history of or potential for licensed material use (e.g. the boiler house) were not included in this survey. The results of the measurements are summarized in Attachment 2. The inspector made general area exposure rates in all of the buildings indicated. Direct measurements were made along cracks and joints in the concrete floor and in floor drain areas. Direct measurements were also made in pipe trenches in the floor and on the old anchor points on the floor where equipment had been removed. All measured exposure rates were not appreciably different than the background radiation exposure rate or appeared to be attributable to naturally occurring radioactive material in building material. The locations where elevated levels due to building material are discussed in Attachment 2.

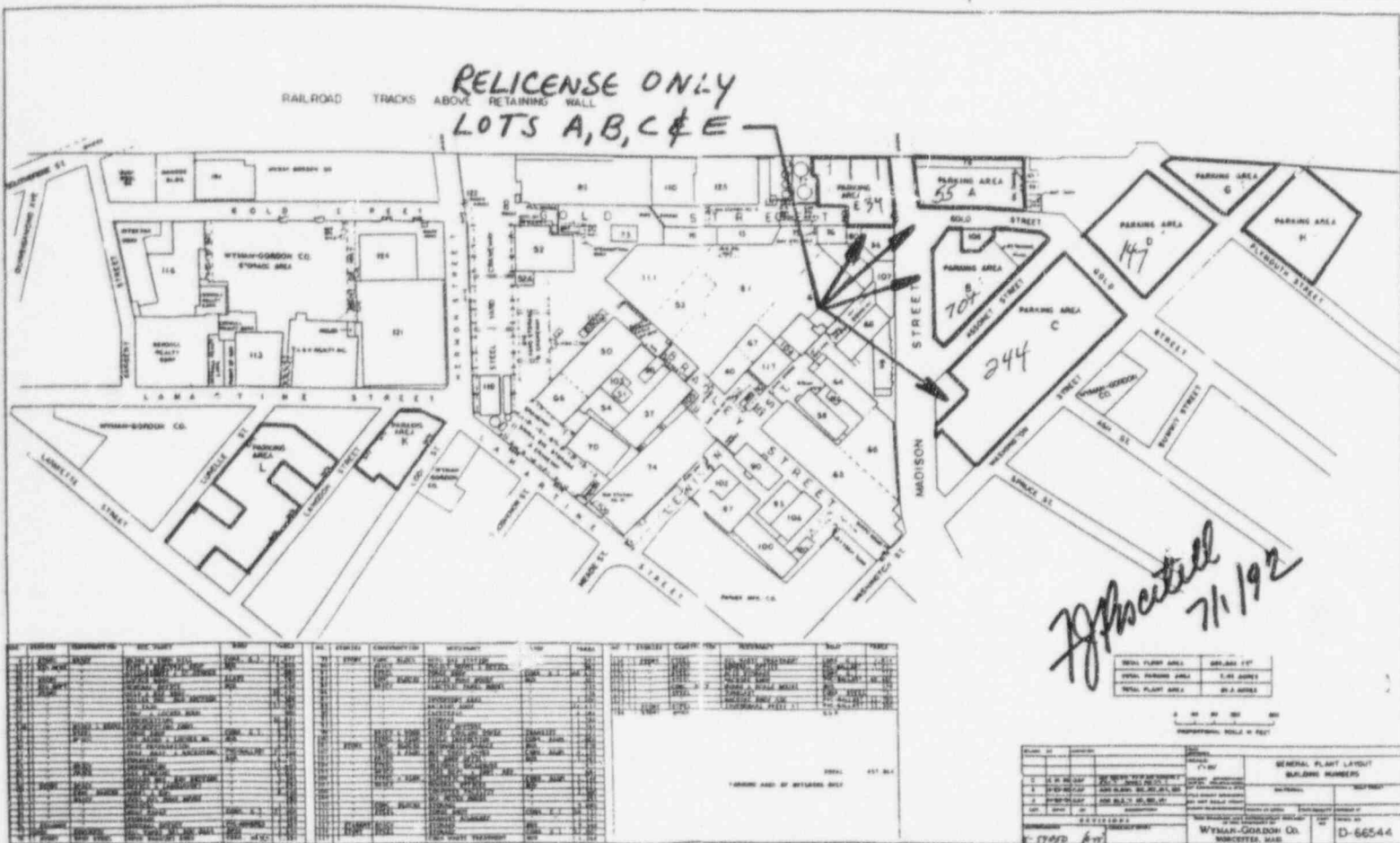
The sample of refractory material indicated naturally occurring radioactive isotopes from the U-238 decay chain (Th-234, 3.5 pCi/gram), the U-235 decay chain (U-235, 0.3 pCi/gram), and the Th-232 decay chain (Ac-228, 2.9 pCi/gram). These values are within the range of what can be typically found in building materials.

No safety concerns were identified.

5.0 Exit Interview

The results of the inspection were discussed with the individual identified in Section 1.

ATTACHMENT 1



ATTACHMENT 2

Results of Radiological Measurements at the Wyman Gordon Company Worcester Facility

Building No.	Use	General Area Exposure Rate $\mu\text{R}/\text{hour}$	NaI Count Rate (cpm)	Comments
80	Guardhouse	20	20,000	31 $\mu\text{R}/\text{hour}$ and 25,000 cpm at contact with brick wall.
Office Trailer	Site Admin	12	11,000	New structure - no history of radioactive material use.
125	Isothermal Forge	8 - 12	8,000 - 11,000	New building.
110	Isothermal Forge	8 - 12	8,000 - 11,000	Measurements at contact with metal bar stock and scrap and old anchor bolt holes in floor.
89	Isothermal Forge	7 - 12	10,000 - 13,000	Contact measurements along concrete seams and with welding rods.
Outside 89	Scrap Storage Staging Area	11 - 14	7,000 - 11,000	Direct measurements on miscellaneous pieces and large bins of scrap metal.
121 and 124	Old Machine Shop	10 - 12	9,000 - 12,000	Currently empty facility was probably not used for licensed activities.
52	Metal Stock Cutting	7 - 12	8,000 - 12,000	Direct measurements in a pipe trench and above a manhole, furnace at SW end of building, scrap buckets at NW end of building and a sink trap.

ATTACHMENT 2 (Continued)

Results of Radiological Measurements at the Wyman Gordon Company Worcester Facility

Building No.	Use	General Area Exposure Rate $\mu\text{R}/\text{hour}$	NaI Count Rate (cpm)	Comments
Outside 66 and 70	Scrap Storage Area	10 - 12	10,000 - 11,000	Direct measurements on miscellaneous pieces of scrap.
66 and 50	Die Cutting	10 - 12	7,000 - 9,000	Direct measurements on bins of metal shavings and storage of metal stock.
54	Die Grinding	11	9,000 - 11,000	Direct measurements on racks of stored metal stock and bins of scrap metal.
70	Die Manufacturing	7 - 15	8,000 - 14,000	Direct measurements on stacks and bins of old equipment and scrap metal. Direct measurements on an old insulated furnace door and bags of castable refractory material (crystalline silica and cement binder) were as high as 22 $\mu\text{R}/\text{hour}$ and 20,000 cpm. A sample of the material lining the door was obtained for gamma analysis.
37	Welding	9 - 14	8,000 - 12,000	Direct measurements on bins of scrap material at south end of building.

ATTACHMENT 2 (Continued)

Results of Radiological Measurements at the Wyman Gordon Company Worcester Facility

Building No.	Use	General Area Exposure Rate $\mu\text{R}/\text{hour}$	NaI Count Rate (cpm)	Comments
16	Storage Alcove	8 - 11	8,000 - 10,000	General area measurements.
74	Heat Treatment	8 - 11	7,000 - 10,000	Active non-licensed activities. General area measurements.
90	Cafeteria	8 - 12	7,000 - 11,000	25 $\mu\text{R}/\text{hour}$ and 25,000 cpm on brown wall tile.
102	Heat Treat Annex	10 - 15	8,000 - 12,000	Direct measurements on racks of equipment. Results at higher range of measurements found on refractory material.
87	Inventory Area	10 - 17	10,000 - 15,000	Direct measurements on stored materials.
100	Inspection	10 - 16	9,000 - 13,000	General area measurements.
120	Acid Storage	8 - 10	7,000 - 9,000	General area measurements.
106	Vehicle Maintenance	8 - 10	7,000 - 9,000	Direct measurements on stored equipment.
93	Mechanical Testing	10 - 17	9,000 - 14,000	Empty area. Slight elevated readings adjacent to walls.
63 and 65	Inspection	13 - 15	12,000 - 16,000	Direct measurements on stored equipment.

ATTACHMENT 2 (Continued)

Results of Radiological Measurements at the Wyman Gordon Company Worcester Facility

Building No.	Use	General Area Exposure Rate $\mu\text{R}/\text{hour}$	NaI Count Rate (cpm)	Comments
64	Blasting	8 - 9	7,000 - 9,000	Direct measurements on equipment and blasting debris. Contact measurement on pieces of firebrick ranged to 20 $\mu\text{R}/\text{hour}$ and 17,000 cpm.
117	Chemical Waste	8 - 9	7,000 - 9,000	New structure.
6, 81, 53, and 111	Main Forge	6 - 12	6,000 - 11,000	Direct measurements on various scrap and in-place equipment; and anchor points for old equipment.
18 and 13	Plumbing, Electrical and Wood Shops	7 - 10	7,000 - 9,000	Direct measurements on parts and sink trap.
68	Laboratory	7 - 10	7,000 - 14,000	Slight elevated readings from concrete block walls.