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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

IE Inspection Report No. 70-25/76-02 (IE-V-105)

Licensee Rockwell International
Atomics International Division
8900 DeSoto Avenue
Canoga Park, California

Docket No. 70-25

License No. SNM-21

Priority 1

Facility

Category 1

Location Canoga Park, California

Group 1

Type of Facility Fuel Fabrication

Type of Inspection Special Inspection, Mat'l Acct., Announced

Dates of Inspection February 6, 1976

Dates of Previous Inspection January 14, 1976

Principal Inspector G. Hamada 2/25/76
G. Hamada, Chemist/Statistician — Date

Accompanying Inspectors None

Date

Date

Other Accompanying Personnel: None

Reviewed by [signature] 2/25/76
V. N. Rizzolo, Chief, Safeguards Branch — Date

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SUMMARY OF FINDINGS

Enforcement Action

Letter of February 5, 1976 from R. H. Engelken, Director, Region V, to M. B. Remley, Manager, Health, Safety and Radiation Services.

Other Significant Findings

This was a special inspection.

Management Interview

Conducted on February 6, 1976 with the following:

M. E. Remley, Manager, Health, Safety and Radiation Services Department
V. J. Schaubert, Manager, Nuclear Materials Management
K. Reinecker, Program Manager for EBR
R. Jaseph, Internal Auditor

Summary

A nonroutine inspection was conducted at Rockwell International, Atomics International Division, Canoga Park, on February 6, 1976. The impetus for this inspection was the telephone call from licensee informing NRC, Region V, that preliminary material balance data indicated that MUF, for the material balance period ended by the physical inventory of January 5, 1976, exceeded the LEMUF specifications by greater than 1.5 times for U-235 (but less than two times specification) and greater than two times specification for element.

Since the most significant contribution to MUF came from the EBR II program, EBR II operations were placed in a shutdown mode and an investigation launched to isolate the factors responsible for the excessive MUF. The investigation included a reexamination of transfer documents and reinventory of EBR II materials. By early morning, February 6, the licensee had already discovered several erroneous transactions which, when accounted for, brought the MUF for isotope to less than 1.5 times the LEMUF specification, but not less than the specification. These mistakes were tracked back to original documents and verified that they were indeed mistakes. At the conclusion of this one-day inspection, the licensee had not as yet fully completed the review of all transfer documents nor the reinventory. The licensee agreed to notify Region V immediately if any new information developed that significantly affected the material balance.

The inspection was initiated with a meeting with licensee personnel to determine what actions had already been taken and what future actions were planned to resolve the excessive MUF problem. Participating in the meeting were M. E. Remley, Manager, Health, Safety and Radiation Services Department; K. Reinecker, Program Manager for EBR II; V. J. Schaubert, Manager, Nuclear Materials Management; R. Jaseph, Internal Auditor; and G. Hamada, NRC, Region V.

The MBA structure and bookkeeping procedures at AI are such that a MUF recorded for a given MBA is not necessarily attributable to activities within that MBA. For example, a MUF loss of 910 gms (element) and 957 gms (element) was reported respectively for MBA 1, which is the vault plus the weighing room, and MBA 3, which is the fuel assembly and testing area. The greater part of the production activity is conducted in MBA 2. The MUF's most often occur because of a delay in obtaining the precise analytical data of the material, usually pins, being transferred between these MBA's. After a pin casting operation has been completed (in MBA 2, the melt and casting area), the pins are transferred to the vault for storage at a nominal value based on the initially weighed out values for the alloy (approximately 95% U and approximately 5% other metals). When the analytical data become available, the nominal values are adjusted to the analytical results. If the material is still in the vault or if it has been transferred to the assembly area, this correction would result in a MUF for these areas, whereas in reality, the MUF should more properly be assigned to MBA 2 since this is where the MUF actually occurred. On the other hand, it is possible to have a "true" MUF for MBA's 1 and 3. If discrete items such as pins or elements were mislabeled, miscounted, lost or stolen, a "true" MUF would result for these MBA's. To show that this did not occur, the licensee was required to perform a complete review of all documents involving these MBA's, as well as take a reinventory of EBR II materials. Preliminary indications were that the MUF was not a result of unaccounted for items such as pins or elements. This review did reveal, however, that a number of bookkeeping errors had been made, and when they were corrected, the MUF was reduced to less than 1.5 times specification for isotope. There were at least four errors of this type; one increased the MUF but the other three reduced it, giving a net reduction in the overall MUF.

These four transactions and their effect on prior period MUF, as well as current period MUF are as follows:

1. When a container of rejected elements was transferred from MBA 1 (vault) to MBA 2 (EBR casting) for decladding, it was found that 12 elements from Heat CE 013 did not appear on the transfer voucher. Investigation revealed that these 12 elements were originally placed in the container of rejected

elements for storage only; however, when this container was transferred from MBA 3 to the vault (MBA 1), these 12 elements were included but were not recorded in the transfer voucher. It also became apparent therefore that these 12 elements had not been recorded on the November 3 inventory in MBA 1 and thus showed up as MUF for MBA 3. (Internal letter of December 17, 1975 from V. Schaubert to M. E. Remley). The MUF reported for the August 27 - November 3 , 1975 period was +126 gms U-235. If the above adjustment is included for this period, the MUF would have been 126 - 394 = -268 gms (isotope). This compares with a LEMUF specification for this period of 807 gms (isotope).

This adjustment was not picked up for the current (January 5, 1976) inventory and thus the MUF was in error by this quantity. If the MUF of approximately 487 gms (isotope) is adjusted for this error, the new MUF becomes 881 gms (487 + 394 = 881) for U-235.

2. On October 28, 1975, a sample shipment (EBR II) was made to Argonne. The 741 for this shipment incorrectly listed the uranium element weight as 224 gms and isotope weight as 149 gms. A correction was made on November 11, 1975 indicating that the element weight should have been 160 gms and the isotope weight 107 gms giving a net difference of 42 gms for isotope. This transaction was not included in the current period material balance. When this adjustment is included in the November 4, 1975 - January 5, 1976 period material balance, the MUF reduces to 839 gms (881 - 42 = 839) for isotope.

   If a similar adjustment is made for the period in which this error occurred, i.e., the August 26 - November 3, 1975 material balance period, the MUF reduces to -226 gms (-268 + 42 = -226). (See 1. above). The -226 gms U-235 MUF is well within the LEMUF specification of 807 gms for isotope for this period.

3. On July 22, 1975, a transfer of pins was made from EBR casting (MBA 2) to the vault (MBA 1) for storage. The gross and tare weights listed were 8995.80 gms and 2875.90 gms, respectively. The net weight was incorrectly recorded as 6919.90 gms instead of the correct weight of 6119.90 gms. This material was subsequently transferred to the assembly MBA (MBA 3) on December 10, 1975 with the same incorrect net weight. This error was identified in an internal letter of December 17, 1975 from V. Schaubert to W. L. Dias, but was not factored into the November 4, 1975 - January 5, 1976 material balance. When this correction is included in the current (November 4, 1975 - January 5, 1976) material balance, the current period MUF reduces to 332.3 gms (839 - 506.7 = 332.3) for isotope.

If this correction is applied to the period in which the error occurred, i.e., the June 24 - August 25, 1975 material balance period, the MUF would have been -104.6 gms (isotope) rather than the MUF gain of -611.3 gms that was reported for this period. The LEMUF specification for this period was 489 gms (isotope).

4. For the January 5, 1976 inventory, a container of contaminated glass was listed at a net weight of 476 gms. The correct weight should have been 4763 gms. The SNM content of this material, however, was such that the U-235 inventory was understated by only 13.73 gms. This correction reduces the current period MUF to 318.6 gms for U-235.

Another area that was looked into as a potential contributor to MUF was the accuracy of the analytical results for "heels." A heel is the alloy melt that is left over in the crucible after a pin casting operation. Because of the nature of the pin casting operation, relatively large heels are left. At the end of the last material balance period, heels in the range of 50 kilograms were inventoried. The precision of the analytical method for heels and pins is on the order of 0.2 - 0.3%. The analytical results for heels were consistently lower than the results for the pins cast from the same melt. While this difference was small, ranging from 0.3% to 0.5%, the quantity of SNM represented by this difference amounted to a significant percentage of the MUF. There is also a prior history of sampling problems with heels. In the past, biased results were obtained when too much of the surface parts of the heels were taken for analysis. Enough surface oxidation had occurred so that the sample was not truely representative of the heel. This difficulty was largely corrected by using a drill to sample deeper into the heel. But even this improved method may not be foolproof. If the drilled out portion is fine enough, thus exposing a large surface, significant oxidation of the sample can occur. Oxygen analysis of some of these samples has shown that the oxygen content can be as high as 1000 - 2000 parts per million or 0.1 - 0.2%. It has been surmised also that since the drilling is conducted under a Freon atmosphere, samples with large surface area might also entrap Freon through adsorption. It appeared desirable, therefore, to resample the heels using a different sampling technique and have them reanalyzed. The plan was to saw off a small block from a section of the heel and immediately analyze this portion. A check of the number of heels still available for reanalysis revealed that all of the heels inventoried on January 5, 1976 had been recycled so that a reanalysis of the same heels was not possible. It is expected, however, that this relationship between heel and pin analyses will continue to be scrutinized and eventually resolved through better sampling methods.

It should be helpful at this point to put the MUF problem in perspective. While it is proper and necessary that the licensee take all of the actions mentioned above and other actions as required, it should be recognized that the unadjusted MUF of 487 gms (isotope) for this period is only 0.25% of throughput. As defined in 10 CFR 70, "additions to process" or "removals from process," however, are not synonymous with throughput. The limiting LEMUF specification thus reverts to the 300 gm quantity under 70.51 e(5)(i). During prior periods, the LEMUF specifications were controlled by the provision under 70.51 e(5)(ii), i.e., 0.5% of additions to process, giving LEMUF limits of 807 gms (isotope) for the August 26 - November 3, 1975 period and 489 gms (isotope) for the June 24 - August 25, 1975 period. The current situation developed because EBR II operations are now in a winding down stage. This required that recycling of heels and pins be maximized and thus caused the "additions to process" to be limited to a small quantity while the actual throughput remained high.

The above notwithstanding, because the MUF (487 gms U-235) exceeded the LEMUF specification (300 gms) by greater than 1.5 times, certain actions by the licensee, as well as by Region V were taken to investigate and explain the MUF. In retrospect, we might conclude that this occurrence was not of a highly significant nature; but in the investigation made necessary by the guidelines for action, it was revealed that there were a number of significant deficiencies in the accountability procedures as practiced. Twelve pins remained unaccounted for through three material balance periods. There should be redundancies built into the procedures to preclude such occurrences, and certainly, when they do occur, this fact should become known in a more timely manner. While it is recognized that human errors cannot be completely eliminated, procedures should be instituted to minimize such errors. On the other hand, as undesirable as any error may be, a certain level of occurrence of errors can be tolerated if a procedure is set up to detect and correct such errors promptly. There were several instances where an error was discovered by the licensee and a corrected copy of the transaction reissued, but the correction was never imputed into the system for material balance purposes. It is clear that these occurrences reflect upon the lack of adequate procedures and/or practices as implemented at the operational level.

Finally, all of this frantic activity and around-the-clock review occurred as it did because of the last minute formulation of the material balance. As has been the case in the past, the analytical data from Chemistry arrived barely in time to meet the deadline for reporting the material balance data. This is not a reflection on Chemistry but rather a reflection on the ordering of priorities by management. Had the analytical results been available sooner,

Nuclear Materials Management personnel would have had the opportunity to perform a review prior to reporting of the MUF data, and it is likely that they would have located the book-keeping mistakes within 24 hours or so, as they did, and the action level on the MUF would have been significantly different than that which was taken. This raises the question of the lack of understanding or resolve to put together all of the necessary components of a material accountability program into an effective safeguards program.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION V

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APR 2 1976

Atomics International Division
Rockwell International
8900 DeSoto Avenue
Canoga Park, California 91304

Docket No. 70-25

Attention: Mr. R. G. Jones
Vice President and Controller

Gentlemen:

This refers to the inspection conducted by Messrs. G. Hamada and Y. Kobori of this office on March 1-5, 1976 of activities authorized under NRC License No. SNM-21. It also refers to the discussion of our inspection findings with Drs. W. Meyers, M. Remley and Mr. V. Schaubert at the conclusion of the inspection, as outlined in the enclosed inspection report.

The areas examined during the inspection included your program for controlling and accounting for special nuclear material pursuant to applicable provisions of Part 70, Title 10, Code of Federal Regulations, and specific requirements of NRC License No. SNM-21. Within these areas, the inspection consisted of selective examinations of procedures and records, interviews with plant personnel and observations by the inspector.

Based on the results of this inspection, it appears that certain of your activities were not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation enclosed herewith as Appendix A. The items of noncompliance have been categorized at the level described in our correspondence to all NRC licensees dated December 31, 1974.

This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office, within twenty (20) days of your receipt of this notice, a written statement of explanation in reply including: (1) corrective steps which have been taken by you and the results achieved; (2) corrective steps which will be taken to avoid a further violation; and (3) the date when full compliance will be achieved.

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