AEC RESEARCH AND DEVELOPMENT REPORT

STANDARD OPERATING PROCEDURE

FOR

ROLLING 2.75% ENRICHED METAL

AT SIMONDS SAW AND STEEL COMPANY

PRODUCTION ORDER NO. 296

(Section 1.4.3.12)

by

John F. Schiltz

of

Technical Division
National Lead Company of Ohio

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Approved by:

Director, Technical Division

National Lead Company of Ohio
Cincinnati, Ohio

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OPERATION:

The rolling of 2.75 per cent enriched ingots to rods at Simonds Saw and Steel Company.

PURPOSE:

To produce 0.843 inch round rod stock suitable to finish by subsequent machining operations to 0.75 inch diameter stock.

SPECIFICATIONS:

Finished rod diameter of 0.843 inch ± .005 inch by approximately 16 foot lengths.

CONDITIONS REQUIRING SPECIAL PRECAUTIONS:

1. Toxicity of uranium oxide
2. Intrinsic value of enriched uranium
3. Working temperature of metal
4. Intermixture with normal uranium or any foreign metals
5. Criticality of enriched uranium

PROCEDURE:

Step (1) a. All enriched ingots shall be loaded end to end in H-beams from the Pilot Plant and distributed in a single layer over the bottom of a government or commercial truck, whichever is designated by C. H. Walden. All H-beams shall be placed parallel to the axis of the truck and a minimum of 12 inches shall be maintained between H-beams.

b. All H-beams shall be secured in the truck to insure no possible movement of metal or beams during shipping. Proper loading procedures shall be the responsibility of C. H. Walden.

c. This order shall be shipped, as arranged by C. H. Walden, from the Pilot Plant to Simonds Saw and Steel in Lockport, New York.
d. Truck shipments shall be accompanied by armed escort. Arrangements for these guards shall be the responsibility of C. H. Walden.

e. Empty H-beams for holding the finished rods, along with necessary scrap drums, vacuum cleaner, respirators, gloves and standard protective clothing shall be shipped from Fernald along with the ingots. Procurement of gloves and protective clothing shall be the responsibility of C. E. Bussert and procurement of the remaining items the responsibility of C. H. Walden.

Step (2) All enriched ingots are to be removed from the trucks at Simonds Saw and Steel by means of an overhead crane and deposited on the mill floor man area behind the lead-bath furnace. Ingots shall be placed in the same configuration as was used during shipment; that is, ingots shall be placed end to end in rows, each row being at least 12 inches apart. At no time during any operations shall ingots be stored greater than one deep.

Step (3) All enriched metal in this order shall be under continuous guard while at Simonds Saw and Steel. Responsibility of this metal while at Simonds Saw and Steel from the time of arrival of the shipment shall be that of C. E. Bussert.

Step (4) Prior to rolling, the mill floor area and vicinity of the heating furnace, 16-inch mill, crop shear, quench tank, 10-inch mill and 10-inch mill run-out table shall be thoroughly cleaned by sweeping and vacuuming using either the regular Simonds' vacuum system, or approved portable units.

Step (5) Ingots will be removed from storage, check weighed and recorded under supervision of a representative of C. H. Walden.

Step (6) Ingots will be assembled into lots of no more than 10, for scheduling into the heating furnace.

Step (7) The preheat furnace shall be a lead-bath furnace. This furnace shall be operated within a temperature of 1010°F - 1035°F with 1020°F being desired. Ingots shall be left in the furnace for no less than 30 minutes nor more than 50 minutes.
Step (8) The ingots shall be charged in the furnace on alternate sprockets. In this way an empty sprocket shall be between each ingot while in the furnace.

Step (9) Each ingot shall be individually discharged from the lead-bath furnace and carried to the 16-inch cogging stand where the ingot shall be reduced to approximately a two-inch diamond section. No more than one ingot shall be handled at this stand at one time.

Step (10) After reduction in the 16-inch mill, the distorted ends of the billets shall be cropped. Each cropped end shall be individually quenched, allowed to dry, and when dry placed in drums marked with a large red "E" on the top and sides. Each drum shall contain no more than 160 pounds of enriched solid scrap and remain no closer than 24 inches to one another. At no time shall cropped ends, scrap, etc., be allowed to remain loose in the quench tank.

Step (11) After cropping and hot shearing to appropriate lengths, each billet shall be taken without intermediate reheating to the 10-inch mill and finished to a 0.843 inch diameter round rod and to approximately 16 foot lengths. Not more than the product of one ingot shall be handled at this stand at one time.

Step (12) All finished rods shall be allowed to air cool on the 10-inch mill run-out table and each rod shall be stamped within two inches of the rod end with its corresponding ingot and billet position number.

Step (13) All finished rods shall be loaded not more than two deep in H-beams which have been tare weighed. The rods in each beam shall be strapped and blocked so as to prevent rod movement within the H-beam. A large red "E" shall be painted on all beams, and the legend, P.O. 296, along with the correct gross weight.

Step (14) The loaded beams shall be placed on a truck and given the same loading configuration as when the H-beams with ingots were shipped; i.e., H-beams shall be loaded parallel to the axis of the truck bed and with a minimum of 12-inches between beams.

Step (15) During all rolling, cleaning and associated operations, standard protective clothing, gloves, and
respirators shall be worn by all workers in the immediate vicinity of the hot metal.

Step (16) After all rolling and associated operations have finished, the areas in which enriched metal was processed shall be cleaned using hand vacuum cleaners as supplied from Fernald. After their use, all cleaners shall be returned to Fernald, to be emptied under supervision of a representative of C. H. Walden.

Step (17) All enriched dust and sludge shall be collected and placed in drums. Dust and sludge shall not be mixed with one another or with solid scrap. At no time shall more than 120 pounds of enriched dust or sludge be accumulated in any one place or be placed in a drum. Drums so filled shall be placed a minimum of 2\(\frac{1}{4}\) inches from one another. All drums containing enriched material shall be painted on the top and sides with a large red "E" and lot marked as prescribed in the Accountability Lot-Marking and Color Coding Manual.

Step (18) During shipment, drums containing enriched material shall be placed no closer than 2\(\frac{1}{4}\) inches to one another and no closer than 2\(\frac{1}{4}\) inches to H-beams containing enriched rods. All enriched metal, rods, scrap, dust, and sludge and special equipment shall be shipped under guard to Fernald.

Step (19) Mr. Bussert's responsibility for the order will terminate when the shipment leaves the Simonds Plant. Enroute and upon arrival at Fernald it will be the responsibility of C. H. Walden.
Dr. C. H. Walden
Head, Accountability Department

Dr. J. A. Quigley
Director, Health & Safety