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FORMERLY UTILIZED SITES  
REMEDIAL ACTION PROGRAM

ELIMINATION REPORT  
FOR  
FORMER CARPENTER STEEL COMPANY;  
101 WEST BERN STREET;  
READING, PENNSYLVANIA

December 1991

U.S. Department of Energy  
Office of Environmental Restoration

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Elimination Report  
Former Carpenter Steel Company

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**INTRODUCTION**

The Department of Energy (DOE), Office of Environmental Restoration, has reviewed the past activities of the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC) at the former Carpenter Steel Company facility, 101 West Bern Street, Reading, Pennsylvania, and has completed a preliminary radiological survey of the site. DOE has determined that the conditions at this site are in compliance with current DOE radiological guidelines (DOE, 1987). Furthermore, the survey did not identify residual radioactive material on the site associated with MED or DOE predecessor activities and confirmed that radiological exposures at the site are equivalent to those associated with natural background. Therefore, this site requires no remedial action and is no longer under consideration for inclusion in the Formerly Utilized Sites Remedial Action Program.

The material in this docket consists of information from documents supporting the determination that the radiological conditions at the former Carpenter Steel Company site are in compliance with DOE radiological guidelines determined to apply to this site (DOE, 1987) and provides assurance that use of this site will not result in any measurable radiological hazard to site occupants or the general public.

Through the Office of Administration and Human Resource Management, this elimination report is being placed in DOE's Freedom of Information Act (FOI) Public Reading Room in Washington, D.C., so that it will be accessible to the general public.

**BACKGROUND**

**Site Function**

Through DuPont, the Carpenter Steel Company was under contract to the Manhattan Engineer District to conduct experimental uranium metal-forming work in 1944. Historical information is sparse, however, available records indicate that the large-scale uranium hot rolling tests conducted here were similar to those performed by the Joslyn Manufacturing Company in Fort Wayne, Indiana. Accounts also suggest that the product was intended for the Hanford Engineer Works. The fabrication method, aimed at producing sounder uranium metal and improving the yields of rods from billets, was reportedly soon discarded as unsatisfactory (Wallo, 1980).

**Site Description**

The facility is an industrial complex in Reading, Pennsylvania. The buildings, where the uranium work was probably performed, are all under one roof. The floor surfaces are composed of concrete and steel plates laid directly over the ground. There is intervening exposed soil surface. The building incorporates mills, storage areas, and furnaces.

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The complex is now referred to as the Carpenter Steel Division of the Carpenter Technology Corporation.

Radiological History and Status

DOE directed that a preliminary radiological survey of the site be conducted because operations may have caused elevated levels. In 1981, Argonne National Laboratory (ANL) conducted a survey (ANL, 1981; ANL, 1984). Most readings were at background, but several elevated readings were found near two furnaces at the south end of Building Number 1.

In 1988, a second survey was conducted by the Oak Ridge National Laboratory (Cottrell and Carrier, 1990), because heating and/or melting of uranium may have generated aerosols that deposited on overhead structures. The objective of this survey was to obtain sufficient radiological data upon which to base a decision for inclusion or exclusion from the Formerly Utilized Sites Remedial Action Program. Survey activities included gamma and beta-gamma scans, and measurements of total and removable surface activity levels. No residual radioactivity associated with MED or DOE predecessor activities was identified. Furthermore, all areas surveyed complied with the guidelines (DOE, 1987). Levels were within the range of natural background radiation in the area (Myrick and Berven, 1981).

Outdoors, gamma scans indicated levels to 2 to 8 uR/h on the ground and 2 to 7 uR/h on the roof, which are in the range of background for southeast Pennsylvania. Total directly-measured alpha activity on the roof ranged from <25 to 900 dpm/100 cm<sup>2</sup>, and beta-gamma dose rates ranged from 0.02 to 0.10 mrad/h. Although these activities were slightly above background, they were probably of natural origin as indicated by analyses of process materials showing Ra-226 and U-238 in equilibrium.

Smears from the roof indicated that removable alpha and beta-gamma activity levels were below respective minimum detectable activities of 10 and 200 dpm/100 cm<sup>2</sup>. Analyses of roof debris indicated concentrations below typical background for Ra-226, Th-232, and U-238.

Indoors, gamma scans indicated levels of 2 to 8 uR/h except one spot on the floor at 12 uR/h and one inside a brick furnace housing at 24 uR/h. The latter, while above background, was typical from naturally-occurring radioactive materials in fire bricks. Gamma exposures were low (1 to 6 uR/h) on surfaces inside mill housings, along mill trains, inside service pits, and along the length of beams. Directly-measured alpha activity levels ranged from <25 to 110 dpm/100 cm<sup>2</sup>, and surface beta-gamma levels, from 0.01 to 0.05 mrad/h. Smears from beam surfaces were <10 dpm/100 cm<sup>2</sup> for removable alpha activity and below minimum detectable activities for beta-gamma activity. Smears from inside mill housing showed alpha activity of 10 dpm/100 cm<sup>2</sup> or less and beta-gamma activity of 200 dpm/100 cm<sup>2</sup> or less.

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Indoor samples of soils indicated low levels typical of background for Ra-226, Th-232, and U-238. Indoor samples of dust and debris from overhead beams indicated concentration of U-238 at the same levels as the materials used in on-going processes in the plant.

All radiation levels and radionuclide concentrations were below DOE guidelines. The analysis of the process materials showed two radionuclides to be in secular equilibrium; therefore, the residual debris material were of natural original and not the result of former MED activities.

**ELIMINATION ANALYSIS**

Information had been found to indicate that probably only limited quantities of radioactive material had been handled at the site as part of work for the MED through DuPont. The results of the radiological survey by ORNL support this statement, because direct radiation levels and environmental samples were typical of natural background.

Based on the information summarized in this report, DOE has determined that no remedial action is necessary at this site and has eliminated the former Carpenter Steel Company facility in Reading, Pennsylvania, from consideration under the Formerly Utilized Sites Remedial Action Program.

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