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ORNL RASCA PROGRAM - FORMER SUPERIOR STEEL MILL, CARNEGIE, PENNSYLVANIA

Attached for your review and comments is the Radiological Survey Plan for the Former Superior Steel Mill at Carnegie, Pennsylvania.

It should be noted that significant pre-survey contracting and cleanup activities will be necessary at this location. Sufficient lead-time for acquiring these services must therefore be factored into the scheduling priority for this survey. The present owner of the facility is awaiting official word from DOE concerning the scope of the survey effort and estimated scheduling requirements before he discusses the situation with the tenant of the building. It is anticipated that the tenants would have to shut down their present operation for several days in order to allow for survey access.

Your early advice with regard to scheduling the survey at the Former Superior Steel Mill will be appreciated.

James W. Nehls
for William R. Bibb, Director
Research Division

ER-13:CLY

Attachment:
Survey Plan (5)

cc w/o Attachment:
A. Wallo, Aerospace Corp.

RADIOLOGICAL SURVEY PLAN FOR THE FORMER SUPERIOR STEEL MILL AT CARNEGIE, PENNSYLVANIA

A portion of the former Superior Steel Company facility, located in Carnegie, Pennsylvania, was utilized under contract with the Atomic Energy Commission from 1952 to 1957 for the handling and milling of uranium metal. This processing consisted of a combination of salt bathing, rolling, brushing, shaping, cutting, stamping, and coiling, depending on the desired final product. Due to this treatment and handling, large quantities of radioactive dust (principally uranium) were generated during operation. Ventilation of this airborne material was provided to varying degrees during the operational life of the plant, although the system was not adequate to prevent contamination of the working environment. No details of the post-operative facility decontamination are available.

At the request of the Department of Energy, a preliminary radiological survey of the former mill area was conducted on July 31, 1980, by members of the Health and Safety Research Division at Oak Ridge National Laboratory (ORNL). Based on the results of this preliminary survey, it was determined that residual uranium contamination from former mill operations exists in several areas of the remaining structures.* The following survey plan is based on the findings of that preliminary survey and the best historical information presently available on the operating conditions of the former plant. Variance from the specified plan may occur due to conditions at the site during the survey or the acquisition of additional historical and/or other pertinent information regarding the site.

Survey Measurements Planned

This survey plan has been developed to determine the radiological status of that portion of the former Superior Steel facility involved in or influenced by operations carried out under MED/AEC contract. The survey will be performed by members of the Off-Site Pollutant Measurements Group at ORNL and will include radiological characterization of the main mill area (Area A on Fig. 1), the area outdoors immediately surrounding the mill building, the railroad rights-of-way leading into the mill building, and portions of two adjacent buildings (Areas B and C on Fig. 1) that may have been utilized during previous mill operations. Measurements to be made at the site will determine:

1. Average and maximum gamma radiation levels at the surface and at 1 m above the surface inside buildings and outdoors on the site.

2. Surface alpha and beta-gamma contamination levels, both fixed and transferable, in on-site buildings.

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*T. E. Myrick and C. Clark, "Preliminary Site Survey Report for the Former Superior Steel Mill at Carnegie, Pennsylvania," letter report submitted by the Health and Safety Research Division at Oak Ridge National Laboratory to the Department of Energy, Environmental and Safety Engineering Division, April 1981.

3. Beta-gamma dose rates 1 cm above the surface inside buildings and outdoors on the site.

4. Radionuclide concentrations in surface soil and other materials (mill residues, drain residues) indoors and outdoors on the site.

5. Radionuclide concentrations in subsurface soil in suspect areas outdoors.

6. Background gamma radiation levels and radionuclide concentrations in surface soil in areas away from the site for comparison with on-site values.

The portable survey instrumentation to be used at the site will consist of (1) Geiger Mueller (GM) survey meters with <7 mg/cm^2 window thickness and open/closed window option for determination of beta-gamma dose rates, (2) sodium-iodide (NaI) scintillation survey meters for gamma-ray exposure rate measurements, and (3) zinc sulfide alpha scintillation probes for determining surface alpha levels.

The following discussion of the survey plan has been divided into those measurements to be made in the former mill building (Area A), those to be made in the adjacent buildings (Areas B and C), and those to be made in outdoor areas.

Former Mill Building

Floor and Lower Walls

The building floor and lower walls (to a height of 2 m) will be divided into survey blocks formed by the intersection of mutually perpendicular grid lines. This grid pattern will be used to provide a systematic survey of the building surfaces, and to arrive at meaningful estimates of average contamination levels. The exact spacing of the grid lines will be determined in the field based on the physical layout and accessibility of building surfaces. Grid spacings are typically 2 m in former process areas and 3 m in "clean" areas.

Each accessible survey block will be scanned at the surface with a gamma scintillation survey meter to locate isolated areas of contamination. In each of these contaminated areas, at the point of maximum surface gamma-ray levels, the gamma radiation level at 1 m above the surface, the beta-gamma dose rate at the surface, and the surface alpha contamination level will be determined. In addition to these measurements, grid point readings of gamma radiation levels (at surface and 1 m above the surface), surface beta-gamma dose rates, and surface alpha contamination levels will be made to provide information on the average radiation levels in the building. Transferable surface contamination (alpha and beta-gamma) will be measured at random locations throughout the building using standard smear techniques.

In those portions of the mill building where the former process line machinery was operating, beta-gamma scanning of the survey blocks may be required to further define areas of low-level uranium contamination. The approximate locations of this machinery and the areas that may require the additional scanning surveys are shown in Fig. 2.

In grid blocks where the general survey techniques described above cannot be applied (i.e., where equipment is located or portions of the block are inaccessible), a gamma-ray scan of accessible surfaces will be conducted, with beta-gamma and alpha measurements taken as appropriate. Every attempt will be made to have stored materials and moveable equipment relocated to allow for maximum survey access with minimal disruption of normal business operations.

Overhead Surfaces

On overhead surfaces (i.e., ceilings, structural members, piping, and wall surfaces greater than 2 m above the floor), surface alpha contamination, surface gamma-ray exposure rates, beta-gamma dose rates, and transferable alpha and beta-gamma contamination will be measured at randomly chosen points, as well as at systematic locations in areas where contamination is suspected (primarily those areas where milling and finishing activities were performed).

Floor Irregularities

Floor irregularities, consisting of drains, sumps, cracks, crevices and pipe chases, will be monitored to determine alpha, beta-gamma, and gamma radiation levels. Where available, samples of dirt, scale, and/or water will be collected and returned to ORNL for radionuclide analysis. In particular, several large subfloor pits (approximately 4 to 6 ft deep) are known to exist where former process machinery was located. All of these pits have been filled with rubble and a number have been concreted over to floor level. Access to the bottom of these pits will be required, and a significant amount of effort will need to be expended to achieve the safe removal of the rubble for survey access. The displaced rubble will be monitored for contamination as it is removed, and will be placed back into the pits upon completion of the survey.

Adjacent Buildings

Those areas of buildings adjacent to the former mill facility that are believed to have been involved in or influenced by the uranium milling operation will be gamma-ray scanned to identify locations (if any) that require additional, more detailed assessment. Random beta-gamma and direct alpha measurements on floors and walls will also be made throughout these areas, and dry smears will be taken to determine the extent of removable contamination. In areas where evidence of contamination is found, the detailed grid block survey described above for the mill building will be applied in these adjacent buildings.

Outdoor Survey

The outdoor survey at the former Superior Steel site will encompass those areas surrounding the mill building as well as the railroad rights-of-way leading into or out of the survey area. A grid pattern will be established to provide for systematic surveying of the area within approximately 30 m of the building. Exact spacing of the grid lines will be determined in the field based on physical layout and accessibility of these areas. Typical grid block spacings outdoors are 10 to 15 m, with smaller grid blocks (as small as 1 m spacing) required in isolated areas requiring greater resolution.

Surface Measurements

Each accessible survey block will be scanned at the surface with a gamma scintillation survey meter to locate isolated areas of contamination. In each of these contaminated areas, at the point of maximum surface gamma-ray levels, the gamma radiation level at 1 m above the surface and the beta-gamma dose rate at 1 cm above the ground surface will be determined. In addition to these measurements, grid point readings of gamma radiation levels, at the surface and 1 m above the surface, will be made to provide information on the average radiation levels outdoors.

The railroad rights-of-way will be gamma-ray scanned to an adequate distance away from the building to assure that spillage from previous operations is not present. Identified areas of contamination will be gridded off and the detailed measurements described above conducted.

Soil Sampling

Surface soil samples will be systematically collected from grid points outdoors, as well as from biased areas identified by the outdoor survey. These samples will be packaged and returned to ORNL for laboratory analysis. Sampling of subsurface soil may be required based on the results of the surface survey. If required, drilling and/or coring will be undertaken at selected locations with a motorized drill rig. Samples of subsurface soil will be collected and returned to ORNL for analysis.

Background Radiation Levels

Surface soil samples will be collected in the surrounding Carnegie, Pennsylvania, area in order to establish the background concentrations of radionuclides of interest. Gamma radiation levels at 1 m above the ground surface will be determined at each background soil sample location for comparison with measured on-site values.

Sample Analysis, Survey Results, and Reporting

Upon completion of the on-site survey work, sample analysis, data reduction, and summarization of survey results will be provided by ORNL. A report presenting the general operating history of the facility, the layout and present use of the plant, and the results of the radiological survey will be submitted to DOE for publication as part of their Remedial Action Survey and Certification Activities (RASCA) program.

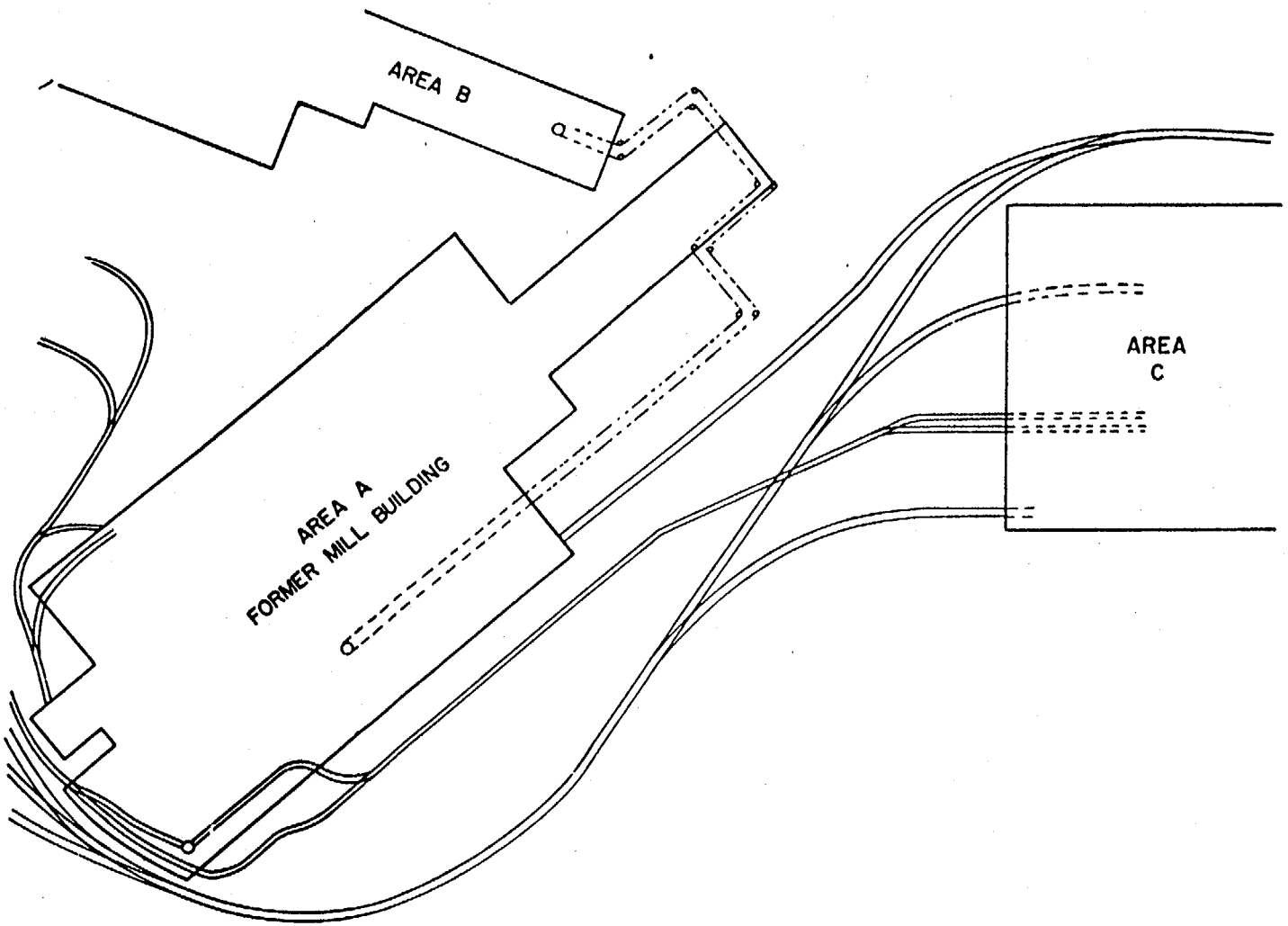

Fig. 1. Survey area designations at the former Superior Steel Co. facility.

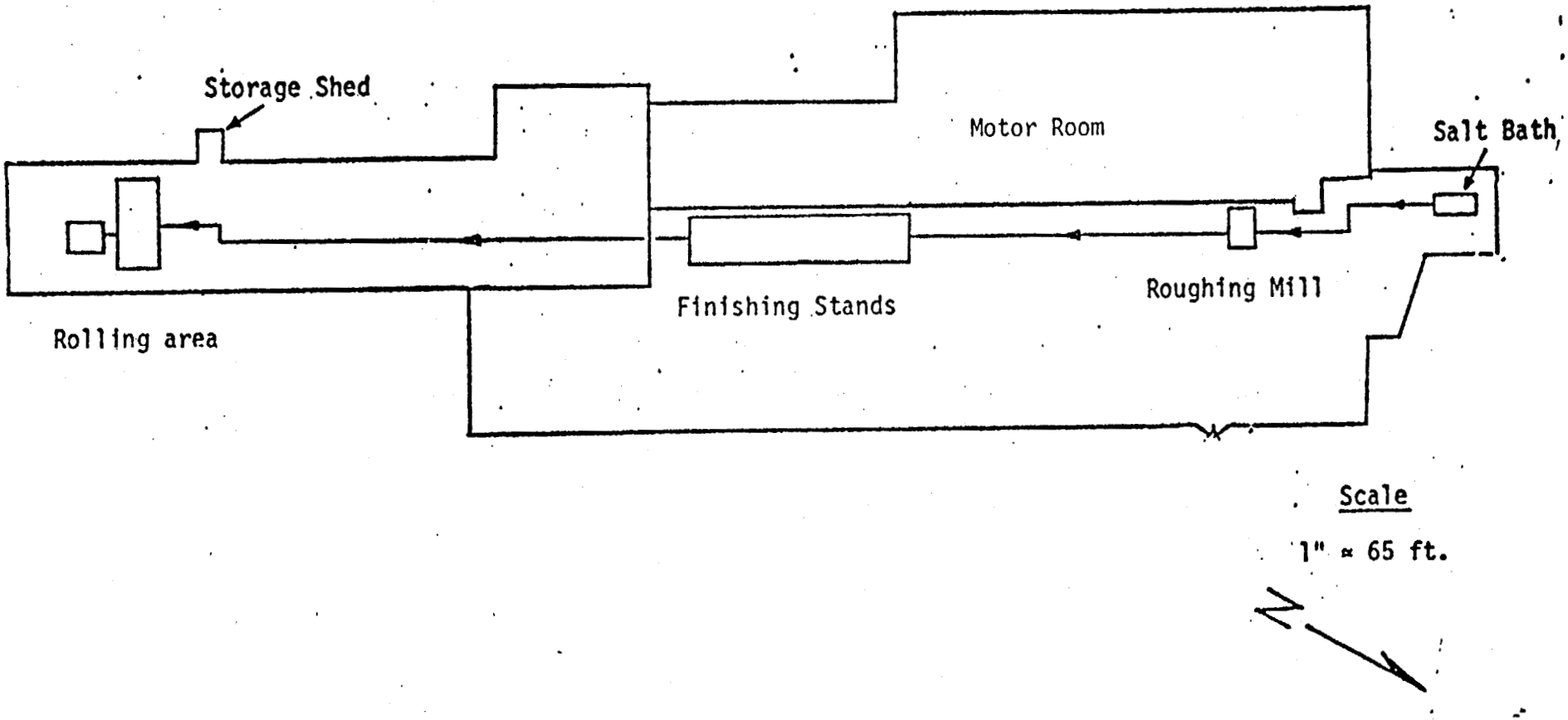

Fig. 2. Layout of former Superior Steel Facility, showing approximate locations of process line machinery.