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UNITED STATES
ATOMIC ENERGY COMMISSION

OAK RIDGE OPERATIONS
P.O. BOX E
OAK RIDGE, TENNESSEE 37830

May 3, 1967

AREA CODE 615
TELEPHONE 483-8611

Guinn PB

Union Carbide Corporation
Lawrenceburg Technology Operation
Post Office Box 500
Lawrenceburg, Tennessee 38464

Attention: Mr. L. D. Stoughton, Operations Manager

Subject: SS MATERIALS SURVEY NUMBER OR-226

Gentlemen:

In August 1966, personnel from this office conducted a survey of the control exercised by you over special nuclear material held under your license. At the conclusion of that survey, a meeting was held and the findings and recommendations available at that time were discussed with you. In particular, you were advised that:

1. it appeared that a cross-over had occurred between several of your jobs;
2. a procedure manual setting forth your controls over special nuclear material as recommended in our prior survey had not yet been prepared; and
3. preliminary results of check-weighing performed indicated more discrepancies than appeared to be reasonable.

You were also advised that a more precise statistical evaluation of the check-weighings and of the uranium and U-235 analyses would be performed. The analytical data are now available and have been analyzed statistically. This letter is to advise you of the results of that survey.

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4. The previous suspected cross-over between Jobs AVR (Section 53 Leased SNM) and WANL (Non-Section 53 SNM) appears to have been confirmed as a result of the inventory tests. The life-of-contract analysis of WANL transactions reveals an unaccounted-for loss of 7,478 grams of U-235. The same analysis of AVR transactions discloses a (9,896) gram gain in U-235. These analyses were made as of July 31, 1966.
5. Also, as previously reported to you, a procedure manual which outlines your controls (measurements, inventory, recording, and reporting) for special nuclear material had not yet been issued.
6. Your July 31, 1966, inventory did not fairly present your holdings of SNM. Based on the survey group's sample results which are given below, there were an excessive number of errors in the statements of uranium and U-235 content of items on inventory.

Type Sample	Samples Uranium	Rejects Uranium	Samples U-235	Rejects U-235
Whole Container Samples-Scrap	31	16	30	24
Samples from Containers-Scrap	18	16	13	5
Samples from Containers-Oxides	<u>18</u>	<u>13</u>	<u>18</u>	<u>1</u>
	67	45	61	30

The following reject limits were used in this evaluation:

		Reject Limits	
		Uranium	U-235
Whole Container Samples-Scrap	$\pm 100\%$ of AEC Value)		
Samples from Containers-Scrap	$\pm 40\%$ of AEC Value)		$> 20\%$ Assay; $\pm 1\%$ Rel.
Samples from Containers-Oxides	$> 50\%$ U: $\pm 1\%$ of AEC Value)		$> 10\% - 20\%$ Assay; $\pm 5\%$ Rel.
	$< 50\%$ U: $\pm .75\%$ U.)		

7. Book inventories were not adjusted to agree with the physical inventory. For example, we noted that your facility reported an ending inventory on the WANL job as 7,614 grams of U-235 at July 31, 1966. The physical inventory of that date, as verified by the survey team, amounted to 500 grams of U-235.

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8. Some measured discards and other known losses were not entered in NFD accountability records for the month in which they occurred, and were not reported to the AEC on the Material Balance Reports for the period in which such discards occurred. We noted that the health-safety engineer maintained a register in which engineering estimates, sample analyses, and other measurements covering stack losses, track-out, and sewer discards were recorded. Our audit checks disclosed no transfer of actual data to the records department.
9. A subsidiary ledger which should identify special nuclear material according to its origin and location in the plant was not being maintained.
10. Inventory and labeling practices were deficient in various aspects. For example, inventory listing and summing procedures did not include provision for listing isotopic enrichment by item, but rather provided for use of nominal enrichment by job. Also, inventory procedures did not include attaching stickers or otherwise marking items as they were inventoried to indicate that they had been inventoried.
11. We observed that about 75% of your enriched uranium inventory was contained in scrap. As a general rule, high uncertainties are associated with the measurement of uranium contained in scrap. A large amount of scrap may, therefore, result in unacceptable high inventory uncertainty and other errors. For example, the reject rate found in your inventory at survey time would contribute heavily to a finding of serious safeguards hazard, if found in a somewhat larger inventory. Also, the 3.8 kilograms of U-235 shipper-receiver difference (about 20%) on scrap shipped to Nuclear Fuel Services (NFS) is attributed by the survey team to poor segregation, unidentifiable items, and uncertainty in the measurement of scrap. Although, the scrap inventory has been reduced substantially as of this writing, the survey team urges a policy of careful segregation, identification, and measurement of scrap, and as far as possible, keeping scrap recovery current with scrap generation.

We would appreciate your advising this office of the specific steps

Union Carbide Corporation

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you have taken, or propose to take, with regard to the above items, and of your time schedule for accomplishing them.

Very truly yours,

Original Signed By
[Signature]

Charles A. Keller
Director
Production Division

CC: Mr. R. C. Armstrong

BC: D. E. George, DNMM, HQ
John G. Davis, Region II/
Div. of Compliance
Atlanta, Ga.