AUG 2 4 1990

Docket No. 040-07102 License No. SMB-743

Shieldalloy Metallurgical Corporation
ATTN: David R. Smith
Director of Environmental Services
West Boulevard, P.O. Box 768
Newfield, New Jersey 08344

Gentlemen:

Subject: Routine Inspection No. 040-07102/90-001

On May 2-3, 1990, Betsy Ullrich and Mark C. Roberts of this office conducted a routine safety inspection at the above address of activities authorized by the above listed NRC license. The inspectors were accompanied on May 2, 1990 by Gary Comfort, of the NRC Office of Nuclear Materials Safety and Safeguards; Duncan White and Donna Gaffigan of the State of New Jersey Department of Environmental Protection; and Florie Caporussio of the Region II Office of the Environmental Protection Agency. The inspection was an examination of your licensed activities as they relate to radiation safety and to compliance with the Commission's regulations and the license conditions. The inspection consisted of observations by the inspector, interviews with personnel, and a selective examination of representative records. The findings of the inspection were discussed with Michael Morgenstern at the conclusion of the inspection.

Based on the results of this inspection, it appears that your activities were not conducted in full compliance with NRC requirements. A Notice of Violation is enclosed as Appendix A and categorizes each violation by severity level in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (Enforcement Policy). You are required to respond to this letter and in preparing your response, you should follow the instructions in Appendix A.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and your reply will be placed in the Public Document Room.

The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511. Your cooperation with us is appreciated.

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The responses directed by this letter and the accompanying Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511. Your cooperation with us is appreciated.

Sincerely,

Original Signed By:
Jenny M. Johansen

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

Enclosures:
1. Appendix A, Notice of Violation
2. NRC Region I Inspection Report No. 040-07102/90-001

cc:
Public Document Room (PDR)
Nuclear Safety Information Center (NSIC)
State of New Jersey
M. Morgenstern, Radiation Safety Officer

bcc:
Region I Docket Room (w/concurrences)
Management Assistant, DRMA (w/o enclosures)

RI:DRSS	RI:DRSS	RI:DRSS
Ullrich/bj/pmb	M.Roberts	Kinneman
08/8/90	08/9/90	08/9/90

APPENDIX A

NOTICE OF VIOLATION

Shieldalloy Metallurgical Corporation
Newfield, New Jersey 08344

Docket No. 040-07102
License No. SMB-743

As a result of the inspection conducted on May 2-3, 1990, and in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (Enforcement Policy) (1988), the following violations were identified:

A. Condition 8 of License No. SMB-743 limits the amount of thorium that may be possessed at any one time to 100,000 kilograms and the amount of uranium that may be possessed at any one time to 5000 kilograms.

Contrary to the above, as of May 3, 1990 you possessed more than 150,000 kilograms of thorium and 17,000 kilograms of uranium. These quantities were estimated at the time of the June 30, 1989 inventory, and additional quantities of source material have been received since that date.

This is a Severity Level IV violation. (Supplement VI)

B. Condition 13 of License No. SMB-743 requires that licensed material be possessed and used in accordance with statements, representations and procedures contained in an application dated December 23, 1977.

Item No. 11 of this application requires that radiation survey instruments be calibrated every seven months.

Contrary to the above, as of May 3, 1990 radiation survey instruments had not been calibrated since January 1989, a period of greater than seven months.

This is a Severity Level IV violation. (Supplement VI)

Pursuant to the provisions of 10 CFR 2.201, Shieldalloy Metallurgical Corporation is hereby required to submit to this office within thirty days of the date of the letter which transmitted this Notice, a written statement or explanation in reply, including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved. Where good cause is shown, consideration will be given to extending this response time.

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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 040-07102/90-001

Docket No. 040-07102

License No. SMB-743

Licensee: Shieldalloy Metallurgical Corporation
West Boulevard
P.O. Box 768
Newfield, New Jersey 08344

Facility Name: Shieldalloy Metallurgical Corporation

Inspection At: Newfield, New Jersey

Inspection Conducted: May 2-3, 1990

Inspectors: Betsy Ullrich, Health Physicist — 8/8/90 date

Mark C. Roberts, CHP, Health Physicist — 8/9/90 date

Approved by: John D. Kinneman, Chief
Nuclear Materials Safety Section B — 8/9/90 date

Inspection Summary:

Routine, Announced Safety Inspection Conducted May 2-3, 1990
(Report No. 040-07102/90-001)

Areas Inspected: Licensee action on previous violations, licensee event reports, and NRC notices; organization and scope of licensed activities; storage and use of source material; inventory of source material; surveys of the restricted area; surveys of unrestricted areas; effluent control; training of personnel; personnel protection; and instrumentation.

Results: Two apparent violations were observed: possession of source material in quantities greater than the licensed limit (Section 5); and failure to calibrate survey instruments at the required frequency (Section 11).

DETAILS

1. Persons Contacted

David Smith, Director of Environmental Affairs, Shieldalloy
*Michael Morgenstern, Environmental Manager, Shieldalloy
Bob Troxel, Purchasing Manager, Shieldalloy
**Dr. Raymond Holmes, ENSR Corporation
(Health Physics Consultant)
**Donna Gaffigan, Bureau of Federal Case Management, NJ DEP
**Duncan White, Supervisor, Radiological Environmental
Assessment Section, NJ DEP
**Florie Caporussio, Region II, Environmental
Protection Agency
**Gary Comfort, Office of Nuclear Materials Safety
and Safeguards, NRC

*present at exit interview
**present on May 2, 1990 only

2. Licensee Action of Previous Violations, Licensee Event Reports, and NRC Notices

The last inspection was performed on October 20, 1987. No violations were identified.

(Open) MLER-RI-90-044 On December 1, 1989, a spill occurred from the licensee's chromium ion-exchange tanks. The path of the spill crossed into an dirt roadway area on the licensee's site known to contain radioactive slag. This soil, contaminated with both chromium and slag, has been removed and is contained in a separate pile from the soil contaminated only with chromium. The licensee has not yet determined a disposal method for this soil.

3. Organization and Scope of Activities

Shieldalloy Metallurgical Corporation (Shieldalloy) has been processing raw ores for the production of metals and metal alloys since 1955. The ferro-columbium ores, also known as pyrochlore, contain licensable quantities of source material. The ferro-columbium standard (Fe-Cb std) ore usually contains approximately 0.7% Thorium and 0.08% uranium by weight. The ferro-columbium high ratio (Fe-Cb HR) ore usually has a lower concentration of thorium and uranium. Some ferro-vanadium ores used at this facility also contain thorium and uranium, but in concentrations which do not meet the definition of source material.

Of the persons named on the license as authorized to use, or supervise the use of, licensed material at this facility, only William Ziegler still works at this facility. Mr. Ziegler is the Superintendent of Department 111, which handles the ferro-columbium processing. Approximately 40 employees handle source material under his supervision at Shieldalloy.

The Shieldalloy facility is located on 60 acres in Newfield, New Jersey, bounded by West Boulevard, Weymouth Road, and a municipal landfill. A diagram of this property is included as Attachment A to this report. The front half of the property is occupied by office buildings, warehouses, and processing buildings. Large piles of ferro-columbium slag, ferro-vanadium slag, and filtered lime and dust from the baghouse are located at the rear of the property. A chain-link fence encloses the restricted area of the facility.

The Shieldalloy facility is currently being reviewed by the Environmental Protection Agency (EPA) due to chromium contamination of groundwater on- and off-site. Representatives of the EPA and the New Jersey Department of Environmental Protection (NJDEP) are reviewing the control of all potential contaminants, including source material, and were present on May 3, 1989 of the inspection.

No violations were identified.

4. Storage and Use of Source Material

Each entrance gate into the facility is marked as required by the license. The pyrochlore is shipped to the facility in drums, which are stored in Building D-111, the ferro-columbium foundry. Licensed material is also blended in Building 102, and has been stored in Buildings A, D, G, and F in the past. Buildings in which licensed material is used or stored are marked with the "Caution-Radioactive Materials" sign.

Pyrochlore is processed in the furnace of the foundry building to extract niobium (previously known as columbium) metal. The resultant slag from the process contains nearly all the source material from the original ores. Small quantities of source material are collected in the filters of the baghouse. The cooled slag is removed from the foundry and stored onsite. The Fe-Cb std and Fe-Cb HR slag piles are each marked with "Caution-Radioactive Material" signs.

No violations were identified.

5. Inventory of Source Material

The licensee has received pyrochlore exclusively from Canada for the past several years. Assays of the source material content of the pyrochlore is provided to the licensee monthly by the mining company. Shieldalloy receives an average of 10 shipments per month of ferro-columbium ore. In 1989, the licensee used a total of nearly 1 million kilograms (kg) of pyrochlore.

An inventory of source material on site was performed on June 30, 1989. Based on the maximum expected concentration of thorium (2%) and uranium (0.4%), the licensee estimated that the slag piles contained 434,000 kg of thorium and 86,700 kg of uranium. Based on the assay of 0.7% thorium and 0.08% uranium provided to the licensee by the mining company, the licensee estimates that, as of June 30, 1989, the slag piles contain a total of 150,000 kg of thorium and 17,000 kg of uranium. Additional quantities of some material are possessed onsite as incoming pyrochlore, and in baghouse dust.

The finding that the licensee possesses source material in quantities greater than authorized by the current license is an apparent violation of the license condition.

6. Surveys of the Restricted Area

Radiation level surveys were performed by the inspectors using a Ludlum Model 3 Micro R Meter, Serial No. 008582, calibrated in May 1989. Background radiation levels were 6-8 microroentgen per hour (uR/h). Building D-111 storage area levels were 300-400 uR/h. Drums containing pyrochlore material measured 1500 uR/h on contact. The maximum radiation level on contact with the Fe-Cb std and Fe-Cb HR slag piles was 3000 uR/h. One unmarked pile of a ferro-columbium ore thought to be free of radioactive material measured 1500 uR/h. The lime pile, which is composed of the filtered material from the baghouse, measured 300 uR/h. The ferro-vanadium slag pile measured 120 uR/h on contact.

Records of the licensee's radiation level surveys were reviewed for the period 1988 though 1989. The Building D-111 furnace area, Building D-111 scale area, and the two ferro-columbium slag piles are surveyed every three months. The average radiation levels recorded by the licensee agreed with surveys performed during the inspection.

No violations were identified.

7. Surveys of Unrestricted Areas

Radiation level surveys were performed outside of the fenced area by the inspectors with representatives of the State of New Jersey Department of Environmental Protection (NJDEP) and Region II of the Environmental Protection Agency. Results of this survey are included as Attachment B of this report. Radioactive slag appears to have been used in two areas as support material to build up the ground level. The first area begins at the corner of the fence along Weymouth road and extends along the fenceline to the access road, and about 10 feet from the fence. Radiation levels of 300-400 uR/h were noted in this area, but dropped to less than 20 uR/h at a distance of 25 feet from the fence. The second area is the access road from Weymouth Road through a gate into the fenced site. It is not known if the slag in the access road is ferro-columbium or ferro-vanadium.

NJDEP representatives stated that they have analyzed soil and sediment samples taken between the fence and the stream along Weymouth Road, and found concentrations of source material in excess of natural background levels.

Ambient radiation levels at the fence along the landfill range from 40 uR/h to 200 uR/h. The maximum radiation level at the fence by the ferro-columbium slag piles was 200 uR/h, and dropped to 40 uR/h at a distance of approximately 25 feet from the fence. A small area by the transformer station at the front of the property measured 60 uR/h.

No violations were identified.

8. Effluent Control

Dusts produced during blending and smelting are pulled into a baghouse filtration system. The baghouse filters are 99% efficient, and are checked periodically by the licensee. The dust consists mainly of lime, although small amounts of source material are also present. The collected dusts are removed from the baghouse, and deposited in the lime pile on site. The licensee's calculated estimates of source material in the dusts indicate that no releases occur in excess of limits to unrestricted areas, although surveys of unrestricted areas indicate that some erosion of this material might occur.

Groundwater sampling for gross alpha and gross beta analysis began in 1989, and is performed quarterly. Six wells are sampled, two upgrade from the source material storage areas, and four downgrade in the direction of the flow of groundwater (southwest). Records were reviewed of all sample results to date. Samples exceeding the licensee's trigger level of 5 picocuries per liter (pCi/l) gross alpha or 50 pCi/l gross beta activities require isotopic analysis. Only the downgrade well closest to the ferro-columbium slag piles has exceeded the trigger levels, with a maximum gross beta concentration of 130 pCi/l. Analysis of this sample measured a potassium-40 concentration of 120 pCi/l. Analysis of filtered water samples from the wells show very little soluble activity.

No violations were identified.

9. Training of Personnel

The license currently requires all employees to read and sign a form describing the types of radioactive materials on site, the potential hazards, and the rules for working in areas where radioactive materials are used or stored. Records of these training forms were reviewed. Individual workers, including some who work in Department 111, have refused to sign the form. This is noted on the form and initialed by the supervisor. The licensee representative stated that other training methods are currently being considered.

Employees working in Department 111 with source material are required to wear film badges. Workers were observed wearing film badges during the inspection.

No violations were identified.

10. Personnel Protection

Monthly film dosimeters are provided to approximately 25 employees working in the ferro-columbium foundry area. Records were reviewed for the period of December, 1987, through February, 1990. The maximum monthly dose measured was 10 millirem (mrem). Most workers receive an annual dose of less than 20 mrem.

Air sampling is performed every other month in the furnace area of the foundary, and twice each year in the blending area. Records of air sampling results were reviewed for the period of January, 1988 through March, 1990. The sample is collected and the total mass is determined. Based on licensee's assumptions, a calculated activity is determined for the sample. Only one sample in the past three years exceeded the licensee's estimated permissible concentration. This sample was sent to an outside laboratory for analysis, and found to contain 199 milligrams of thorium per kilogram of sample. The licensee calculated this result to represent an airborne concentration of 3 E-13 microcuries thorium per milliliter of air (uCi/ml), which does not exceed the maximum permissible concentration of 3 E-11 uCi/ml. This calculation was verified by the inspectors using the licensee's data.
No violations were identified.

11. Instrumentation

The licensee currently possesses an Eberline SRM100 survey meter with an HP-210 probe. This was last calibrated in December 1988. The licensee representative stated that a Victoreen survey meter has been used in the past, but is currently not on site and has not been calibrated. A Reuter Stokes RSS-111 was last calibrated on January 19, 1989.

The finding that instruments have not been calibrated at least every seven months as required by the current license is an apparent violation of the license condition.

12. Exit Meeting

The results of the inspection were reviewed with the individual identified in Paragraph I of this report.

Attachment A

Diagram of the Shieldalloy

Metallurgical Corporation Facility

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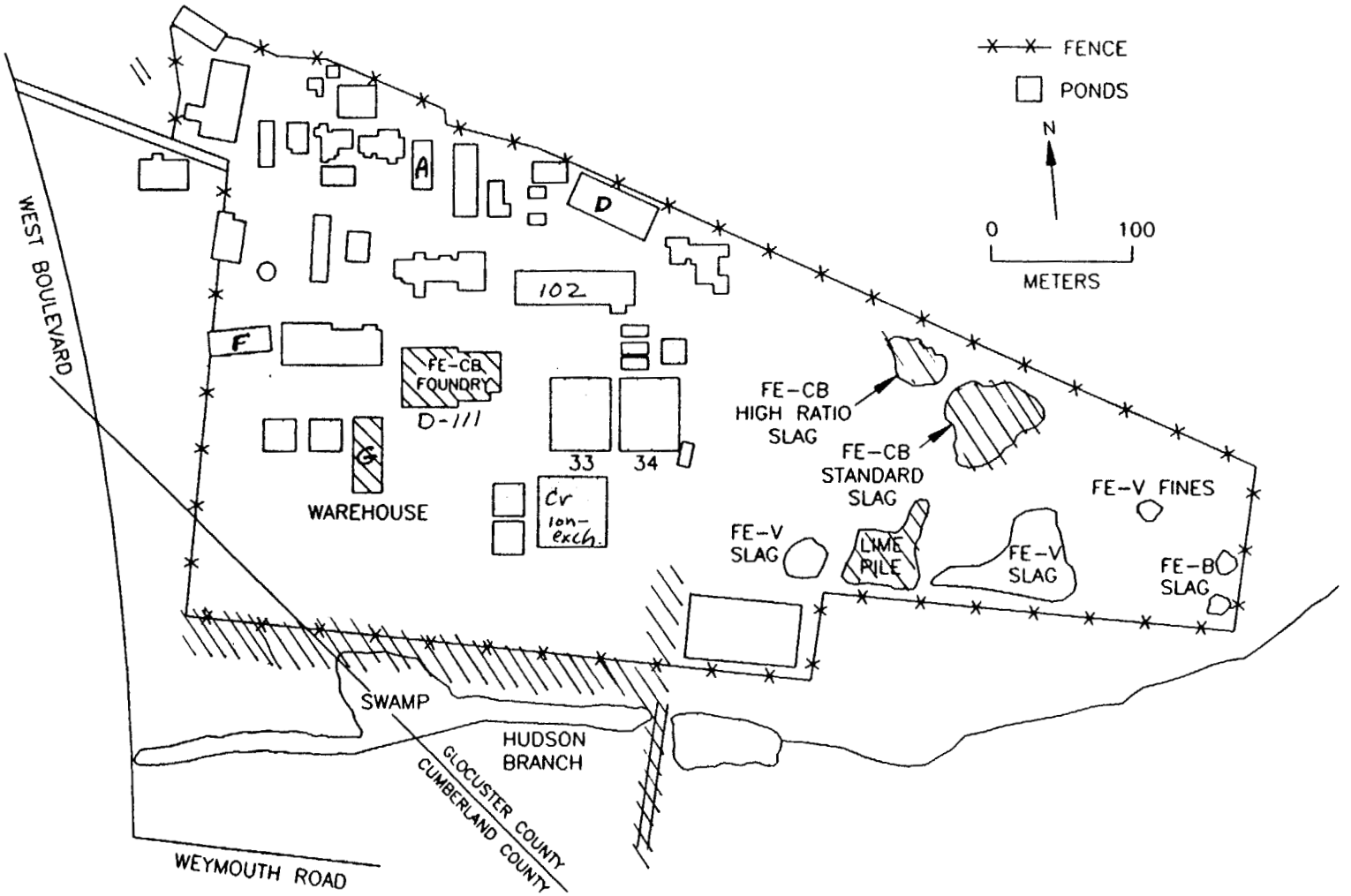

Layout of the Shieldalloy Plant in Newfield, New Jersey

Attachment B

Unrestricted Area Radiation Level Survey Results

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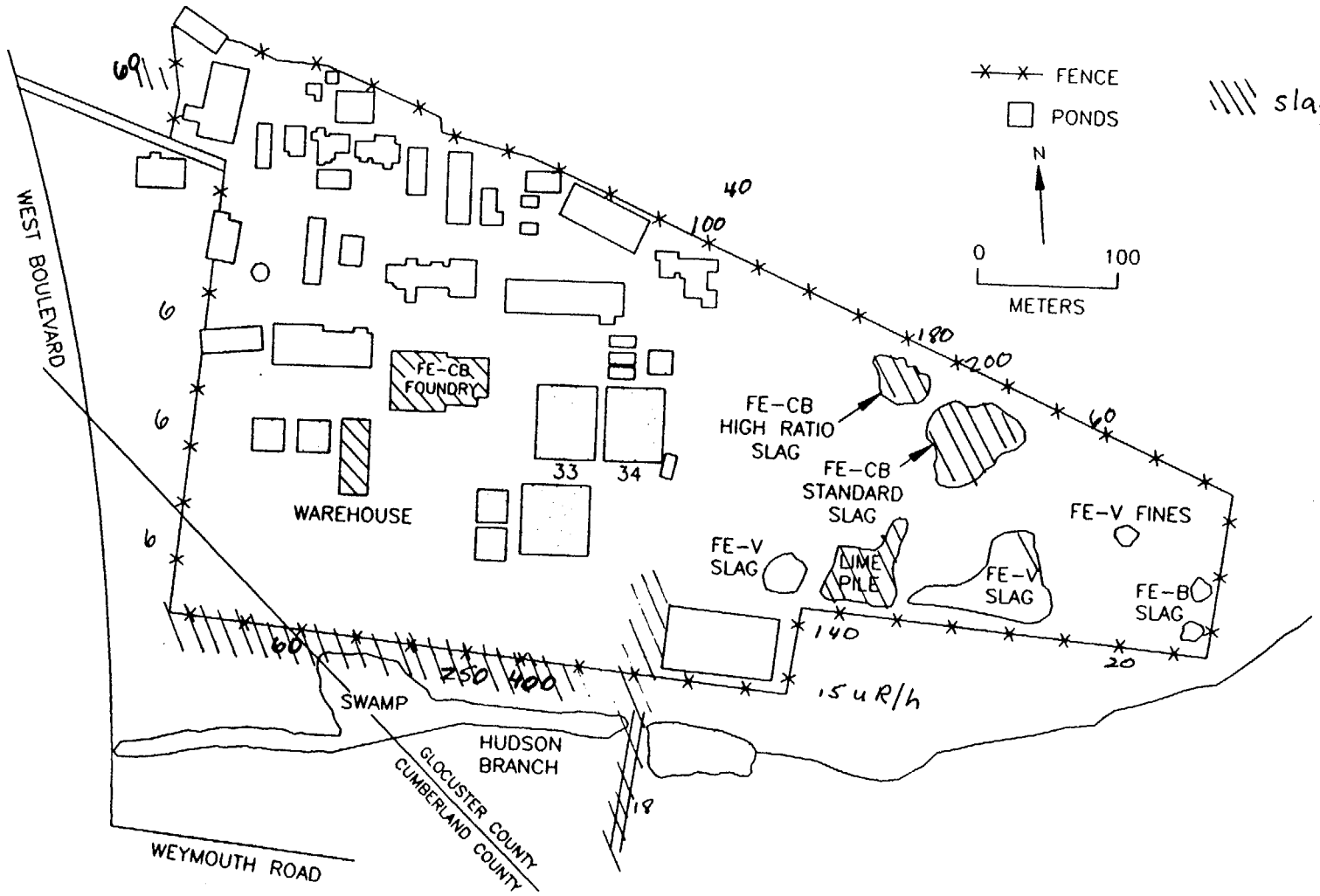

Layout of the Shieldalloy Plant in Newfield, New Jersey

Radiation levels in microroentgen per hour.