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

REGION V

IE Inspection Report No. 70-25/77-03 (IE-V-161)

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

Facility _____

Location Canoga Park & Santa Susana, California

Type of Facility Fuel Fabrication & Research & Development

Type of Inspection Material Control & Accounting, Routine, Unannounced

Dates of Inspection February 22 - March 4, 1977

Dates of Previous Inspection January 21, 1977

Principal Inspector B. L. Brock 4/1/77
B. L. Brock, Chemist Date

Accompanying Inspectors Gerald V. Hamada 4/1/77
G. Hamada, Chemist/Statistician Date

A. Kobori 4/4/77
A. Kobori, Auditor Date

Other Accompanying Personnel: L. R. Norderhaug, Chemist 4/4/77
None Date

Reviewed by V. N. Rizzolo 4/4/77
V. N. Rizzolo, Chief, Safeguards Branch Date

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ATOMICS INTERNATIONAL DIVISION
ROCKWELL INTERNATIONAL

A. Scope of Inspection

The scope of inspection included the following procedures as defined in the Inspection and Enforcement Manual:

<u>Procedure No.</u>	<u>Subject</u>
85202B	Facility Organization
85204B	Facility Operation
85206B	Measurements and Statistical Controls
85208B	Shipping and Receiving
85210B	Storage and Internal Control
85212B	Physical Inventory
85214B	MUF and LEMUF
85216B	Records and Reports
85218B	Management of Materials Control System

B. Summary of Findings

1. Enforcement Actions

a. Violations

None.

b. Infractions

- (1) Contrary to 10 CFR 70.58(j), Atomics International did not follow their established physical inventory procedures: production continued during the inventory, not all materials were processed to a measurable state including submittal of samples prior to March 1, 1977, and tampersafed material was opened and processed prior to completion of the inventory listing. Additionally, the licensee did not check tampersafing seal integrity nor inventory waste drums in the production area until his failure to do so was called to his attention by the inspector.
- (2) Contrary to License Condition 2.1 and the approved Fundamental Nuclear Material Control Plan (AI-75-15, Paragraph 3), a course in the fundamentals of nuclear material control

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and accounting has not been given to the Material Balance Area custodians. The inspectors determined on March 3, 1977 from review of the licensee's internal management audit records that this item of noncompliance, originally identified in April 1976, had remained unresolved through target completion dates of November 1, 1976 and March 1, 1977.

c. Deficiencies

- (1) Contrary to Title 10, Code of Federal Regulations, Part 70.58(1) and Atomic International's (AI) approved Fundamental Nuclear Material Control Plan (FNMC):
 - (a) AI failed to completely implement that portion of the FNMC Plan covering "Adjustments to Records (Paragraph 6.1.4)," which established that such adjustment transactions require approval by the Manager, Nuclear Materials Management (NMM) Unit or his designee. An individual serving in an approval capacity for a single category of adjustments had not been formally delegated that approval authority.
 - (b) AI failed to satisfactorily implement that portion of the FNMC Plan requiring (1) a documented Material Balance Area (MBA)/EDP machine ledger reconciliation of pre-physical inventory book and post-physical inventory book balances (Paragraph 6.1.5) for the November 8, 1976 and January 4, 1977 inventories; and (2) that material balance area records be audited not less than twice yearly. No audit of MBA records had been performed since implementation of the FNMC Plan as of August 20, 1977.
 - (c) AI failed to follow that portion of the FNMC Plan, Paragraph 1.2.3.1, covering minimum work experience requirements in the hiring and appointment of two material control custodians.
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- (2) Contrary to Title 10, Code of Federal Regulations, Parts 70.51(a)(8), 70.51(e)(3) and 70.51(f)(3), inspector review of records on March 4, 1977 and interviews with licensee personnel on March 11, 1977 revealed that nontampersafed items identified during a physical inventory conducted on January 3, 1977 were not remeasured within 30 days of the start of that inventory to comply with 70.51(e)(4)(i).

d. Deviations

Contrary to generally accepted industrial practice and the licensee's Procedure, "Tampersafing, Seal and Use Control" (No. 10.5 Revision A), the inspector observed at 9:30 a.m. on February 28, 1977 that a drum (S/N-19) was sealed (Seal No. 11133) by an individual who did not have knowledge of the SNM involved.

C. Licensee Action on Previously Identified Enforcement Items

All outstanding enforcement items relating to the material control and accounting safeguards program were reviewed as of the current inspection.

1. In Inspection Report No. 76-10, two deficiencies were identified. Licensee progress toward resolution of the items of noncompliance is discussed below:
 - a. "Contrary to 10 CFR 70.54, Nuclear Material Transfer Reports, and its referenced printed instructions for completing the Form NRC/ERDA-741, Atomics International failed to:
 - (1) "Complete measurements and dispatch a completed Form NRC/ERDA-741, 'Nuclear Material Transaction Report,' within thirty (30) days of receipt of highly enriched uranium metal from an external supplier.
 - (2) "Supply required limits of error data on ERDA and AI file copies of Forms NRC/ERDA-741 documenting four (4) shipments of blended product and scrap from AI's licensed operation to its license-exempt facilities."

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In response to Paragraph a.(1) above, AI reported - "The priorities for inspection, sampling, and chemical and isotopic analyses required to complete receiving measurements...have been reassigned, and the activities will be scheduled to assure that the Forms 741 for future receipts of special nuclear material will be completed within the allowable 30 days."

The current inspection confirmed that measurement activities relating to material receipts are now being accomplished so as to permit completion of the Form 741 documentation within thirty (30) days. The licensee is now in compliance with the requirements.

In response to Paragraph a.(2) above, AI reported "...an application has been submitted to the Material Control Licensing Branch, NRC Headquarters, to amend our License No. SNM-21 to exempt us from the requirement for documenting limit of error values on the Forms NRC/ERDA-741 at the time of the on-site transfers." As of the current inspection, no response had been received by AI to its letter of December 3, 1976 to the Division of Safeguards, Nuclear Materials Safety and Safeguards.

This item remains unresolved at this time. On March 9, 1977, a telephone contact was made by an inspector to the Division of Safeguards to request a response to the AI letter.

D. Unusual Occurrences

None.

E. Other Significant Findings

1. Current Findings

It was observed that a condition existed whereby a tampersafed container (Can A) of several items affixed with an appropriate number of labels could have the label from another tampersafed container (Can B) added to it. Can B, from which the label had been removed, will be listed as being in the group of items in Can A during the taking of the physical inventory. Can B would then be

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free of the accountability records system but not of the tamperproof seal log which correlates tamperproof seal number and label number. This weakness can be corrected short of a one hundred percent check of the seal log by including the tamperproof seal number on the inventory prelisting along with the label number and requiring verification of the proper correlation between them. While no means of taking the material (so removed from inventory control) could be readily identified, the licensee agreed to review this problem and make appropriate changes to the procedure.

2. Status of Previously Reported Unresolved Items

- a. Inspection Report No. 76-10 identified a situation where the Division of Safeguards approved FNMC Plan accepted the combined DeSoto vault and weigh room operations as an Item Control Area (ICA), an apparent conflict with the criteria for an ICA as defined by 10 CFR 70.58(d). Since AI was operating in a manner consistent with its FNMC Plan at that time, inspectors considered this item as an unresolved item and requested that AI take necessary action with the Division of Safeguards to remove this apparent conflict between the plan and Part 70.58.

It was determined that in the period between inspections a telephone conversation had taken place between AI and the Division of Safeguards on this subject. No correspondence had yet been initiated by AI. The licensee was encouraged to initiate formal correspondence with NMSS for resolution of this problem.

F. Management Interview

A preliminary exit meeting was held at 3:30 p.m. March 3, 1977 to enable the participation of Mr. R. G. Jones, AI Vice President and Controller. Others in attendance were:

- M. Remley, Manager, Health, Safety and Radiation Services
- V. Schaubert, Manager, Nuclear Materials Management
- B. Brock, NRC Inspector
- Y. Kobori, NRC Inspector
- L. Norderhaug, NRC Inspector

While some further inspection effort was yet to be done, the bulk of the findings was discussed at the preliminary meeting with a subsequent update with Dr. Remley on March 4, 1977.

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The items of noncompliance as noted in Paragraph B.1 of this report were discussed. The licensee expressed much consternation over the problems with the physical inventory. Mr. Jones' attention to this item, in particular, left the inspectors with the opinion that remedial actions would be undertaken immediately.

G. Report Details

Persons Contacted

M. E. Remley, Manager, Health, Safety and Radiation Services
V. J. Schaubert, Manager, Nuclear Materials Management
D. C. Allen, Nuclear Materials Management Representative
S. Wode, Management Systems Specialist
C. L. Nealy, Manager, Analytical Chemistry
J. D. Moore, Operational Safety and Waste Management
E. Walsh, Methods Analyst, Nuclear Materials Management
D. Clark, Chemist, Plutonium Laboratory
R. Meyer, Assistant Manager, Plutonium Processing
C. Mason, Special Clerk, Nuclear Materials Management
M. Reed, NMM Fuel Administrator
Y. Kim, Statistician, Quality Assurance
E. Peters, Engineer, ATR Processing
E. Givens, Leadman, ATR Powder Room
R. Alshouse, Operator, ATR Powder Room
K. S. Mann, Operator, ATR Powder Room
G. D. Dombrowski, Custodian, ATR Vault
D. A. Speights, Custodian, NMM Vault
C. Gunzelmann, Custodian, Advanced Fuels Laboratory
R. L. Jaseph, Internal Auditor
H. Samuels, Accountant Finance Division
T. Christy, Security Captain, DeSoto

1. Facility Organization

The inspection was conducted in accordance with Procedure 85202B to determine whether AI's organizational structure had been implemented in accordance with its NRC approved FNMC Plan.

It was determined that:

- a. The plans contain current organization charts and/or descriptions of plant management structure identifying all positions having responsibility for the control over SNM and the nuclear material management

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structure describing the relationship of the nuclear materials control functions and responsibilities to other organizational units.

- b. Appropriate separations of functions were identified in procedures and practices to provide a system of checks and balances.
- c. Statements of qualification requirements and definitions of authority, responsibilities, and duties have been included for establishment of those positions having responsibility for SNM control. It was noted however that two MBA custodians recently appointed did not meet the minimum experience requirement for custodian per the FNMC Section 1.2.3.1 (See Section B.1.c.(1)(c)).
- d. Statements of responsibility and authority have been established for other positions concerned with input to the material control system such as production control, analytical laboratories and quality control.

2. Facility Operations

The inspection was conducted in accordance with Procedure 85204B to determine whether AI's processes and operations were in conformance with its FNMC Plan and with Commission regulations and/or license conditions.

It was determined that:

- a. MBA's and ICA's had been established in conformance with approved FNMC Plans with the exception identified in E.2 and reported previously in Inspection Report No. 76-10, Section E.1.a. The licensee's operation was consistent with his FNMC Plan but not 10 CFR 70.58(d). The discrepancy was identified and the licensee was asked to contact the Division of Safeguards regarding this matter. He had not made a written request for resolution of the discrepancy prior to this inspection.
 - b. Delegations of authority for MBA and ICA custodians were in writing.
 - c. The licensee's procedures contain material process and measurement flow charts and detailed descriptions of the facility operation including material balance areas, sampling points, measurement points, transfer points and his procedures and practices appeared to be in conformance with his approved FNMC Plan.
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- d. MBA's and ICA's are established in such a way to assure that physical and administrative control of SNM losses, thefts, or diversions can be localized to an individual MBA or ICA.

3. Measurements and Statistical Controls

The inspection was conducted in part in accordance with Procedure 85206B to determine whether the licensee was following his approved FNMC Plan.

It was determined that:

- a. Waste barrel measurements and calibrations were performed in a credible manner; however, it seemed desirable to obtain an independent confirmation of barrel contents at this time. Region V is now arranging for the Los Alamos Scientific Laboratory (LASL) to perform state-of-the-art measurements on about a dozen waste barrels as a means of assessing the relative goodness of AI's values. The licensee is strongly in favor of such an effort since this will provide AI with a better feel for systematic effects (if any) which are not as easily detected with their existing system. When the LASL results become available, it is expected that a reevaluation of waste data as necessary will be performed.
- b. Although MUF and LEMUF for the ATR program have been within applicable limits, the longer term signs as manifested by the cumulative MUF trend appear to indicate that certain systematic effects may be present. This could result from the combined effect of a number of small systematic effects in the same direction, but which by themselves might not be as readily noticeable. On the other hand, it could be the result of other effects. The licensee is cognizant of the potential implications of these signs and is looking into the possible causes of this situation.

While it is recognized that there is a limit to the level of effort one might exert looking for these small effects, there is one area which is often overlooked but which warrants some attention.

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- d. An item of noncompliance from Inspection Report No. 76-10 remained unresolved as of the inspection date. AI had not supplied limits of error data on Forms NRC/ERDA-741 documenting on-site SNM shipments from its licensed Advanced Fuels Facility (Symbol LAL) to the license exempt Santa Susana storage vault (Symbol LAE) during the prior inspection period.

In response to the earlier notice of noncompliance, AI on December 3, 1976, applied for an exemption to the LE requirement in a letter to the Division of Safeguards, Nuclear Materials Safety and Safeguards. No response had been received by AI as of the current inspection.

5. Storage and Internal Controls

The inspection was conducted in accordance with Procedure 85210B to verify that a system of storage and internal controls was established to provide for current knowledge of the quantity, identity and location of all SNM within AI's facilities.

The inspection determined that:

- a. Contrary to 10 CFR 70.58(1) and AI's approved FNMC Plan, the licensee failed to completely implement that portion of the plan covering "Adjustments to Records (Paragraph 6.1.4)," which established that such adjustment transactions require approval by the Manager, Nuclear Materials Management Unit or his designee. Vouchers entitled "NMM Adjustment Ledger Detail," covering the documentation of rounding adjustments for NRC/ERDA-741 transactions, were approved by an NMM employee to whom a delegation of responsibility and authority had not been supplied by the Manager, NMM. Another category of adjustments entitled "NMM MUF/Adjustment Detail," first thought to be unapproved by the Manager, NMM, or his designee was determined to be appropriately approved in a separately maintained adjustment voucher log.
- b. The licensee is maintaining current knowledge on all SNM within its custody.
- c. Movements of SNM between material control areas are documented on internal material transfer vouchers (MT's) signed by duly delegated nuclear material custodians. Approximately 1,100 MT's were processed

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by AI during the period October 1, 1976 through February 28, 1977. A random sampling of the population was conducted to examine preparation, authorized signatures, and traceability of transactions to the SNM ledgers. Satisfactory results were obtained in this examination.

- d. Adequate controls are maintained over the distribution and use of the internal transfer document. A review of the MT control log confirmed that all documents were accounted for and all unissued bulk MT voucher supplies were being maintained in a locked file cabinet.
- e. Seal logs covering the distribution in bulk of Type E and paper seals to material control areas were examined and unissued stock stored in a locked file cabinet was confirmed.
- f. Tamperproofing procedures - The licensee's tamperproofing procedures (Nuclear Materials Management Procedure No. 10.5 Revision A) states in Paragraph 2.4, "Application...of tamperproofing seals...shall be witnessed by a second individual with knowledge of the SNM material involved." Discussions with personnel in the ATR powder room indicated that this requirement was interpreted as meaning in essence that both individuals involved in the sealing operation attest to the stated quantity of material so sealed. This practice which is consistent with generally accepted industrial practice, was not found by the inspector to be uniformly adhered to throughout the licensee's facility.

At 9:30 a.m. on February 28, 1977 during the inventory activity in the DeSoto vault, an improperly sealed drum was opened to verify the integrity of the seals on three inner containers and reclosed. After reclosing, another individual who had not inspected the inner seals was asked to participate in the resealing. Also, during the sampling of UAl_x powder in the weigh room on March 4, 1977, one individual removed the sample while another weighed the sample and reweighed the bulk container. Reclosure of the bulk container for reweighing was not witnessed by the second individual who was busy weighing the sample and the previous bulk container.

This was identified in the exit briefing as a deviation from generally accepted industrial practice (Section F).

6. Physical Inventory

The inspection was conducted in accordance with Procedure 85212B to determine whether AI's program of accounting for SNM and the conducting of physical inventories was capable of detecting losses or diversions of SNM in accordance with his approved FNMC and the regulations.

It was determined that:

- a. The licensee has established written inventory procedures in accordance with approved physical inventory plans. However, it was observed during the licensee's conduct of the March 1, 1977 physical inventory that he did not adequately follow the inventory procedures (see Section B.1.(1)) as required by 10 CFR 70.58(j). The inspector observed that during the inventory of MBA-12 (ATR Powder Room) (1) production (button melting, sieving and deburring) continued during the inventory; (2) not all materials were processed to a measurable state including submittal of samples prior to March 1, 1977 (some items on hand still needed to be sampled, e.g., 100 gram Item #140179 and 278 grams of compact line scrap Item #140059); (3) two tampersafed items (blend BK seal numbers 4557 and 4558) were opened and placed in production prior to completion of the listing and the overcheck; and (4) in the early stages of the inventory, tamper-safing seals were not being inspected though the seal numbers were being recorded. All of the foregoing were failures to follow the written procedure, "Precise Inventory: January-February 1977 Period," dated February 24, 1977. Additionally, the waste drums in the area were not inventoried until the oversight was pointed out by the inspector. Poor practices observed in the MBA included leaving a container of aluminum powder sitting on a balance after departure of the production crew, uninitialed changes on labels (altering the contained SNM), one person both reading and recording with the second person concurring after the fact during the taking of the inventory, and inventory team changes as team members turned their attention to production responsibilities during the inventory leaving the remaining team member to either

inventory alone (which the inspector cautioned against) or seek another person to assist in the inventory. There appears to be a need to give a higher priority to the taking of the physical inventory. Additionally, it was noted that a balance in a glove box (supported by a balance table beneath the glove box) vibrated excessively whenever the mechanism to place materials into the glove box was activated. This appeared to be due to inadequate adjustment of a well designed system - the table was set too low and the glove box legs were adjusted too high thus reducing significantly the vibration protection provided to the balance. The balance calibration was current and its performance was satisfactory during this inventory. A closer look will be taken at scale and balance practices in a subsequent inspection in light of current observations.

- b. The previous physical inventory was taken on January 3, 1977. The licensee's procedures call for the re-measurement of nontampersafed items. While the procedures declare that the hermetically sealed, crimped-lid container provides tamper indication, the procedures specify the use of a tampersafing seal to provide unique serial number identification as a safeguard against container substitution. The work sheets for the January inventory noted 11 containers bearing no seals and containing more than 10 grams of U-235 each. (Samples for analysis or testing containing less than 10 grams of U-235 are exempt from measurement requirements per License Condition 3.1.1). Seven of the 11 containers were also noted on the February 28 inventory as bearing no seal. The licensee could not demonstrate that these items (# 036918, 200041, 200044, 200055, 200056, 200063, and 141053) had been measured following the January 1 inventory to comply with 10 CFR 70.51(e)(3) which requires a physical inventory. The inventory as defined in 70.51(a)(8) is to include remeasurement of untampersafed items (70.51(f)(3)) to allow a material balance to be completed within 30 days per 70.51(e)(4)(i).

This item of noncompliance involving a small number of items (7 out of approximately 1200) and a total quantity of material (303.7 grams) is categorized as a deficiency (Section B.1.c.(2)).

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- c. The licensee's inventory procedure specifies that the data on the uniquely numbered container labels be checked against the inventory pre-listing compiled from transfer records. The condition of the tamper-indicating seal is checked and its number manually recorded.

However, the container label is readily removable and, for a sealed container containing several inventory items, the container may bear several labels. A label could therefore be removed from a container and placed on another with no cause for concern. The original container could then be removed undetected unless the inventory listing is ultimately checked against the seal log to verify that the label number and seal number properly correspond.

The licensee indicated that the seal number for a particular label number could be captured by the pre-listing from the seal logs to then be verified at inventory time.

While no means of stealing the material (so removed from inventory control) could be readily identified, the licensee agreed to review this problem and make appropriate changes to the procedure.

- d. The licensee has conducted physical inventories at the required intervals.
- e. The licensee routinely reconciles the book with and adjusts it to the results of the physical inventory within the required 30 days of the start of the physical inventory.

7. MUF and LEMUF

The inspection was conducted in accordance with Procedure 85214B to evaluate the licensee's capabilities for calculating MUF and LEMUF as part of the licensee's FNMC Plan.

It was determined that:

- a. MUF and LEMUF calculations were consistent with regulatory requirements.
- b. While the MUF and LEMUF for ATR were within regulatory constraints and the MUF was also within its associated LEMUF, the single largest contributor

to LEMUF for the previous material balance interval derived from the analysis of material from furnace cleanout. In this particular case, the situation resulted from a large "t value" (two samples) and poor agreement between the duplicate analyses. While this appears to indicate a sampling error, no further action was taken as both MUF and LEMUF were within applicable limits as noted above. The results of the most recent material balance, which are being finalized now, however, indicate that sampling error for furnace material is minimal for this period.

8. Records and Reports

The inspection was conducted in accordance with Procedure 85216B to determine whether the licensee has established and maintained a records and reports system to provide accurate information on SNM in its possession and to close a measured material balance around its operation.

The records review covered the period October 1, 1976 through February 28, 1977. Material balance summaries are presented in Exhibits I through IV attached.

The inspection determined that:

- a. Contrary to 10 CFR 70.58(1) and AI's approved FNMC Plan, the licensee failed to satisfactorily implement that portion of the plan requiring (1) a documented material balance area/NMM machine ledger reconciliation of pre-physical inventory book balances and post-physical inventory book balances (Paragraph 6.1.5) for the November 8, 1976 and January 4, 1977 inventories; and (2) that material balance area custodian records be audited not less than twice yearly. No audit of MBA records had been performed since implementation of the FNMC Plan as of August 21, 1976 and certain NMM staff were unaware of the requirement.

The licensee MBA/EDP ledger reconciliation form designed to provide a means for comparing SNM book balances, identifying differences and reconciliation was not generally in use for the November 8, 1976 inventory. Improvement in the number of material control areas submitting the reconciliation form was observed for the January 4, 1977 inventory. However, the forms were still not utilized entirely as designed.

It was observed that preliminary steps had already been taken with respect to reconciliation of pre-physical inventory book balances for the March 1, 1977 inventory.

- b. The NMM manual plant control ledger and subsidiary EDP material control area ledger are reconciled with each other prior to and after each bimonthly physical inventory. All ledger entries examined were supported by appropriate documentation.

NMM personnel have indicated that software programming efforts will be devoted shortly to redesigning the EDP ledger to overcome some of its limitations. No definite completion date has yet been identified.
- c. The NMM records examination indicates that AI has confined its possession and use of SNM to the location and purposes authorized by its license.
- d. The transfer of SNM has been restricted to authorized recipients in accordance with 10 CFR 70.42.
- e. Material Transaction Reports have been filed in accordance with 10 CFR 70.54 and the special instructions for completing the Transfer Form NRC/ERDA-741.
- f. No Material Status Reports, Form NRC/ERDA-742, were due during the inspection period. Material Status Reports normally due to be issued for the six month period ended December 31, 1976 were exempted by letter dated December 10, 1976 from the Division of Safeguards, NMSS.
- g. Timely loss reports were filed with the Region V office during the inspection period in accordance with License Condition 6.2.
- h. SNM inventory reports have been prepared and submitted to Region V as requested by the Office of Inspection and Enforcement. Reports were determined to accurately reflect AI's activity for the respective reporting periods.
- i. Book inventories have been reconciled with and adjusted to the results of each physical inventory within 30 days of the start of the physical inventory.

9. Management of Materials Control System

The inspection was conducted in accordance with Procedure 85218B to establish that the licensee has established, maintained and followed a management system which provides for the development, revision, implementation, and enforcement of nuclear material control and accounting procedures in accordance with his approved FNMC procedures.

It was determined that:

- a. The licensee is in compliance with the above except that in a management audit conducted by the licensee's Quality Assurance Department on April 22, 1976 identified 16 separate observations. None were of the violation category of noncompliance. Of the 16, six remained open at the time of the inspection.

The training of MBA custodians identified as needed in April 1976 had a resolution date of November 1976. This date was not met. An estimated completion date of March 1, 1977 had likewise not been met. Apparent lethargic resolution of a licensee identified item of noncompliance prompted this citation (Section B.1.b.(2)).

In the opinion of the inspectors, lack of MBA custodian training may also have contributed to the failures to follow proper inventory procedures identified as a separate item of noncompliance (Sections B.1.b.(1) and G.6.a).

ATOMICS INTERNATIONAL DIVISION
ROCKWELL INTERNATIONAL
CANOGA PARK, CALIFORNIA

ENRICHED URANIUM
MATERIAL BALANCE SUMMARY

RIS: LAL & ZAZ

Exhibit I

	Element	Grams Isotope
Beginning Inventory, 10/1/76	864,914	682,626
Receipts	<u>192,717</u>	<u>179,193</u>
Total to Account For	<u>1,057,631</u>	<u>861,819</u>
Shipments	182,625	159,835
Measured Discards	-	-
Material Unaccounted For	(1,017)	(577)
Ending Inventory, 2/28/77	<u>876,023</u>	<u>702,561</u>
Total Accounted For	<u>1,057,631</u>	<u>861,819</u>

See Exhibits II and III for detail by less than 20% and greater than 20% U-235.

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LESS THAN 20% U-235 ENRICHED URANIUM
MATERIAL BALANCE SUMMARY
10/1/76 - 2/28/77

RIS: LAL & ZAZ

Exhibit II

	<u>Element</u>	<u>Grams</u> <u>Isotope</u>
Beginning Inventory, 10/1/76	7,732	1,441
Receipts	<u>73</u>	<u>3</u>
Total to Account For	<u>7,805</u>	<u>1,444</u>
Shipments	51	6
Measured Discards	-	-
Material Unaccounted For	(7)	*
Ending Inventory, 2/28/77	<u>7,761</u>	<u>1,438</u>
Total Accounted For	<u>7,805</u>	<u>1,444</u>

*Denotes less than reportable unit

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GREATER THAN 20% U-235 ENRICHED URANIUM
MATERIAL BALANCE SUMMARY
10/1/76 - 2/28/77

RIS: LAL & ZAZ

Exhibit III

	<u>Element</u>	<u>Grams</u> <u>Isotope</u>
Beginning Inventory, 10/1/76	857,182	681,185
Receipts	<u>192,644</u>	<u>179,190</u>
Total to Account For	<u>1,049,826</u>	<u>860,375</u>
Shipments	182,574	159,829
Measured Discards	-	-
Materials Unaccounted For	(1,010)	(577)
Ending Inventory, 2/28/77	<u>868,262</u>	<u>701,123</u>
Total Accounted For	<u>1,049,826</u>	<u>860,375</u>

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PLUTONIUM & U-233
 MATERIAL BALANCE SUMMARY
 10/1/76 - 2/28/77

RIS: LAL & ZAZ

Exhibit IV

	Grams Plutonium	
	<u>Element</u>	<u>Isotope</u>
Beginning Inventory, 10/1/76	945	837
Receipts	<u>327</u>	<u>289</u>
Total to Account For	<u>1,272</u>	<u>1,126</u>
Shipments	418	366
Measured Discards	-	-
Materials Unaccounted For	34	33
Ending Inventory, 2/28/77	<u>820</u>	<u>727</u>
Total Accounted For	<u>1,272</u>	<u>1,126</u>

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	<u>Element</u>	<u>Isotope</u>
Beginning Inventory, 10/1/76	<u>*</u>	<u>*</u>
Ending Inventory, 2/28/77	<u>*</u>	<u>*</u>

*Denotes a less than reportable unit