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UNITED STATES ATOMIC ENERGY COMMISSION

MCW [MALLINCKRODT SF] ACCOUNTABILITY PROGRAM

By
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M. Kamen
Authorizing Official

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DATE FEB 28 1957 *hel*
For The Atomic Energy Commission
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MCW Accountability Program
A Progress Report

by

C. H. Walden

Inasmuch as a progress report on the Accountability Program has not been issued for several months, this report includes developments of the past few months as well as plans for the future. This report, as were previous ones, is divided into three sections:

A. Accounting Aspects

Since the last report, the individuals doing the accounting work on SF materials have been incorporated into the Accountability Group. The accounting section of this group will keep all records and make all reports pertaining to SF material. In addition, these people will prepare all production reports submitted to the AEC and all production reports required by the Cost Accounting and Billing Departments. All accounting procedures are subject to the audit of the MCW auditors and the Accounting Department is informed of all procedure changes. The function of preparing the SF shipping memos is now located in this group with the preparation of Shipping Orders being handled by the Accounting Department. These changes have worked out very well and we now satisfy the AEC requirements of a centralized Accountability Group.

We have just begun to change our accounting procedures so that they might meet the double entry requirements of the AEC. Not only will we satisfy Oak Ridge by having this double entry system but we will also establish uniformity among our several SF accounts.

By agreement with the New York Accountability Group, we have eliminated the weekly production reports which have been submitted for several years to the AEC. It was our feeling that the AEC no longer had any interest in this report and we requested a review of their requirements. The result was not only the elimination of the weekly report but also all of the weekly inventory work carried on by the plant. In addition, they had us completely eliminate the residue portion of the monthly production report which permits us to have it in the mail four days after inventory.

The Production Records section has been relieved of the task of keeping IN-5 Charge and Credit production records. These records which are necessary to calculate the various recasting yields and to account for each piece of metal are now maintained by the Accountability Group.

It is the feeling of the AEC that an Accountability Group should take the monthly inventories or have a representative to survey each inventory in the plant. We are doing this as much as our limited personnel will permit. Mr. Emmert actually takes a raw material and finished products inventory in Plant 6 while Mr. Henton and the writer supervise the Work In Process Inventory.

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The Accountability Group has assumed more responsibility for checking the figures going to make up the monthly material balances. The accountants in this group can do little more than take the figures submitted and work up a material balance. They have neither the time nor training to do such checking but the technical people of this group can and will check these figures as much as possible. The Analytical Laboratory's responsibility includes correct compositing of samples, the actual analytical work and the calculations involved to arrive at the desired uranium assay. The application of these assays to the inventory is done by our group but I believe they are also checked by the Analytical Department.

By agreement with the MCW Controller, the yearly inventory to be taken on December 30, 1950 will not include the usual complete "tagging" of all material. We pointed out that our monthly inventories are perhaps more rigorous than these yearly ones and will serve the same purpose. We did agree to conform with their system on any finished lots in which MCW has an investment. This, however, excludes the laboratory, all process tanks, and all SF raw material.

B. Analytical and Theoretical Aspects

All material sampled at Middlesex after August 1, 1950 is being consumed at Plant 6 on a basis of MCW assays. We have established a procedure for carrying out the necessary mathematics for applying these assays to the Accountability records. We are also keeping a control chart on the difference between MCW and shipper's assay so that we might know when the two laboratories differ by an unusual amount.

A statistical treatment of our Plant 6 Work In Process Inventory has been submitted to the AEC. This study covers only one-half of the Work In Process Inventory and will be revised when additional data is available.

The Analytical Laboratory has been requested to carry out the necessary experimental work to revise the green salt assay. All indications point to a downward revision of the present 0.759 factor.

An all purpose sampler has been designed by Mr. Henton which will be used to sample the various dust collector residue produced at Plant 6B and 7. Present plans call for its installation in the old boiler house.

We have formulated a new method of subsampling the AM-7 and AJ-4 residues and facilities for this work are being installed at Plant 6. This work will be carried out by the Analytical Department.

Mr. Henton has aided the Health Physics Group in the sampling of "wet" stacks. This work is progressing slowly and so far has not yielded any interesting data. It is hoped that this work can be completed as soon as the weather moderates and the men can work on the roof of the Manufacturing Building.

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We plan to evaluate the reliability of MgX sampling and assaying by dissolving one or more lots of the material and sample the resultant solutions. An assay on these solutions, applied to the correct volume, will represent an independent evaluation of the uranium content. This will present evidence as to the reliability of the work carried out at Middlesex and can be used as a basis for determining whether more extensive studies be made of the Middlesex operation. Similar studies could be made on pitchblende but would require considerable supervision and laboratory work.

C. Production Aspects

The production aspects of accountability fall into the following categories:

1. Inventories
2. Sampling
3. Weighing
4. Physical Losses

1. Inventories: Three samples are now taken monthly from most of the process tanks. In some cases all three samples are assayed while in other cases only two of the samples are analyzed. If the two are in close agreement, we discard the third sample and take an average of the two. By this procedure, we arrive at a reliable inventory and are at the same time accumulating statistical data for evaluating the uncertainty of the Work In Process Inventory. These multiple samples have brought out the fact that agitation is needed in practically all process tanks having any appreciable uranium concentration. The MgX program has helped in securing agitation for some of these tanks while we have recommended the installation of agitators in M-49.

We have found it necessary for the metal plant to take a daily crop inventory in order to eliminate large discrepancies in the monthly perpetual crop inventory. By maintaining this close control, we can account for each piece of crop produced by either its presence on inventory or having been shown as recasted.

We have been very pleased with the cooperation shown by the plants in preparing for the monthly inventories.

The opening of Plant 7 is expected to present us with many inventory and material balance problems. The uranium content of the large holdup of material in the reactors and conveyors can only be estimated. The uncertainty of this estimate will un-

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doubtedly be large and of course will be reflected doubly in the monthly material balance. This is to say that the variance of a material balance is compared among other things, of the sum of the variances of the opening and closing inventories. By running frequent material balances, we can estimate these uncertainties and thus infer whether the results of a given material balance are reasonable or not. The new weighing equipment in Plant 7 will afford an easy method of inventory and should give very precise weights for the finished product.

2. Sampling: The orange oxide sampler is installed and ready for operation whenever this becomes our Plant 6 product.

It is understood that the AEC will supply samplers in Plant 7 for brown oxide and green salt. A letter was sent to the AEC requesting this equipment.

3. Weighing: We have requested that a man be assigned to the Accountability Group whose function would be to monitor all weights as well as to do the actual weighing of the Plant 6 residues. This weighing of residues has been carried out by the Ledoux representative up until the present time.

A need for such a monitor was recently demonstrated with a shipment of LF-9. A good 10 per cent of the drums in this shipment were incorrectly weighed and it was only by chance that the errors were detected. Even the best of scale equipment and technique need some spot checking.

4. Physical Losses: The main acid, sump recovery and C-3 area samplers are operating very satisfactorily but work has yet to be completed on the acid sewer sampler. We are now receiving physical loss data from these samples which will not only give a better loss figure for the material balance but may also point out the reason for some of these losses. We have in addition a portable sampler to use in evaluating the losses from the laundry, the Plant 6E recovery system, and from the various steam condensate sources which might be contaminated.

CHWalden
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