DOCKET NO. 70-139

For Div of Inspection

ENGELHARD INDUSTRIES, INC.

D. E. MAKEPEACE DIVISION
PINE & DUNHAM STREETS
ATTLEBORO, MASS.
ATTLEBORO 1-0090

March 11, 1960

United States Atomic Energy Commission
Germantown, Maryland

Attention: J.C. Delaney,
Division of Licensing and Regulation Materials Branch

Reference: SNM-135
Docket 70-139

Gentlemen:

In connection with our fabrication of a core for the Enrico Fermi Fast Breeder Reactor the necessity has arisen to provide for the storage of an entire core loading of enriched fuel pins prior to assembly into fuel element subassemblies. Additional building space is being constructed adjacent to our Plainville Nuclear Materials plant for this and other storage of special nuclear material, increasing our current capacity from 630 to 1180 kilograms of contained uranium-235. The following details our plans and presents criticality justification.

Due to technical difficulties associated with the assembly of PRDC core subassemblies, it has become necessary for D. E. MAKEPEACE to store a complete core loading (14,400) of enriched fuel pins. This amounts to 490 kg. U-235.

In order to accomplish this in a safe manner, we are constructing a separate storage building, a portion of which is to be used for enriched pin storage. Other sections of the building will be used for storage of raw enriched uranium in standard 20" cubical birdcages in planar arrays, total quantity not to exceed 60 kg. U-235. This building will be situated adjacent to our main plant building at a minimum distance of 40 ft. from the Nuclear Department. It may thus be considered to be disassociated from other enriched uranium-containing areas. Drawings of the building and its location with respect to the main plant are enclosed. (Exhibits A and B.) We, therefore, request that an additional 550 kg. U-235 be added to our current allotment of 630 kg. U-235 for a total of 1180 kg. U-235. This amount is to be distributed between our two storage areas as described above.

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United States Atomic Energy Commission
Germantown, Maryland
J.C. Delaney

March 11, 1960

Our new storage building will be of corrugated metal construction with a reinformed concrete floor. It will be 36 ft. wide by 80 ft. long by 12 ft. high. Access to the storage building will be limited to the use of four doors, each of which will be locked at all times when not in use. An enclosed wire cage 30 ft. by 36 ft. will house the enriched uranium area inside the building. This cage will be padlocked so that persons having access to the building will not necessarily have access to the enriched storage cage .

A Nuclear Measurements Corp. GA-2 Gamma Alarm will provide constant monitoring of the enriched storage area. This unit acts as an alarm system by activating a flashing red light and a bell when a pre-set activity level is exceeded. The light and bell are located on the unit itself and also on a follow meter panel which will be situated at the main guard station of the Nuclear Department. The GA-2 is a scintillation integrator with a high degree of stability. It has a time constant of two seconds and cannot be saturated by high radiation fields. Basic sensitivity range is .05 to 50 mr/hr., logarithmic with a time constant of 2 seconds.

The monitoring unit will be programmed for alert and alarm level operation. This means that an amber light located on the monitor and the follow meter panel will flash as soon as a gamma field level is sufficient to lift the indicating pointer off the lower contact setting. When the pointer reaches the upper or alarm contact setting, the bell will sound and the red light will turn on, initiating emergency evacuation procedures.

Storage containers for the enriched pins will be similar to the ones already in use for the storage of 4800 pins (Ref. D. E. MAKEPEACE drawing number: 50034 Rev. A, Exhibit C attached.) A quantity of 144 pins (4.9 kg. U-235) which are .158" in diameter and 30-1/2" long will be stored in each container. There will be a total of 100 such containers in the storage area. These containers will be arranged in 4 parallel arrays of 25 units each, on 15-1/2" centers. This will provide a 12" edge-edge separation between reactive units in the same array with a 6 ft. distance between parallel arrays. (Ref. Exhibit D, D. E. Makepeace Drawing number: 50053, attached.)

The spacing between individual containers has been established as a safe condition based on data which was obtained from Exhibit 8 to Application For Special Nuclear Materials and Source Materials License submitted by Power Reactor Development Co., a copy of which is attached. Partial or complete flooding of the storage area has been assumed to be the most adverse condition which could be encountered. Under these conditions the multiplication for a single subassembly is 0.6. In effect this means that the multiplication for the entire array is 0.6 since individual units separated from each other by one foot of water are considered to be isolated from each other. This separation will be assured by the construction and spacing of the storage containers.

The building will contain no water or steam pipes since it will not be heated. This eliminates any possibility of flooding due to a pipe rupture or leakage. All movement of material into or out of storage will be done individually assuring that only one lot of pins will be out of the storage rack at any time.

The storage building will be under the surveillance of our plant Security which consists of a 24 hour guard force seven days a week. A watchman's clock will be installed inside the storage building to insure an hourly check by the guards during nights and weekends.

Keys to the storage building will be in the possession of the chief guard and will be issued only to persons who have obtained prior clearance from the Security Officer or his designate. An entry in the guard's log book will be made for the issuance and return of keys.

Keys to the enriched storage cage will be retained by the Criticality Officer and will be issued only to those persons authorized by him to enter the cage.

It is requested that our Special Nuclear Materials License be amended as described above. We have commenced production and further request that this application receive the earliest possible consideration.

Very truly yours,

D. E. MAKEPEACE DIVISION

John H. Durant
Business Manager

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Enclosure: