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CRITICALITY CONTROL; GENERAL POLICIES AND PROCEDURES				CR-17
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GENERAL

This Standard Procedure has been prepared for the Clevite Research Center Nuclear Program. The purpose of the procedure is to establish rules and policies which will insure the safe handling of SS material. This material will be in the form of metallic uranium, enriched in U-235, and it will be fabricated, as metal or alloy, into fuel plates and assemblies.

The area in which source and special nuclear material (SS material) is to be handled at the Clevite Research Center has been designed and prepared specifically for this work (see Dwg. B523).

A. BASIC PLANS

Responsibility for the establishment of criticality procedures has been delegated by the Manager, Materials Division, to the Health Safety Supervisor, and for enforcement to the Head of Production. The basic rules governing the handling of SS materials are as follows:

1. The Vault Custodian will issue SS material, or alloys of it, in amounts that will be "Always Safe".
 - a. Such amounts will be established so as to eliminate the possibility of danger from an accidental double batching or flooding of the controlled area.
 - b. The amounts issued will be authorized either on a Melting Practice Card or a Travel Accountability Card, depending on the operation to be performed.
 - c. The above forms will be valid only when signed by the Head of Process Engineering, or Head of Production.
 - d. Each batch will be issued in a numbered and tared tote pan. As far as possible, all material issued in a specific tote pan will be returned to the vault in the same pan. This will include scrap and remelt material as well as the material

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ready for the next operation. Chips and cuttings and other nonremeltable scrap will be placed in a small covered container which is carried in the tote pan.

2. The following system will prevent the possibility of two batches of material being placed in one work area (see Dwg. B523).
 - a. All transporting of SS bearing metal or alloys will be done by specially assigned personnel called Material Handlers. Only one Material Handler will be on duty per shift. Therefore, only one batch of enriched material will be in motion at one time.
 - b. A work area is defined as a floor area of a minimum of 40 square feet in which a specific piece of process equipment is located. This floor area is outlined with a 4-inch wide band of "traffic yellow" paint. The area enclosed by this line is cross-hatched with diagonal bands of "traffic yellow".
 - c. Upon delivering enriched material to the work area, the Material Handler will install red tags on standards located at prominent points in the marked-off area. The red tags are 9 x 12 inches in size and are attached to the standards at eye level.
 - d. When the material is removed from the work area, the Material Handler will remove the red tags from the standards.
 - e. Under no circumstances will a batch of enriched material be brought into a work area in which red tags are displayed.
 - f. Adjacent work areas are separated by an open space.

B. GENERAL CONTROL PROCEDURE

1. Incoming SS Material.
 - a. All SS material will be received at the Receiving Dock.

- b. This material will be delivered directly to the vault in the containers in which the material is received.
- c. Raw SS materials will be stored in the shipping containers along the east wall of the vault (see Dwg. A560).
- d. Checking and weighing of received material will be carried out, one container (bird-cage) at a time.

2. Vault Control.

The vault is the direct responsibility of the Vault Custodian, who is responsible to the Accountability Representative.

- a. All incoming shipments will be check-weighed and entered in the Vault Record.
- b. A separate Vault Record will be kept for each project.
- c. The SS Material Vault is arranged in a specific bin design (See Dwg. A560). The vault is 12 ft. wide, 24 ft. long and 12-1/2 ft. high.
- d. The east wall is broken into wooden "open bottom" bins, designed to hold "bird cages".
- e. The west wall has two bin sections extending from the vault door north for 24 feet. One section has 15-inch x 24-inch x 15-inch high bins which will be used for storage of the in-process tote pans. Special bin sections may be used where required by the shape for a particular job. The geometry of these bin sections will be defined in the specific criticality procedure for the job involved. Only one tote pan containing one batch of material will be stored in each bin. This storage arrangement is the direct responsibility of the Vault Custodian who is the only person authorized to handle material in the vault. Further along the wall are bins for finished fuel element storage. This bin arrangement will be dependent upon the materials

being handled. The policy will be to deliver finished elements as promptly as possible and thus maintain a minimum finished element inventory.

- f. The SS materials will be returned to the vault by the Material Handler at the completion of the operation and/or the end of the work period.
- g. The mass of each batch issued from the vault will be prescribed, based on criticality data for a given operation (see A2 and A3, above).
- h. Under no circumstances will a specified amount of SS material in a batch be altered without written authority from the Head of Production and Head of Process Engineering.
- i. At no time will more than one batch be issued in one tote pan.
- j. Tote pan sizes to be used will be 24 inches x 11 inches x 4 inches or 24 inches x 11 inches x 9 inches. Scrap container carried in the tote pan will be approximately 6 inches in diameter x 8 inches high, with fitted lid.

Special size tote pans may be used where required. The sizes will be discussed in the specific criticality procedure for the job involved.

- k. In no case will two pans be stacked directly one on top of another.

C. SCRAP OR REWORK STORAGE

Handling of scrap and rework materials will be dependent on the specific product being fabricated. The broad policies are stated below while detailed procedures are contained in the criticality procedures for each specific job.

- 1. All nonremeltable scrap for each specific job will be stored either in the Storage Building, (see Dwg. B523), or in the vault, depending upon the security requirements.

- a. A "current" container will be kept in the vault where additions will be tabulated on the container.
 - b. Only the Vault Custodian is authorized to deposit materials in this container.
 - c. Once the permissible mass is reached, the Vault Custodian seals the container, and moves it to storage in the scrap storage area of the vault or Storage Building.
 - d. The permissible mass referred to in C.l.c. above, and the storage array, will be prescribed in the specific criticality procedure for each job. This mass will limit the U-235 concentration in the container to:
 - (1) A maximum of 350 grams when the form of the scrap materials necessitates storage under oil.
 - (2) A maximum of 1,000 grams when the form of the scrap materials permits dry storage.
2. Liquids bearing SS materials.
- a. Limits to the amount of SS materials contained in pickling solutions, rinse water, water from floor mopping, etc. will be prescribed in the specific criticality procedure for a particular fabrication project. These limits will be established to prevent the accumulation of more than 100 grams of U-235 in any one carboy or barrel.
3. Unaccountable Scrap.
- Generally this category covers burnable trash, rags, wipes, floor sweepings, etc.
- a. Trash of this type will be burned and the ashes collected in 30-gallon drums, sealed and stored in the scrap storage area of the vault. The U-235 content per container will be limited to a maximum of 100 grams.
4. The storage array for carboys or drums containing liquids or ashes will be prescribed in the specific criticality procedure for each job.

D. ADDITIONAL CONTROLS

1. It will be the responsibility of the roving Health Safety Inspector to assist the Floor Supervisor and the Head of Production in enforcing the above procedures.
2. The Health Safety Inspector will instruct the Floor Supervisor to direct personnel to correct any error immediately, and to stop operations if necessary.
3. If such an incident should occur, the Head of Production will submit to the Manager of the Materials Division a written report covering the circumstances which led to the incident and the steps taken to prevent a recurrence.

E. REFERENCES

The following documents were consulted for the preparation of the described criticality procedures:

1. "Nuclear Safety Guide", L. A. 2063.
2. "Criticality Masses of Fissionable Materials as Basic Criticality Data", L. A. 1958.
3. "Nuclear Safety Reports", Y-A-2-98, Y-A-2-101.

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