

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

REGION V ~~10~~

IE Inspection Report No. 70-25/76-10 (IE-V-147)

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 & R&D

Type of Inspection Material Control & Accounting; Routine, Unannounced

Dates of Inspection November 1-5, 1976

Dates of Previous Inspection June 1-4, 1976

Principal Inspector G. Hamada
G. H. Hamada, Chemist/Statistician

12/13/76
Date

Accompanying Inspectors Y. Kobori
Y. Kobori, Auditor

12/13/76
Date

Date

Other Accompanying Personnel: None

Reviewed by M. Rizzolo
V. N. Rizzolo, Chief, Safeguards Branch

12/13/76
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 |
| 85214B | MUF and Associated Limit of Error |
| 85216B | Records and Reports |
| 85218B | Management of Materials Control System |

B. Summary of Findings

1. Enforcement Actions

Violations

None

Infractions

None

Deficiencies

- 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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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. 76-06, June 1-4, 1976, one infraction and seven deficiencies were identified. Licensee progress toward resolution of the items of noncompliance is discussed below:

- a. "Contrary to License Condition 7.1, the manually maintained central nuclear material plant control ledger and the computerized material balance area ledger were not adequately reconciled at the end of each accounting period."

The AI response of July 29, 1976 indicated re-assignments of responsibilities were being made to provide the necessary effort to assure reconciliation of the ledgers at the end of each accounting period. The current inspection confirmed that the ledgers are now being reconciled in a satisfactory fashion.

- b. "Contrary to 10 CFR 70.51f(3)(iii), AI did not verify the quantity of contained element and fissile isotope...for which the validity of such previously made measurements had not been assured by tamper-safing."

- (1) "The quantity of contained element and fissile isotope in a container of high enriched uranium oxide feed in the plutonium vault was not assured by tamper-safing."

- (2) "For the physical inventory of March 1, 1976, pieces of cut-up ATR fuel plates...were not re-measured to verify the assigned SNM content as required."

In response to the above items, AI reported that "the tamper-safing program has been modified to assure that material which is being stored or held temporarily for later activities will be tamper-safed so that there will be no requirement for remeasurement at the time of use or during a subsequent inventory."

Items (1) and (2) above have been corrected and certain additional procedures have been instituted to assist in eliminating the recurrence of such deficiencies.

c. "Contrary to 10 CFR 70.54, Nuclear Material Transfer Report and its referenced printed instructions, Atomics International failed to:

- (1) "Complete measurements and dispatch completed Form NRC/ERDA-741, "Nuclear Material Transaction Report," within thirty (30) days..."

AI responded that "Since previously planned corrective action has not been completely effective, the procedure for handling special nuclear material (SNM) receipts has been modified, and the responsibility for material sampling and subsequent issue of the Forms NRC/ERDA-741 has been re-assigned. These actions should result in timely completion and dispatch of the Forms 741."

The current inspection indicated improvement but another instance of noncompliance was identified. (See paragraph G.4.b.1.)

- (2) "Supply required limits of error data on ERDA and AI file copies of Forms NRC/ERDA-741 documenting... feed material receipts and...product shipments to customers."

The AI response indicated that "The practice of entering the limit of error data on all copies of the forms during their preparation has been initiated and should prevent recurrence of this omission."

The current inspection confirmed that AI is now in compliance with this long outstanding item, except in a unique category of shipments. (See paragraph G.4.b.2.)

- (3) "Acknowledge receipt or complete measurements and the Forms NRC/ERDA-741 within ten (10) days..."

AI responded that procedures had been modified and responsibilities re-assigned to provide timely completion and dispatch.

The current inspection confirmed that the licensee is now in compliance with the requirements.

- (4) "Issue promptly Forms NRC/ERDA-741 on twelve (12) transfers of irradiated low and highly enriched uranium from an ERDA exempt facility, also under its administration, to its licensed operation both of which are located at Santa Susana."

AI responded "The responsibility and method of preparation of Forms NRC/ERDA-741...has been revised to assure issue on the same day the shipments are made."

The licensee is now in compliance with the requirement for prompt issue of transaction reports.

- (5) "Issue promptly Forms NRC/ERDA-741 on...shipments of special nuclear material."

AI responded as in (4) above and the licensee is now in compliance.

D. Unusual Occurrences

None

E. Other Significant Findings

1. Current Findings

- a. The Division of Safeguards approved fundamental nuclear material control (FNMC) plan submitted by AI in January, 1975 and revised through March 18, 1976, identified the "SS Vault and Weigh Room" at its Canoga Park Headquarters site as an item control area (ICA). While operations within the SS Vault proper would fit the criteria of an ICA as defined by 10 CFR 70.58(d), activities in the Weigh Room are not consistent with its operations as an ICA and should be designated as a separate material balance area (MBA).

While 10 CFR 70.58 requirements were implemented as of August 21, 1976, AI, consistent with its FNMC plan, operates the "SS Vault and Weigh Room" as a simple material control area. Inspectors believe that under Part 70.58, it was intended that such operations be split into two material control areas, one an ICA and the other an MBA. Since AI was operating in a manner consistent with its FNMC plan, 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 FNMC plan and Part 70.58.

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- b. The current inspection resulted in a finding of non-compliance for not supplying limits of error data on Forms NRC/ERDA-741 documenting unirradiated SNM transfers between a licensed facility and a license-exempt facility, both administered by AI and both located at Santa Susana.

Printed instructions for reporting nuclear material transfers on Form NRC/ERDA-741 provide that "Licensees making on-site transfers between two different reporting identification symbols (RIS's) or the same RIS are exempt from supplying limits of error data for the transfers." It further states parenthetically that "Transfers between a license exempt operation and a licensed operation at the same location are not considered on-site transfers and limits of error are required."

AI indicated that it intended to apply to the Division of Safeguards for an exemption from the requirement since it would cause delays in actual transfers of material and preparation of Forms NRC/ERDA-741. Such delays are said also to cause operating hardships resulting from the need to comply with possession limits requirements of the physical security regulations.

- c. The prior inspection (June 1-4, 1976) identified several unresolved items involving recalibrations of measurement systems for prefilters and HEPA filters. These recalibrations were performed and the resultant calibration factors used for the calculation of contained SNM in those materials measured by nondestructive assay. Because the recalibration indicated a bias in the earlier factor, the recalibration included all of the waste barrel data that were obtained using the old factor. The result was a MUF gain of 1374 grams U-235 due primarily to prior period activity. This is discussed in more detail under the section on MUF and LEMUF.

2. Status of Previously Reported Unresolved Items

None

F. Management Interview

The results of the inspection were discussed with R. Jones, Vice President, Finance and Administration; M. E. Remley, Manager, Health, Safety and Radiation Services; and V. J. Schaubert, Manager, Nuclear Materials Management (NMM).

Several items of noncompliance were identified and other potential noncompliance items were discussed. Other areas examined within the scope of the inspection, however, were found to be satisfactory. The inspectors noted that AI's overall program for SNM control and accountability was generally good, and except for those items mentioned above, appeared to be in reasonably healthy condition.

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
- M. Klenck, Chemist
- V. Swanson, Project Engineer, Reactor Operations
- D. Clark, Chemist, Plutonium Laboratory
- R. Meyer, Manager, Plutonium Processing
- C. Mason, Special Clerk, Nuclear Materials Management
- M. Reed, NMM Fuel Administrator
- Y. Kim, Statistician, Quality Assurance

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.

AI has been operating under the provisions of 10 CFR 70.58 as implemented through its FNMC plan for several months now and within the scope of this inspection, was found to be in compliance with the requirements within this category.

2. Facility Operation

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

The inspection determined that:

- a. AI processes and operations utilizing SNM were almost entirely associated with the fabrication of Advanced Test Reactor (ATR) fuel plates at Canoga Park and the plutonium research and development effort at Santa Susana, both of which are recognized in the FNMC plan. The fuel element fabrication effort associated with the Experimental Breeder Reactor II (EBR-II) has been terminated and the EBR Melt and EBR Assembly MBA's deactivated. Remaining scrap and wastes from this program await disposition instructions from the Chicago Operations Office of the Energy Research and Development Administration (ERDA). The scrap is stored in the Canoga Park Vault while waste containers are stored in the Waste Storage MBA.

Also completed since the prior inspection is the Sodium Reactor Experiment (SRE) irradiated fuel decladding operation in the Hot Cell at Santa Susana. Further decladding operations involving the Hallem core, presently stored by Savannah River Operations Office, ERDA, are to commence in calendar year 1977, subject to prior Division of Safeguards approval.

- b. All delegations of authority covering the responsibility for custody of SNM in each MBA and ICA have been renewed in writing for the period October 1, 1976 through September 30, 1977.
- c. An apparent conflict exists between the NRC approved FNMC plan and 10 CFR 70.58 with respect to operation of AI's Canoga Park SS Vault and Weigh Room as an ICA. (See Section E - Other Significant Findings, for additional information.)
- d. For high enriched uranium scrap, 10 CFR 70.58 requires that appropriate action be taken to remove such items from inventory if the measurement uncertainty exceeds 10 percent. Materials classified as scrap currently on hand have all been measured to within the + 10 percent uncertainty criterion. Pending a decision by ERDA, the disposition of these scrap materials remain uncertain.

3. Measurement and Statistical Controls

The inspection was conducted in accordance with Procedure 85206B to determine whether AI was following his approved FNMC plan measurement control program.

The inspection determined that:

- a. While the measurements and statistical control program for ATR fuel manufacturing is under good control at present, certain practices have been noted which, if not corrected, could reintroduce anomalies in ATR powder analysis data similar to those experienced in the past. Earlier, a small but statistically significant difference in the uranium analysis was observed between two containers of ATR powder obtained from the same batch. The licensee determined that the discrepancy developed because the procedure for splitting the powder into the two containers was not carried out in a manner which would assure that powder from either container would be representative of the batch. Currently, the sampling is done after blending, but before splitting of the powder into the two containers. This effectively evades the earlier problem of differences between the two containers. The sample is taken with a thief sampler designed to provide a series of representative fractions along the vertical profile of the powder in the container. Four subsamples from this relatively large initial sample are obtained for analytical and metallurgical purposes. It was indicated to the licensee that while the procedures up to the thief sample followed accepted sampling practice, the procedure followed for obtaining the subsamples was not one which would assure that the subsamples were representative of the initial thief sample. It is possible that this may not be a problem, but, in light of the earlier experience, this would be an item worthy of some attention.
- b. While the activity at the Pu facility (Santa Susana site) is minimal, involving only small amounts of Pu, the program is reaching a point where procedures and methodologies for assaying various categories of material such as scrap, waste, filters, etc., need to be developed. All of these have been considered in a general way but not all of the details have been worked out as yet. A procedure for measuring process waste has been developed and other procedures for handling and measuring filters and contaminated equipment are currently being worked on.

4. Shipping and Receiving

The inspection was conducted in accordance with Procedure 85208B to determine where the licensee has established and maintained a program to assure that all SNM received and/or shipped is accurately accounted for.

The inspection determined that:

- a. There were no statistically significant shipper-receiver differences during the inspection period.
- b. Contrary to 10 CFR 70.54, Nuclear Material Transfer Report, and its printed instructions, AI failed to properly expedite the preparation and/or handling of transfer documents as follows:
 - (1) AI did not complete receiving measurements and dispatch a completed Form NRC/ERDA-741 within the allowable thirty (30) days on a receipt of highly enriched uranium metal from Union Carbide Corporation on August 30, 1976. The 741 was dispatched on October 7, 1976. A review determined that the QC inspection for this receipt was completed on September 14, 1976 but that samples for isotopic determination had not been shipped to Teledyne Isotopes in New Jersey until September 24. Isotopic data was made available to AI by TWX on October 5. In-house chemistry for this receipt was completed on September 30.
 - (2) AI did not supply limits of error data on ERDA and AI file copies of Forms NRC/ERDA-741 documenting four (4) shipments of blended Mixed Oxide product and scrap from its licensed Plutonium Facility (reporting identification symbol LAL) to the license-exempt Santa Susana storage vault (symbol LAE). AI personnel first defended their noncompliance with the regulations upon a supposed inconsistency between ERDA and NRC requirements. They indicated that ERDA did not require LE data on on-site transfers of ERDA owned materials. Inquiry into this matter by a Region V inspector with the San Francisco Operations Office - ERDA disclosed there was no basis for this position.

The four shipments occurred on July 30, August 6 and September 29, 1976.

AI intends to apply to the Division of Safeguards for exemption from this requirement. (See Section E - Other Significant Findings, for additional information.)

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. Processing MBA's are maintaining current knowledge of all SNM within their custody by a combination of MBA maintained records, internal transfer documentation files, production forms and inventory item cards.
- b. Kardex-type files utilizing a copy of the SNM label or Material Batch Card are maintained daily as a perpetual record of inventory items held in storage vault material control areas. These files are reconciled with physical inventory listings on a bimonthly basis.
- c. Other MBA's such as the analytical, QA, and metallurgical laboratories maintain current knowledge of all SNM in their custody by means other than perpetual inventory records.
- d. Movement of SNM between MBA's/ICA's are documented on internal material transfer vouchers (MT's) which are signed by duly delegated individuals. Approximately 2,800 transfer vouchers were processed by AI during the period March 2 - September 30, 1976. A random sampling of sixty documents was conducted to examine preparation, authorized signatures and to trace each transaction to the SNM ledger to confirm timely and correct input. Satisfactory results were obtained in this examination.
- e. Adequate controls are maintained over the distribution and use of internal transfer documents. A review of the MT logbook which records the bulk MT series issued to MBA/ICA custodians as well as the dates of their individual uses resulted in questions on seven apparently unaccounted MT's. Investigation by the licensee staff resulted in accountability of four of the previously unaccounted MT's. Three MT's could not be located and custodian statements of non-use were obtained for the record.
- f. In the licensee's fuels fabrication operation items are often transferred from processing areas to vault storage areas on calculated U and U-235 values based on original charge data. Therefore, adjustments of data to actual analytical results is often in a material control area removed from the item's point of origin. AI is continuing its efforts to develop a software program to provide computer generated documentation to recognize and list differences between calculated and analytical/isotopic data. It is intended that such documentation will result in returning the differences, i.e., MUF, to the proper point of origination so as to permit a meaningful material balance around each MBA.

9. Procedures have been added to the NMM procedures manual to identify AI policy with respect to internal control of NMM including internal transfers, tamper-safing, scrap and waste control, records retention, etc. A floor working manual is maintained for detailed procedures.

6. Material Unaccounted For and Associated Limit of Error

The inspection was conducted in accordance with Procedure 85214B to review and evaluate the licensee's capabilities for determining and calculating the material unaccounted for (MUF) quantities and the associated statistical limits of error (LEMUF).

The inspection determined that:

A MUF gain adjustment of 1374 grams U-235 resulting from a bias in waste barrel measurements was made recently which effectively accounted for a cumulative MUF situation that was beginning to reach significant levels. Because of this, a more than the usual inspection effort was devoted to verifying the validity of this adjustment. Those barrels that earlier gave readings beyond the range of the old calibration curve were recounted (in some cases repackaged and recounted). All of the other barrels, however, were readjusted for SNM content by using the old measurement data and applying the new calibration factor. While there is some justification for this approach, e.g., essentially the same detector system was used for the earlier measurements, the significance of this adjustment indicated a need for additional supporting data. It was suggested to the licensee that remeasurement of 10-20% of the waste barrels would be desirable and based on these data, a decision on whether or not to perform further measurements could be made. These remeasurements are currently underway.

The recalibration procedure was closely examined and based on this inspection there is no reason to doubt the validity of this most recent calibration. The level of effort for this recalibration was considerably more than minimal and was conducted on a sound technical basis.

7. 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 March 2, 1976 through September 30, 1976. Material balance summaries are presented in Exhibits I through V attached.

The inspection determined that:

- a. The AI Procedure Manual contains a policy statement relating to the Nuclear Material Accounting system. A description of the record system and reports generated is contained in the FNMC plan. A floor working manual system is used to maintain a file of detailed procedures.
- b. On the basis of a NMM records review, AI has confined its possession and use of SNM to the location and purposes authorized by its license.
- c. The NMM plan, control ledger and the subsidiary computerized material control area ledger are supported by appropriate documentation and records are considered adequate. Both ledgers are now reconciled with each other prior to and after each bimonthly physical inventory.

Reconciliation of plutonium fissile data between the manual control ledger and the electronic data processing (EDP) inventory and summaries is still complicated in the case of privately-owned plutonium because inventories continue to be listed with the element and Pu-240 content rather than showing the Pu-239 + 241 content. Plutonium held under ERDA contract was listed with the fissile data as of September 1 for the first time. AI was planning to correct for this problem as of the November 8, 1976 physical inventory. The EDP Material Control Area ledger continues to supply only the total plutonium data.

- d. The transfer of SNM has been restricted to authorized recipients in accordance with 10 CFR 70.42.
- e. Material status reports, Form NRC/ERDA-742, for June 30, 1976, were filed as required by 10 CFR 70.53. However, in the case of reporting symbol "LAL", and as a result of filing prior December 31, 1975 reports based on a very preliminary closing of its EDP ledger which was at variance with the final closing balances for that date, and the filing of June 30, 1976 reports based on pre-physical inventory book ending inventory balances, the reported MUF and ending inventories do not agree with the final recorded balances as of June 30, 1976. These differences are reconcilable and result from a earlier reporting date requirement (ninth calendar day after end of period) by ERDA compared to the "within thirty days after the end of the period" requirement of 10 CFR 70.53.

In addition to the June 30, 1976 Material Status Report, and in recognition of the new federal fiscal year, ERDA has required its contractors to prepare another Material Status Report at September 30, 1976 for the three month period starting July 1, 1976. ERDA has also established a new six month reporting frequency with reports due March 31 and September 30, while 10 CFR 70.53 remains unchanged with report dates of December 31 and June 30.

- f. All Material Status Reports, Form NRC/ERDA-742, continue to be signed by a corporate officer.
- g. Nuclear Material Transaction Reports, Form NRC/ERDA-741, have been filed in accordance with 10 CFR 70.54 except as noted under "Shipping and Receiving," Paragraph G.4.b.

8. Management of Materials Control System

The inspection was conducted in accordance with Procedure 852018B to determine if the licensee had established, maintained, and followed a management system which provides for the development, revision, implementation, and enforcement of nuclear material control and accounting procedure in accordance with his approved FNMC procedures.

The inspection determined that:

An audit of AI's SNM control system was performed by R. L. Jaseph, Quality Assurance Engineer, on April 22, 1976. It is to be noted that this audit was conducted prior to the implementation of 10 CFR 70.58 and the "new" license conditions, and thus was guided by the requirements of "old" license condition 8.1. The format used for reporting the findings of the audit is highly readable and very effective. Among other things, the audit identifies a specific individual who is expected to respond to the findings of the audit and to take corrective action as required, and also sets a time frame in which these actions must be completed. To date, some of the items identified in the audit have been resolved, others are being acted on, and some are still pending a decision for action. None of these items are considered items of noncompliance at this time.

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ENRICHED URANIUM

Material Balance Summary
3/2/76 - 9/30/76

RIS: LAL & ZAZ

Exhibit I

| | <u>Grams</u> | |
|-----------------------------|------------------|------------------|
| | <u>Element</u> | <u>Isotope</u> |
| Beginning Inventory, 3/2/76 | 944,710 | 688,163 |
| Receipts | <u>1,079,413</u> | <u>740,711</u> |
| Total to Account For | <u>2,024,123</u> | <u>1,428,874</u> |
| Shipments | 1,145,513 | 746,564 |
| Measured Discards | -- | -- |
| Material Unaccounted For | | |
| Hot Cell | 14,510 | 320 |
| All Other | (814) | (636) |
| Ending Inventory, 9/30/76 | <u>864,914</u> | <u>682,626</u> |
| Total Accounted For | <u>2,024,123</u> | <u>1,428,874</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
3/2/76 - 9/30/76

RIS: LAL & ZAZ

Exhibit II

Grams

| | <u>Element</u> | <u>Isotope</u> |
|-----------------------------|----------------|----------------|
| Beginning Inventory, 3/2/76 | 7,540 | 1,421 |
| Receipts | <u>140,453</u> | <u>4,289</u> |
| Total to Account For | <u>147,993</u> | <u>5,710</u> |
| Shipments | 126,035 | 4,044 |
| Measured Discards | -- | -- |
| Material Unaccounted For | | |
| Hot Cell | 14,258 | 231 |
| All Other | (32) | (6) |
| Ending Inventory, 9/30/76 | <u>7,732</u> | <u>1,441</u> |
| Total Accounted For | <u>147,993</u> | <u>5,710</u> |

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Greater Than 20% U-235 - Enriched Uranium

Material Balance Summary
3/2/76 - 9/30/76

RIS: LAL & ZAZ

Exhibit III

| | <u>Grams</u> | |
|-----------------------------|------------------|------------------|
| | <u>Element</u> | <u>Isotope</u> |
| Beginning Inventory, 3/2/76 | 937,170 | 686,742 |
| Receipts | 938,960 | 736,422 |
| Total to Account For | <u>1,876,130</u> | <u>1,423,164</u> |
| Shipments | 1,019,478 | 742,520 |
| Measured Discards | -- | -- |
| Material Unaccounted For | | |
| Hot Cell | 252 | 89 |
| All Other | (782) | (630) |
| Ending Inventory | <u>857,182</u> | <u>681,185</u> |
| Total Accounted For | <u>1,876,130</u> | <u>1,423,164</u> |

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Canoga Park California

PLUTONIUM

Material Balance Summary
3/2/76 - 9/30/76

RIS: LAL & ZAZ

Exhibit IV

Grams

| | <u>Element</u> | <u>Isotope</u> |
|-----------------------------|----------------|----------------|
| Beginning Inventory, 3/2/76 | 2,773 | 2,450 |
| Receipts | <u>505</u> | <u>445</u> |
| Total to Account For | <u>3,278</u> | <u>2,895</u> |
| Shipments | 2,246 | 1,978 |
| Measured Discards | -- | -- |
| Material Unaccounted For | 27 | 80 |
| Ending Inventory | <u>945</u> | <u>837</u> |
| Total Accounted For | <u>3,278</u> | <u>2,895</u> |

10 [REDACTED] ON

10 [REDACTED] ON

Atomics International Division
Rockwell International
Canoga Park California

PLUTONIUM

Material Balance Summary
3/2/76 - 9/30/76

RIS: LAL & ZAZ

Exhibit IV

| | <u>Grams</u> | |
|-----------------------------|----------------|----------------|
| | <u>Element</u> | <u>Isotope</u> |
| Beginning Inventory, 3/2/76 | 2,773 | 2,450 |
| Receipts | 505 | 445 |
| Total to Account For | <u>3,278</u> | <u>2,895</u> |
| Shipments | 2,246 | 1,978 |
| Measured Discards | -- | -- |
| Material Unaccounted For | 87 | 80 |
| Ending Inventory | 945 | 837 |
| Total Accounted For | <u>3,278</u> | <u>2,895</u> |

10 [REDACTED] ON