AUG 0 7 1987

License No. SMB-743 Docket No. 40=7102

State of New Jersey
Department of Environmental Protection
Bureau of Environmental Radiation
ATTN: Duncan White, Radiation Physicist
Radiological Environmental Assessment Section
CN411
Trenton, New Jersey 08625

Subject: ORAU SURVEY PLAN FOR SHIELDALLOY FACILITY

Dear Mr. White:

Your June 17, 1987 letter requested that we provide you with an opportunity to review and comment on the Oak Ridge Associated Universities (ORAU) plan for surveying the Shieldalloy Corporation facility in Newfield, New Jersey. A copy of the ORAU proposed survey plan is enclosed. We would appreciate receiving any comments you have on the proposed plan as soon as possible.

Sincerely,

Original Signed By:
John D. Kinneman

John D. Kinneman, Chief
Nuclear Materials Safety Section A
Division of Radiation Safety
and Safeguards

Enclosure: As stated

bcc:
M. Miller, SLO
Region I Docket Room (w/concurrences)

RIMRSS
Kinneman/bc
08/7/87

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PROPOSED RADIOLOGICAL SURVEY PLAN
SHIELDALLOY CORPORATION
NEWFIELD, NEW JERSEY

I. Introduction

The Shieldalloy Corporation (SC) of Newfield, New Jersey, manufactures a variety of specialty ferro alloys using alumino thermic or thermal electric melting processes. One of these products, ferro columbium, utilizes pyrochlore ores, containing up to 2% thorium and 0.4% uranium by weight; average thorium and uranium concentrations in the ores currently being processed are approximately 0.7% and 0.1%, respectively. Because these ores contain naturally occurring radioactivity above the licensable concentrations, the ferro columbium operations are conducted in accordance with Nuclear Regulatory Commission (NRC) license SMB-743.

The thorium and uranium from the ores is not incorporated into the finished alloy product, but remains in the slag waste from the operation. This slag is segregated from other (non-radioactive material containing) slags, generated at the site, and is stored in a separate pile on the eastern end of the SC property. The average concentration of radioactivity in this slag material has been reported to be approximately 15,000 pCi/g. A maximum daily production rate of about 10,000 kg of ferro columbium slag is possible, based on four batches per 8 hour shift and two shifts per day. Because no acceptable use has been identified for this slag and the cost of disposal as radioactive waste is prohibitive, a large quantity of the material has been accumulated on the site, since operations began in 1955.

Shieldalloy is located on a 24 hectare site, on the south side of Newfield, New Jersey. Site access is controlled by a chain link fence. There are multiple buildings on the property; however, all ferro columbium melting

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operations are conducted in Building 111, near the west central portion of the site (Figure 1). The majority of the ferro columbium ores are stored in Warehouse 203, southwest of the production building. Exhaust air from the process building passes through two baghouse dust collectors with a combined capacity of approximately 10,000 m^3/min. Dust from these baghouses is disposed of with the process slag. There is one liquid effluent outfall (NPDES permit NJ000413) - to Hudson Branch, south of the site. Neither the air nor liquid effluents are monitored by the licensee for radioactivity content. Storm runoff and groundwater have been identified by the NRC and State of New Jersey as possible migration pathways for radioactive contaminants.

Data and calculations developed by the licensee indicate that the radioactive components of the slag are relatively insoluble and that the air and liquid effluents from the facility contain radionuclide concentrations, which are within the NRC guidelines. The NRC's Region I Office has requested that Oak Ridge Associated Universities (ORAU) perform independent measurements to determine the quantity of thorium and uranium bearing slag on the SC site and to evaluate the impact of the ferro columbium process and slag on the environment of the site.

II. Purpose

The purposes of the survey will be to:

1. determine the inventory of thorium and uranium bearing slag at the site;
2. determine whether slag is causing contamination of onsite and offsite soil or water;
3. perform measurements of radiological conditions in the environment of the Shieldalloy site; and
4. measure concentrations of radionuclides in plant effluents.

III. Responsibility

Work described in this survey plan will be performed under the supervision of Mr. J.D. Berger, Manager and Mr. G.L. Murphy, Assistant Manager of the

Radiological Site Assessment Program of the Manpower, Education Research, and Training Division of ORAU.

Onsite survey activities will be coordinated with Mr. M.R. Morganstern, Environmental Manager for Shieldalloy.

IV. Procedures

A. Slag Inventory

1. A 10 m grid will be established around the ferro columbium slag pile to facilitate measurements of pile size and reference of sampling and radiation measurement locations.

2. The areal and vertical dimensions of the pile will be measured and the total volume calculated.

3. Approximately 30 samples of slag will be obtained from various locations throughout the pile for determination of average radioactive material contact.

B. Impact of Slag on Soil and Groundwater

1. Samples of surface soil will be collected at approximately 10 m intervals around the ferro columbium slag pile and at locations identified as surface runoff pathways.

2. Core sampling will be performed at about 10 locations around the pile, using split-barrel samplers driven through hollow-stem augers. At least one 60 cm core will be obtained for each 1.5 m auger flight. Coring will continue to groundwater depth (about 4 to 7 m).

3. Samples of water will be obtained from boreholes drilled during coring and from surface drainage streams (as available).

C. Environmental Radiation Conditions

1. Walkover gamma scans will be performed out to approximately 10 m, around the site perimeter fence. Locations of elevated direct radiation levels will be noted for further investigations.

2. Exposure rates at the surface and 1 m above the surface will be performed at 20 m intervals around the perimeter fence and at locations identified by walkover scans.

3. Surface soil samples will be collected at 20 m intervals around the perimeter fence and at locations identified by walkover scans.

4. Samples of sediment and water (as available) will be collected from all surface drainage pathways leading from the site; the pond (origin of Hudson Branch); and at 6 to 8 locations along Hudson Branch, both upstream and downstream of the plant outfall.

5. Coring will be performed (see B.2. above) at 8 to 10 locations, down gradient (west southwest) of the site; soil and groundwater samples will be collected. Several coring locations will also be selected upgradient to provide baseline data for comparison.

6. Water samples will be obtained from 6-10 private wells in the Newfield area.

7. Samples of sediment and water will be obtained from drainage systems on the plant site.

D. Effluent Monitoring

1. Stack sampling probes will be installed in the new baghouse discharge and samples collected for a period of two days. Samples will also be obtained from the discharge of the old baghouse, if design permits; if not, samples will be collected upstream of the

collectors and related to potential discharge, using nominal dust collection efficiencies.

2. Water samples will be obtained from the plant outfall. Twenty-four hour composite samples will be collected for several days during the survey period.

3. A sample of the inlet and outlet water from the ion exchange groundwater-cleansing system will be collected.

E. Additional Monitoring

Walkover gamma scans will be conducted throughout the areas of slag and waste storage to identify additional locations of elevated direct radiation which may indicate inappropriate control of radioactively contaminated materials. Samples and exposure rate measurements will be obtained from such areas, if any.

F. Background and Baseline Determinations

Soil and water samples and exposure rate measurements will be obtained at a minmum of six locations within a range of 0.5 to 10 km from the site, to provide baseline concentrations of radionuclides and gamma exposure rate levels for comparison purposes.

V. Sample Analysis and Interpretation of Results

Samples and direct measurment data will be returned to Oak Ridge, TN for analysis and interpretation. Soil and sediment samples will be analyzed by solid state gamma spectrometry. Radionuclides of primary interest are Th-232, Th-228, Ra-228, U-238, and Ra-226, however, spectra will be reviewed for other identifiable radionuclides. Water samples will be analyzed for gross alpha and gross beta levels using low-background proportional counters. Isotopic analyses will be performed on samples exceeding 5 pCi/l gross alpha. Air sample filters will be analyzed for gross alpha and gross beta concentrations.

Selected samples of soil and water will also be analyzed for priority metals.

VI. Tentative Schedule

Onsite Activities	September 14-23, 1987
Sample Analysis	November 13, 1987
Draft Report	December 18, 1987

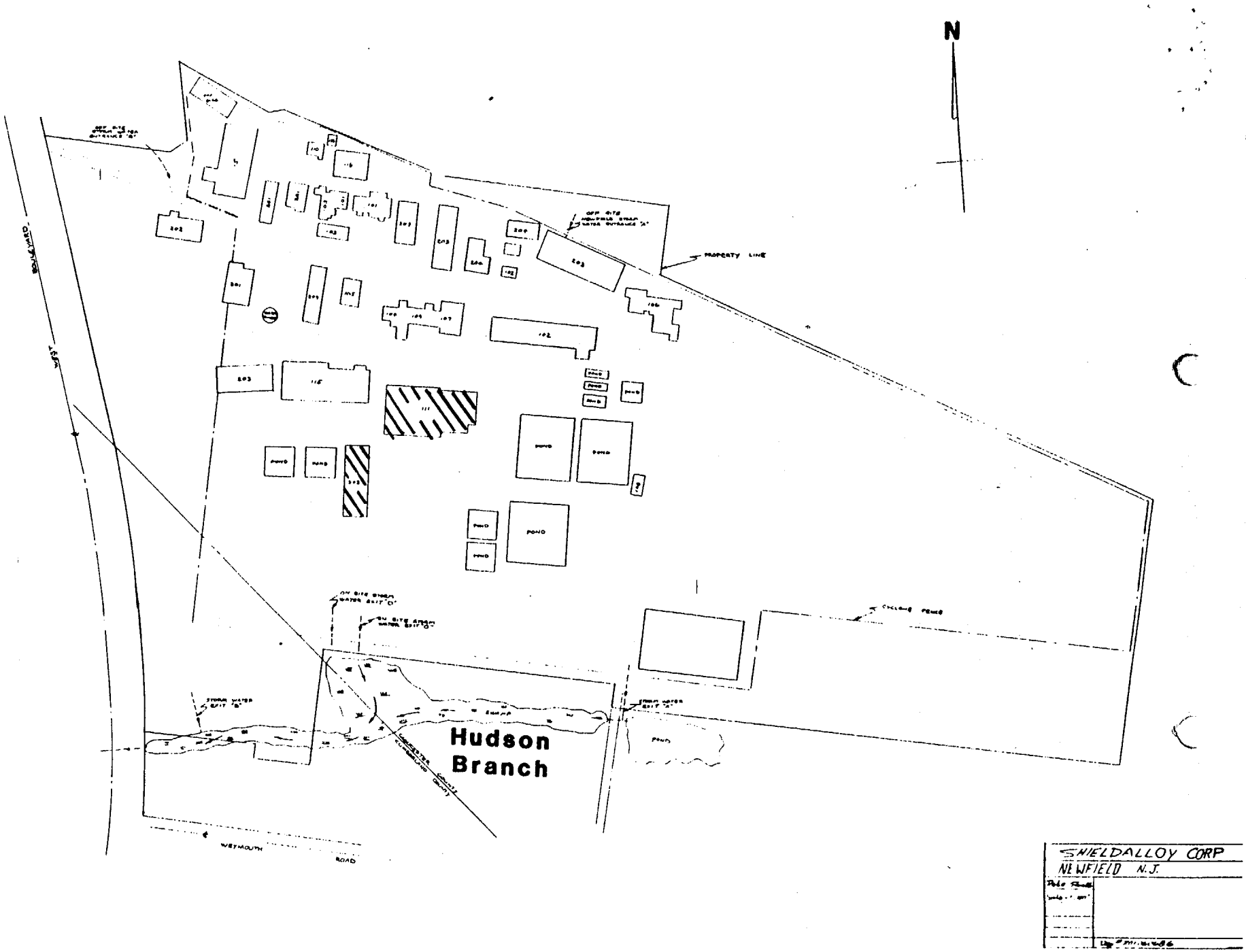

FIGURE 1. SHIELDALLOY SITE LAYOUT