

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

REGION V

IE Inspection Report No. 70-25/75-01 (IE-V-44)

RIS: LAL & ZAZ

Licensee Atomics International
Rockwell International
8900 DeSoto Avenue

Docket No. 70-25

License No. SNM-21

Canoga Park, California 91304

Priority 1

Facility _____

Category 1

Location Canoga Park & Santa Susana, California

Type of Facility Fuel Fabrication

Type of Inspection Material Control and Accounting
Routine, Announced

Dates of Inspection January 13-17, 1975

Dates of Previous Inspection September 9-13, 1974

Principal Inspector J. Kobori
A. Kobori, Auditor

3/21/75
Date

Accompanying Inspectors B. L. Brock
B. L. Brock, Chemist
G. H. Hamada
G. H. Hamada, Chemist/Statistician

2/21/75
Date

3/21/75
Date

Other Accompanying Personnel None

Reviewed by V. N. Rizzolo
V. N. Rizzolo, Chief, Materials and Plant
Protection Branch

3/21/75
Date

REPORT OF INSPECTION OF SAFEGUARDS
CONTROL OF NUCLEAR MATERIALS
AT

ATOMICS INTERNATIONAL DIVISION
OF
ROCKWELL INTERNATIONAL
CANOGA PARK, CALIFORNIA

A. INTRODUCTION

1. Inspection dates at Atomics International (AI) were January 13-17, 1975. The prior inspection report was RO-V-34 dated December 2, 1974.
2. The current inspection covered the period September 1, 1974 through December 31, 1974.
3. AI is partially a privately owned commercial facility and partially government owned. Activities include research and development (R&D) under cost-type contracts with the Energy Research and Development Administration (ERDA), commercial processing and fabrication activities under license.

AI is partially licensed and partially exempt from licensing. The facility consists of a headquarters operation in Canoga Park and a field operation in the Santa Susana mountains. At the Santa Susana site, buildings and equipment within a defined area, "the triangle," are government owned. All activities with special nuclear material under ERDA contract and subcontract within the defined area are exempt from licensing requirements by the ERDA General Manager's order. These activities including compliance with health, safety, and safeguards are under the administrative responsibility of the San Francisco Operations Office.

Some contract activities take place outside the triangle and are subject to license requirements. Work in the hot laboratory or the plutonium laboratory falls in this category.

Production capability includes metallurgical processing of uranium metal to produce various types of alloyed fuel for conventional reactors and space nuclear reactors. Some processing of plutonium oxide into carbide or nitride fuels is planned.

B. SCOPE OF INSPECTION

1. Determination of conformance with the current materials and plant protection amendments to License SNM-21, MPP-1.
2. Determination as to whether licensee's operation was in conformance with his Nuclear Material Control and Accounting Plan approved by the Directorate of Licensing and effective May 6, 1974.
3. Determination of compliance with applicable requirements of 10 CFR 70, "Special Nuclear Material" (SNM).
4. Determination of compliance with authorized possession limits for SNM and with authorized uses.
5. Determination as to whether licensee's material unaccounted for (MUF) and its limit of error (LEMUF) were within regulation requirements.
6. Uranium samples were taken from production materials for independent chemical analysis.

C. SUMMARY OF FINDINGS

1. One item of noncompliance with safeguards requirements in 10 CFR 70 was identified. (See H.3.b.1(c)(5))
2. No items of noncompliance with authorized possession limits or authorized use of SNM were noted.
3. The licensee was not in full compliance with License Condition 3.1 of Amendment No. MPP-1. (See H.3.a.3.1)
4. Determined that licensee's MUF was within applicable regulation requirements and that the required reporting and investigation of excessive LEMUF was accomplished. (See H.2)
5. Enforcement Action
 - a. Contrary to the requirements of License Condition 3.1 under Section 3.0, "Measurements and Statistics," Amendment MPP-1, the licensee had not assured that all items inventoried were measured. Some items were carried at nominal or calculated values and additionally six (6) waste drums were not measured.

- (2) The standards program did not provide a minimum of two measurements of standards per week for each measurement type during weeks in which one or more samples were measured.

This item has been complied with, and the licensee improved his program through analysis of a standard prepared independent of his calibration solutions.

- (3) The program of replicate sampling was not maintained to provide a minimum of 15 representative data sets on process materials for each measurement type per material balance period.

Subsequent to the last inspection, the license was revised to permit a minimum of 15 representative data sets or 100 percent replication for each measurement type per material balance period. The licensee is in compliance with the amended requirement.

- c. Estimates of random and systematic errors had not been determined for use in the determination of limits of error of material unaccounted for (LEMUF) for each material balance period.

This item is unresolved and the licensee's procedure for compliance was scheduled for release in February 1975. The procedure and the licensee's practices will be evaluated during the next inspection.

- d. Standard deviations of measurement biases had not been determined so that material accounting data could be adjusted for measurement biases exceeding 10 percent of their standard deviation.

This item has been complied with through the licensee's effort to make the necessary material accounting data adjustments while collecting the necessary data for evaluating the bias relative to its standard deviation.

- e. Data generated under the measurement control program was not utilized to monitor and control measurement performance.

This item is unresolved. The inspection occurred while the licensee was in the early stages of training a new statistician and developing his procedure. This item will be evaluated during the next inspection.

- f. Assurance had not been obtained from the contractor (offsite analytical laboratory) who performed material control and accounting measurements that such measurements were made in conformance with applicable measurement control requirements of this section.

This item is unresolved, however, the licensee has obtained verbal assurance that the contractor laboratory was measuring standards at the required frequency and making replicate measurements of the samples submitted.

- 3. Previously reported that the licensee had not appropriately implemented the requirements of the license conditions under Section 7.0, "Records and Reports," Amendment MPP-1, relative to the following:

- a. Monthly reports of intentional discards and material unaccounted for were not submitted to Region V within fifteen (15) days after the end of the month, as required, in five (5) of seventeen (17) instances.

This item has been complied with in that the licensee's monthly reports are now issued in a timely manner as required.

- b. Measurements of three receipts of SNM were not completed and reported on Forms AEC-741 within thirty (30) days after receipt of the material, as required.

This item has been complied with through the licensee's timely measurement of subsequent receipts and completion of the forms in the required thirty (30) days.

E. UNUSUAL OCCURRENCES

None.

F. OTHER SIGNIFICANT FINDINGS

Current Findings

None.

Status of Previously Reported Unresolved Items

None.

G. MANAGEMENT INTERVIEW

The results of the inspection were discussed with R. G. Jones, Vice President, Business Administration; M. E. Remley, Manager, Health, Safety and Radiation Services Department; and V. J. Schaubert, Manager, Nuclear Materials Management, at the conclusion of the inspection on January 17, 1975.

H. DETAILS

1. Persons Contacted

- R. G. Jones, Vice President, Business Administration
- M. E. Remley, Manager, Health and Radiation Services Department
- V. J. Schaubert, Manager, Nuclear Materials Management
- D. C. Allen, Nuclear Materials Management
- C. L. Nealy, Manager, Analytical Chemistry
- J. D. Moore, Operational Safety and Waste Management
- E. Peters, Custodian and Manufacturing Engineer, EBR-II
- E. Walsh, Vault Custodian
- D. Espanoza, Nuclear Material Control Technician
- E. Givens, Senior Reactor Mechanic
- L. Richon, Reactor Assemblyman
- J. Dong, Statistician, Nuclear Materials Management

2. Material Unaccounted for (MUF) and Measured Discards (MD)

The material balance summary for the period September 1, 1974 through December 31, 1974 was as follows:

<u>Enriched Uranium (< 20%)</u> <u>(September-October 1974)</u>	<u>U gm</u>	<u>U-235 gm</u>
Beginning Inventory	7436	1419
Receipts	<u>0</u>	<u>0</u>
Total	7436	1419
Shipments	0	0
MD	0	0
Ending Inventory	7434	1419
MUF	2	0
LEMUF	N.A.*	N.A.*
LEMUF % of Additions to (A) or Removals from (R) Materials in Process	N.A.	N.A.

*N.A. not available

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<u>Enriched Uranium (<20%)</u> (November-December 1974)	<u>U gm</u>	<u>U-235 gm</u>
Beginning Inventory	7434	1419
Receipts	<u>7061**</u>	<u>1408**</u>
Total	14495	2827
Shipments	7061**	1408**
MD	0	0
Ending Inventory	7434	1419
MUF	0	0
LEMUF	N.A.	N.A.
LEMUF % of A or R	N.A.	N.A.
<u>Enriched Uranium (>20%)</u> (September-October 1974)	<u>U gm</u>	<u>U-235 gm</u>
Beginning Inventory	422101	302204
Receipts	<u>(834)</u>	<u>(805)</u>
Total	421267	301399
Shipments	(468)	(413)
MD	0	0
Ending Inventory	420560	301024
MUF	1175	788
LEMUF	629	420
LEMUF % of A or R	No Production	
(November-December 1974)		
Beginning Inventory	420560	301024
Receipts	<u>261605</u>	<u>174775</u>
Total	682165	475799
Shipments	285165	190304
MD	0	0
Ending Inventory	397948	286129
MUF	(948)	(634)
LEMUF	752	974
LEMUF % of A or R	0.77A	1.50R

**Transfer from lease to
private ownership only

<u>Plutonium</u> (September-October 1974)	<u>Pu gm</u>	<u>Pu-239 & 241 gm</u>
Beginning Inventory	459	406
Receipts	<u>0</u>	<u>0</u>
Total	459	406
Shipments	0	0
MD	0	0
Ending Inventory	457	408
MUF (rounding)	2	(2)
LEMUF	N.A.	N.A.
LEMUF % of A or R	N.A.	N.A.

(November-December 1974)

Beginning Inventory	457	408
Receipts	<u>411</u>	<u>363</u>
Total	868	771
Shipments	12	11
MD	0	0
Ending Inventory	857	760
MUF	0	0
LEMUF	N.A.	N.A.
LEMUF % of A or R	N.A.	N.A.

The licensee's MUF for uranium enriched to <20% U-235 did not contribute significantly to the U or U-235 MUF for the total plant. The research reactor, L-77, core loading constituted almost the entire <20% U-235 inventory.

The licensee's MUF for uranium enriched to >20% U-235 was statistically significant for both the first and second material balance periods covered by the inspection. During the first material balance period (September-October 1974), the licensee reported to IE-V by telephone followed by a letter dated November 11, 1974 that his October 23, 1974 physical inventory had indicated apparent MUF's for U and U-235 (1305 gm and 870 gm, respectively) in excess of the 10 CFR 70.51(e)(5) limits. The licensee immediately undertook the required investigation and in a letter to IE-V dated November 11, 1974 preliminarily reported that the MUF was principally associated with the measurement of

the uranium content of process materials. The initial analysis of the dross remaining from master alloy casting and the heel remaining from fuel pin injection casting proved to be nonrepresentative. The problem was resolved in the case of the dross by revising the sample preparation to include calcination to the oxide followed by blending, sampling, dissolution separation of the insolubles and analysis of the supernate by X-ray fluorescence and analysis of the residue by gamma counting. The results of this revised head end sample preparation reduced the dross contribution to the MUF's by eighty (80) percent.

The heel analysis discrepancy was improved primarily through improvement in the analytical laboratory practices in preparation of a homogeneous solution from a representative sample. The result was a 96% reduction in the heel contribution to the MUF's.

The completion of the MUF investigation was reported to IE-V by letter dated December 20, 1974.

Improvement of the dross and heel measurements resulted in a commensurate reduction of the U and U-235 LEMUF's from ± 3801 gm and ± 2537 gm, respectively to ± 629 and ± 420 gm.

Although these values still exceeded the 10 CFR 70.51(e)(5) LEMUF limits, the licensee had determined that the principal contributions were traceable to the measurement of process wastes and the measurement of SNM receipts. A method of reducing the LEMUF contribution of process waste measurements through pretreatment of the waste was being evaluated. The LEMUF contribution from the measurement of receipts was being reduced through acquiring more complete shipper measurement information on all the items in an SNM receipt. This will eliminate ambiguous measurement differences that result when the receiver inadvertently composites samples across lots because of insufficiently detailed shippers' data. The resultant inflated LE on the receipt inflates the LEMUF on addition of the SNM to the production process.

3. Discussion of Findings Relative to Conformance with Current License Conditions in Amendment MPP-1 and 10 CFR Part 70

a. Amended MPP License Conditions

1.0 Facility Organization

1.1

This license condition requires in part that the Manager, Criticality and Nuclear Materials Control (C&NMC) shall develop, revise, implement, and enforce the nuclear material control procedures.

The development of nuclear material control procedures (particularly relating to statistics) and revision of certain existing procedures were scheduled for completion after the inspection just conducted. This remains an unresolved item pending completion of objectives promised by AI in its letter of December 20, 1974.

1.2

This license condition requires in part that a manual containing all current nuclear material control procedures shall be maintained by the Manager, C&NMC.

The Nuclear Materials Management Procedure Manual maintained by the Manager, C&NMC, was not reviewed during this inspection, however, its need for revision continues until the needed procedures are issued. As in 1.1 above, this remains an unresolved item.

1.3

As a result of the prior inspection, we reported the licensee's compliance with this license condition which requires that nuclear material control procedures be appropriately reflected in standard operating procedures and management instructions.

Procedure revisions currently underway will need to be reviewed when completed to assure continued compliance.

1.4

The licensee is now in compliance with this license condition requiring written delegations of safeguards responsibilities.

2.0 Facility Operation

No review was made of this license condition with which the licensee was in compliance as reported in RO-V-34.

3.0 Measurements and Statistical Controls

3.1

This license condition requires in part that the licensee or his designated agent shall measure material inventoried.

Contrary to this part of the license condition, the licensee had not listed some items on his inventory at measured values but instead used nominal or calculated values. Additionally, six (6) waste drums were not measured. (See H.3.b.1(c)(5))

3.2

This license condition requires that an ongoing measurement control program covering all SNM accounting measurements shall be maintained in which:

- 3.2.1 All measurements are calibrated over the range of operation.
- 3.2.2 A minimum of two standards per week are analyzed per measurement type during weeks in which one or more samples are analyzed by that type measurement.
- 3.2.3 A program of replicate sampling and measurement of process materials is maintained to provide a minimum of either 15 representative data sets or 100 percent replication for each measurement type per material balance period.

The current inspection occurred prior to the date the licensee was committed to complete the adjustments to his program to meet the above requirements. He had, however, almost completed the preparation of the standards for calibrating his nondestructive assay system over the range of operation to comply with License Condition 3.2.1. The licensee has prepared an additional standard the analysis of which facilitates compliance with License Condition 3.2.2 and 3.4 as well. The October 9, 1974 amendment to License Condition 3.2.3 which permits the option of sampling 15 representative replicates or 100 percent replication now allows the licensee to unambiguously comply with this requirement.

3.3

This license condition requires that the licensee shall determine measurement biases and systematic errors from the standards program and random errors from replicate sampling and measurement of process materials. The licensee's determination of measurement biases, systematic error and random error components are being developed as part of the statistics procedure; however, the inspection preceded the date the licensee was to issue the procedure and this item therefore will be reviewed during the next inspection.

3.4

This license condition requires that material accounting data be adjusted for any measurement bias which exceeds ten (10) percent of its standard deviation. The licensee has through calibration with standards assured that his material accounting data would be routinely adjusted for bias corrections whether or not the bias exceeded ten (10) percent of its standard deviation.

3.5

This license condition requires that the data generated under the measurement control program be utilized to monitor and control measurement performance. The data being accumulated under the measurement control program will be more fully utilized to monitor and control the measurements program on completion of the statistics procedure and full utilization of the newly hired statistician. This item will be reviewed during the next inspection.

3.6

No review was made of this license condition requiring an annual review of the measurements program by the Manager, Health, Safety and Radiation Services.

3.7

This license condition requires in part that the licensee shall assure that any person who contracts to perform material control and accounting measurements conforms to the measurement control requirements. The licensee had

initiated a review of the mass spectrometry isotopic measurements that had been made by a contractor laboratory. Preliminary findings indicated that standards were analyzed at the required frequency and replicate analyses of the samples submitted were being made. This unresolved item will be reviewed in the next inspection.

3.8

The licensee has acquired a full time statistician who will assure proper data evaluation including consideration of all identifiable covariance effects. An evaluation of whether or not the licensee is in compliance with this license condition will be made during the next inspection.

3.9

Although no overcheck measurements were currently being made, it was pointed out to the licensee that inter-comparisons between fuel elements such as planned were not sufficient to verify the assigned SNM content without comparison to a fuel element the SNM content of which is traceable to measurement. The licensee had secured the components for the fuel element NDA system but had not assembled them to place the system in operation. This unresolved item will be evaluated during the next inspection.

4.0 Shipping and Receiving

4.1

The licensee's completion of receiving measurements within the required thirty (30) days now permits a timely evaluation of shipper receiver differences. The delay previously reported in RO-V-34 was traced by the licensee to failure of analytical equipment. The licensee reported the repair of the equipment, completion of the analysis, and acquisition of sufficient spare parts to assure the timely measurement of all future receipts.

5.0 Storage and Internal Transfer

5.1

The licensee has maintained a documented system of control over SNM stored and processed within his MBA's. Perpetual inventory records are maintained for SNM in vault storage; in-process SNM identification and location are maintained by production records. The perpetual inventory records are reconciled with physical inventory listings.

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The first production of EBR-II fuel pins was initiated in early December 1974. The last prior activity had been in July 1974 when EBR-II preproduction qualification runs were completed.

5.2

All transfers of SNM between MBA's were determined to be properly documented as required by the license condition and internal procedures.

The licensee's system of control for the distribution and accounting of all transfer documents was determined adequate. Six documents not immediately accounted for were traced by the inspector to incomplete transactions involving unmeasured waste barrels (measurements were delayed pending calibration of gamma counting equipment).

5.3

Internal material transfer documents (MT's) were reviewed by random sampling plan. Signatures on all examined MT's were checked against the list of authorized MBA custodians and specimen signatures shown in the "delegation of authority" file. A receiving signature was found missing on a single MT. A review indicated the transaction to be valid and properly recorded.

6.0 Inventory

6.1 and 6.2

The licensee was not taking a physical inventory at the time of the inspection, therefore, his inventory practices reported as needing improvement in RO-V-34 could not be currently assessed. During the course of the inspection, however, it became apparent that improvements were still needed as indicated by the licensee's failure to measure six (6) waste drums and his use of nominal or calculated values on some inventory items where the measured values were not yet available. The licensee also had some items in his storage vault that were not sealed because his tamper safing seal supply had been exhausted and his new supply had not yet been delivered. His new seals were not received until January 10, 1975.

6.3

No exemptions or exceptions from 10 CFR 70 were granted to the licensee.

6.4

No review was made of this license condition requiring verification of the completeness of the physical inventory.

6.5

The Manager, NMM, reviews the MUF and LEMUF calculations made by the statistician, however, the adequacy of the calculations and the review will be evaluated during the next inspection. The statistics procedure will be evaluated when received.

7.0 Records and Reports

7.1

- (a) The licensee's central nuclear material accounting record system remains essentially unchanged from the prior inspection as of August 31, 1974. They consist of a manually maintained control ledger, an EDP MBA subsidiary ledger, EDP inventory report and related EDP prepared schedules. The MBA subsidiary ledger is project oriented and does not directly provide summary data for each material balance component (i.e., receipts, shipments and discards). The licensee plans improvements to its record system but is unable at this time to forecast its completion. The licensee is in compliance with the license condition with present records.

All transactions reviewed were found to be properly supported by documentation.

- (b) The licensee reconciles internal MBA records and central nuclear material accounting records on a bi-monthly basis to coincide with the frequency for physical inventories.
- (c) Licensee records are adjusted bi-monthly to recognize results of physical inventories.

7.2

Monthly reports of measured discards and MUF are made to the Vice President and Controller, Finance and Administration, by the Manager, NMM.

7.3

The licensee has supplied Region V with monthly reports of measured discards and MUF as required. All reports were issued in a timely manner.

7.4

The licensee has made use of the Form AEC-284 in acknowledging receipt of nuclear materials. Receiving measurements have been completed and reported on Form AEC-741 within 30 days after receipt of material.

8.0 Management of Materials Control System

8.1

The licensee's compliance with this requirement for an annual management review was reported in RO-V-34, thus no review of this item was required during this inspection.

8.2

There was no review of this license condition on loss estimates which was also evaluated and reported in the prior inspection.

8.3

There was no loss of a discrete item or container of SNM reportable under this license condition.

b. Title 10, Code of Federal Regulations

1. Part 70

(a) 70.41, "Authorized Use of SNM"

This paragraph requires a licensee to confine his possession and use of SNM to the locations and purposes authorized in his license.

Atomics International has confined its possession and uses of SNM to locations and purposes authorized by its license.

- (b) 70.42, "Transfer of Special Nuclear Material"
This paragraph requires that licensees transfer SNM only to authorized receivers and that licensees shall take certain actions to verify that the transferee's license authorizes receipt of the type, form and quantity of SNM to be transferred.

All transfers of one gram U-235 or greater were made to license exempt Energy Research and Development Administration facilities. The licensee's practices conform with current requirements.

(c)

- (1) 70.51(b), "Records"
This paragraph requires that a licensee shall keep records showing the receipt, inventory, disposal, acquisition, import, export and transfer of all SNM, etc.

The licensee has continued to maintain records satisfying this requirement.

- (2) 70.51(c)
This paragraph requires that the licensee shall establish, maintain, and follow written material control and accounting procedures which are sufficient to enable the licensee to account for the SNM in his possession.

Contrary to this requirement, the licensee had not followed completely his approved Material Control and Accounting Procedures particularly relative to the use of control charts for evaluation of measurement system performance and MUF and LEMUF evaluations.

This item will be reviewed during the next inspection.

- (3) 70.51(e)(1)(i)
This paragraph requires that the licensee shall maintain procedures for tamper-safing containers or vaults containing SNM not in process.

The licensee's current procedure did not adequately address the placement of seals on hermetically sealed cans though the need for some procedural comment was discussed during the prior inspection. The need stems from the demonstration at AI during the prior inspection that hermetically sealed cans could be opened and resealed and the penetration would not necessarily be readily apparent.

The licensee's tamper-safing procedure should be revised to correct the referenced inadequacy. This will be reviewed during the next inspection.

- (4) 70.51(e)(1)(ii) & (iii)
This paragraph requires that a licensee shall maintain records of SNM added to or removed from process and inventories for quantities of SNM in process.

The licensee has established records satisfying all of these requirements. In addition, the licensee maintains records of unopened receipts and ultimate products.

- (5) 70.51(f)(3)(i)
This paragraph requires that the licensee establish inventory procedures for SNM in process that provide for measurement of all quantities not previously measured by the licensee for element and fissile isotope.

Contrary to this requirement, the licensee did not measure some inventory items, rather he listed them at nominal or calculated values. Additionally, he did not measure six (6) drums of process waste. (See H.3.a.3.1)

(d)

- (1) 70.53(a), "Material Status Reports"
This paragraph establishes a semiannual reporting frequency for SNM transactions.

As of the inspection dates, a material status report for the period January 1 through December 31, 1974 was pending. Appropriate Form AEC-742 material status reports were prepared and dispatched subsequent to the inspection but prior to the deadline date.

- (2) 70.53(b)(1)
This paragraph requires the licensee to submit a statement of the probable reasons for MUF in excess of LEMUF and deminimus quantities and the actions taken or planned with respect to the MUF.

The licensee's excessive MUF's in the two material balance periods covered by the inspection were reported and investigated, and a plan for control was developed in compliance with this requirement. (See H.2)

- (3) 70.53(b)(2)
This paragraph requires the licensee to submit a statement of the probable reasons for LEMUF in excess of the applicable limits specified in Paragraph 70.51(e)(5).

The licensee's excessive LEMUF's during the period covered by the inspection were reported and investigated, and a plan for control was developed in compliance with this requirement. (See H.2)

- (e) 70.54, "Nuclear Material Transfer Report"
This paragraph, together with its printed instructions for completing the Form AEC-741, establishes criteria to be met by licensees upon making shipments to or receiving of nuclear materials.

For the current inspection period, the licensee is in compliance with requirements.