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Law

DATE OF DOCUMENT: 6/27/62 | DATE RECEIVED: 6/27/62 | NO.: 5988

LTR. | MEMO: X | REPORT: | OTHER:

TO: L. Lowenstein

ORIG.: | CC: | OTHER:
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ENGELHARD INDUSTRIES, INC., NEWARK, NEW JERSEY; LICENSE NO. SNM-98-SHORTAGE OF URANIUM AND U-235

ENCLOSURES:

Cpy. memo fm CO:I dtd 5/16/62, w/encl.

REFERRED TO	DATE	RECEIVED BY	DATE
~~Lowenstein~~	6/27		
~~Johnson~~	6/27		
~~Newton~~	6/27		
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REMARKS:

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A. A. Wells, Director
Division of International Affairs

JUN 2 7 1962

L. D. Low, Director
Division of Compliance

Original Signed by.
Leo Dubinski

ENGELHARD INDUSTRIES, INC., NEWARK, NEW JERSEY;
LICENSE NO. SNM-98 - SHORTAGE OF URANIUM AND U-235

CO:EGO

On December 4, 1961, DIA transmitted to this office copies of two memoranda to the files dated November 17 and 28, 1961. These pertained to a possible shortage in the uranium content of fuel elements sent by the Netherlands Government to subject licensee for reprocessing.

Inquiry disclosed that the licensee has on hand residues, aqueous wastes and dissolver solutions generated in the reprocessing of the fuel elements. Attached is a copy of a memorandum dated May 16, 1962, in which Region I, Division of Compliance, sets forth the results of assays by the New Brunswick Laboratory of samples collected from the licensee.

Based on the assays, it appears that about 152 grams of uranium remain in the residues on hand at the licensee's facility.

Attachment:
Cpy memo fm CO:I
dtd 5/16/62, w/encl.

cc: R. W. Kirkman, CO:I, w/o
H. K. Shapar, OGC, w/
R. Lowenstein, L&R, w/
D. E. George, NMM, w/

5988

OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

Memorandum

TO : Leo Dubinski, Assistant Director for Materials, Division of Compliance, HQ

DATE: MAY 16 1962

FROM : Robert W. Kirkman, Director
Region I, Division of Compliance

SUBJECT: ENGELHARD INDUSTRIES, INC., NEWARK, NEW JERSEY; LICENSE NO. SNM-98 - SHORTAGE OF URANIUM AND U-235 (YOUR MEMO 3/14/62, CO:EGO)
70-98
CO:I:AMB

Anson M. Bartlett, of this office, and Harold V. Werner, Nuclear Materials Management Branch, HYOO, visited the office of Mr. E. O. Nurmi, Chemical Engineer in charge of Uranium Department, Refinery Division, Engelhard Industries, Inc., 149 Murray Street, Newark, New Jersey, on April 3, 1962, to obtain samples of the Netherlands Government uranium fuel recovery residues.

A total of 24 samples were obtained, including 2 samples of solid residues, 5 of aqueous waste, and 17 of dissolver solutions. These samples were delivered to the New Brunswick Laboratory on April 4, 1962, with a request that they be assayed to determine their uranium content.

SUMMARY

Assays by the New Brunswick Laboratory of samples of solid residues, aqueous wastes and dissolver solutions, as supplied by Engelhard Industries from its reclamation of uranium from Netherlands Government fuel elements showed that (1) the solid residues still in Engelhard's possession, and weighing 24 pounds, contained approximately 1.4% or about 152 grams of uranium, (2) the quantity

of uranium remaining in the aqueous wastes was essentially correct as reported by Engelhard, and (3) Engelhard's assays of the original dissolver solutions were for all practical purposes correct. It would appear to be practical to rerun the 24 pounds of solid residues in an effort to reclaim additional uranium therefrom, possibly as much as 120 grams.

DETAILS

In gathering the above-mentioned samples it was found that the solid residues were stored in a large plastic bag inside a 55 gallon steel drum, which drum had a lid on it, and was stored among several other similar drums. It was weighed in the presence of the AEC representatives and was found to have a gross weight of 113 pounds. The drum itself, according to Mr. Nurmi, is of a standard type weighing 56 pounds, so the net weight of the contents was 57 pounds.

A technician member of Mr. Nurmi's staff put on rubber gloves and a face mask and, using a metal scoop, started to mix the residues preparatory to withdrawing representative portions for our samples, it having been decided that 3 samples would be assembled, 2 for us and 1 for Engelhard. It was soon discovered that various foreign objects were among the residues, namely empty sample bottles, crucibles, insulation material, and metal fuel element end pieces.

Mr. Nurmi and his technician at first were unable, except for the fuel element end pieces which they said were from the Netherlands fuel elements, to explain the presence of the above-mentioned objects. However, after some reflection and discussion they both concluded that the foreign material

appeared to be floor sweepings and other debris which must have been dumped in the drum by other refinery workers without their knowledge. The disclosure, quite obviously, was a source of embarrassment to Mr. Nurmi.

It was decided by Messrs. Nurmi and Werner that the foreign objects, including the fuel element end pieces, should be removed from the drum before extracting any residue samples. This was done and the drum was reweighed with the result that the residues had a net weight of 24 pounds, as compared with a net weight of 57 pounds before the foreign objects had been removed. The residues were then mixed, and samples were removed from various sections of the total mass. The extracted samples were then composited in a mixing bowl and from this material 3-1 pound glass bottles with plastic screw caps were filled. The bottles had previously been labeled and weighed on a Fisher Scientific Ohaus Triple-Beam Balance and the weights had been recorded on the labels. The bottles were reweighed after they had been filled with residue material, and these weights were recorded on the labels, along with the resulting net weight of the material. The bottles were then sealed with plastic tape.

One of the 3 samples of residues having a net weight of 129.5 grams and identified as Sample AR, was retained by Mr. Nurmi. The other 2 samples identified as Sample BR and Sample CR, and having net weights of 97.3 grams and 89.4 grams respectively, were retained by the AEC's representatives and were turned over to the NBL on April 4, 1962.

Mr. Nurmi was requested to retain the residues until the results of our analyses would be available and he said he would do so. He pointed out, however, that by letter dated January 23, 1962, he received written authorization from DIA to dispose of these residues along with all other wastes from the Netherlands recovery project. He added that he had expected to turn these wastes over to

a waste disposal from in the near future, but he said he would defer such action until he heard from this office.

Mr. Nurmi said that when the Netherlands reclamation project was finished, he had 15 lots of aqueous waste containing from 115 to 178 liters of liquid each. He said that he sent a report of his analysis of this waste to DIA in a letter dated February 16, 1962, which showed that there was a total of 146.8 grams of uranium in these wastes, and that he was making arrangements to dispose of these solutions. He said that he has disposed of all but 5 of these lots which contained a total of 49 grams of uranium.

Samples of the above-mentioned aqueous wastes were obtained by our representatives and turned over to the NBL for analysis. The analysis reflected that the 5 lots of aqueous wastes contained a total of 43 grams of uranium, which Mr. Werner said was within analytical accuracy, and Engelhard's value of 49 grams, therefore, would be acceptable. Werner also said that in view of the aforementioned agreement of analytical results it can be assumed that Engelhard's data for the uranium content of the aqueous wastes that have already been discarded, are correct.

Mr. Nurmi also turned over to our representatives a complete set of the samples which he extracted from each of the 17 dissolver solutions. He also supplied a copy of a letter dated December 12, 1961, which he wrote to the Netherlands Government agency "Comprino, N.V., Amstel-21, Amsterdam, Netherlands," in reply to that agency's request for data on the processing of the fuel elements. He pointed out that a "Table" was attached to his letter which showed the sample code, the elements numbers, the weight of solution, and the analytical results of both the uranium and the aluminum analyses. Copies of this letter and the Table are attached as Exhibits "A" and "B" respectively.

The above-mentioned 17 samples were analyzed by the NBL, and a report dated April 26, 1962, as submitted by NBL reflects,that, with very few exceptions, the Engelhard assays were very close to the NBL assays. We are listing the NBL assay data below in comparison with the Engelhard data:

Engelhard's Sample No.	grams U/gram* According to Engelhard	grams U/gram* According to NBL
039-1A	.00406	.00401
039-1B	.00428	.00428
039-1C	.00416	.00409
039-1D	.00853	.00851
039-1E	.00825	.00839
039-1F	.00815	.00762
039-1G	.00761	.00828
039-1H	.00770	.00773
039-1I	.00762	.00804
039-1J	.00820	.00816
039-1K	.00616	.00616
039-1L	.00479	.00475
039-1M	.00423	.00426
039-1N	.00903	.00902
039-1P	.00802	.00802
039-1R	.00789	.00785
039-1T	.00565	.00564

*-20% enrichment in all cases. NBL used the following atomic weights in its computations:

238.03 for natural uranium
237.45 for 20% enriched uranium

Mr. Werner reviewed the comparative assays and said that in his opinion, with the relatively minor exception of Samples No. 039-1F, 039-1G, and 039-1I, the NBL assays reflect that Engelhard's assays, for all practical purposes, were sufficiently accurate.

MAY 16 1962

The NBL assayed the two samples of solid residues twice because the first assay indicated a rather high percentage of uranium. However, the second assay confirmed the results of the first assay, namely that Sample BR contained 1.0% of uranium, and Sample CR contained 1.8% of uranium, of 20% enrichment in both cases, or an average uranium content of 1.4%.

Mr. Werner computed that, on the basis of the NBL assays, the 24 pounds of solid residues still contain approximately 152 grams of uranium. He said that by rerunning these residues, it should be possible for Engelhard to extract about 120 grams of uranium, which in his opinion would be a worthwhile thing to do since the uranium is worth $15/gram.

Mr. Werner volunteered to initiate discussions with Mr. Nurmi on an informal basis in an effort to have Engelhard rerun the solid residues, so if DIA agrees to this procedure please let us know. We will await your instructions before initiating any further action.

Enclosure:
Exhibits "A"
and "B"

VIA AIR MAIL

December 12, 1961

Comprimo, N.V.
Amstel-21
Amsterdam, Netherlands

Attention: Mr. Nikkesen

Gentlemen:

In reply to your request, we are submitting herewith the data on the processing of the fuel elements in our scrap facility.

The fuel elements were dissolved in dilute nitric acid, the resulting solution was filtered, weighed, sampled, and the sample analyzed for uranium content. The solids, or dirt removed by the filter, were calcined and leached with nitric acid. The resulting solution was weighed, sampled, and the sample analyzed for uranium content.

We are listing in Table I the sample code, the elements numbers, the weight of solution and the analytical results of both the uranium and the aluminum analyzes. The aluminum value is ± 10 per cent at best as it is used for process control only.

We hope this information is what you require. Should you need more information, we shall be happy to help in any way we can.

Very truly yours,

ENGELHARD INDUSTRIES, INC.

E. O. Murat

EOM:mp
Att.

cc: Mr. Joseph F. Quinn, A.E.C. Washington

TABLE I

DITCH FUEL ELEMENT PROCESSING DATA

Sample	Element No.	Solution Wt. Grams	U G/G	Al G/G
U-039-1A	174	102550	.00401	.0242
U-039-1B	171	101400	.00428	.0239
U-039-1C	3721	100950	.00409	.0239
U-039-1D	3720,3724	187113	.00851	.0245
U-039-1E	2717,3719	206388	.00839	.0243
U-039-1F	3731,3725	213419	.00762	.0207
U-039-1G	2710,2712	203660	.00828	.029
U-039-1H	2716,2730	214126	.00773	.027
U-039-1I	3728,3714	214653	.00804	.0297
U-039-1J	279,3721	209110	.00816	.0295
U-039-1K	2713,179	204347	.00616	.0301
U-039-1L	176,271	186430	.00475	.0350
U-039-1M	172,273	204347	.00406	.0317
U-039-1N	2711,3726	185522	.00902	.0330
U-039-1P	2715,3729	202079	.00802	.0296
U-039-1R	2718,278	220800	.00765	.0284
U-039-1T	Leach	40300	.00564	.0196

Notes: All fuel element numbers were prefixed by Letter "N".

Uranium and Aluminum analytical results are expressed as grams metal per gram of solution.

E. O. Worrel
12/12/61