DOCKET NO. 40-268
70-139 Suppl. Only

ENGELHARD INDUSTRIES, INC.

D. E. MAKEPEACE DIVISION
PINE & DUNHAM STREETS
ATTLEBORO, MASS.
ATTLEBORO 1-0090
MYrtle-5-9358

December 22, 1960

Director, Division of Civilian Application
U. S. Atomic Energy Commission
Washington 25, D. C.

Gentlemen:

Attached you will find a report pertaining to an investigation of a radiation overexposure which recently occurred at our facility. This is in accord with requirements stated in Title 10, Part 20, Section 20.403 (C.)

We feel that the corrective actions to be taken will prevent a reoccurrence of this type in the future. Additional information will be supplied upon request.

Very truly yours,

Norton M. Weiss
Norton Weiss
Health & Safety Manager

NW/sl

Enc:

~~ML06 202 0545~~

J/10

DOCKET NO. 40-768
70-139

Report of Radiation Overexposure at Engelhard Industries, Inc., D.E. Makepeace Division in the Period from Oct. 31, 1960 to Nov. 14, 1960.

On Nov. 25, 1960, a radiation exposure report from our film badge supplier, Nucleonic Corporation of America, was mailed to Engelhard Industries, D.E. Makepeace Division, Plainville, Mass. This report contained an exposure of 1,400 mrems beta radiation for the two week period of Oct. 31, 1960 to Nov. 14, 1960 to (b)(6) a melter in our Nuclear Department. Upon receipt of the report, (b)(6) was removed from his job as a melter and transferred to the vacuum annealing furnace. He will be returned to his regular job in the melting area Jan. 1, 1961.

Uranium 238 and 235 are the principal sources of radioactivity in our plant. High beta exposures in our Nuclear Department come from the decay products of U^{238} i.e. UX_1 (Th^{234}) and UX_2 (Pa^{234}) with a maximum energy level of 2.31 Mev.

The higher levels of radiation in our plant come from the melting area and more particularly from the Kinney vacuum furnace, where most of our melting is done, and from the melting hoods, where used crucibles are cleaned.

Much of our melting is performed in a vacuum induction type furnace. It is sometimes necessary for the melters to enter the furnace shell for certain periods of time to charge the furnace or to remove crucibles and molds. A procedure is now in effect which permits the melters to charge the furnace without entering it. This was a previous source of high exposure which was eliminated by incorporating a hoist mechanism to load the furnace. The only time persons enter the furnace for any appreciable time is when the furnace is cleaned, which is usually once a week, depending on how heavy the melt schedule is. This cleaning is not done by either the melters or helpers, but by personnel employed in the Nuclear Department who clean on a rotating basis.

The crucible cleaning is done in three melt hoods, which are exhausted through an absolute filter. The hoods have plexi glass fronts with circular armports. These hoods are cleaned at the end of each shift and a technician checks out the flow rates of the hoods with a velometer. The flow rates are checked every week and filters are changed whenever necessary.

The maximum concentration of radioactive material in the melt area is approximately 350 pounds of U^{238} which is a melt charge for PRDC depleted melts.

Levels of airborne activity in our Nuclear Department are obtained through air sampling. The results of these breathing zone air samples have revealed concentrations continuously below MPC of airborne activity for a restricted area.

Crucibles are monitored before and after cleaning and results show that this is the major area where high radiation levels are encountered. Radiation surveys in the melt area are a weekly routine. Crucibles which are cleaned and do not show adequate decontamination are removed to the backyard area for a cooling off period.

It is felt that the underlying cause of the incident was increasing the FRDC three ingot melt schedule for that beweekly period to double prior weekly melt schedules. Also it would seem that the primary exposure was to the hands and arms of the person with lesser amounts affecting the upper part of the body. This we feel was due to our cleaning operations and entering the furnace.

Present procedures seem to be adequate for normal plant operations and normal melt schedules. In the future stringent control procedures for the melt area and the cleaning operations in particular will be enforced. These procedures along with current Health Physics controls in the area will consist of:

1. A complete radiation survey of the melt area every week.
2. At least two air samples in the melt area every week.
3. Accurate account of radiation levels in crucibles through monitoring before and after cleaning operations.
4. Monitoring of gloves in the melt area.
5. Ventilation check of hoods with a velometer every week. Also cleaning of hoods after each shift.
6. Timestudy of the three ingot FRDC melt operation.
7. Weekly notification to the Health Physics department of the melting schedule.