OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
U.S. ATOMIC ENERGY COMMISSION

ORNL - TM - 17 Rev
COPY NO. - 9
DATE - October 3, 1961

TITLE - NUCLEAR SAFETY AUDIT

AUTHOR(S) - H. C. Paxton and Dixon Callihan

DISTRIBUTION - 1-2 - Luther Evans, Dow Chemical Company
3 - J. G. Epp, Dow Chemical Company
4 - L. A. Matheson, Dow Chemical Company
5 - R. R. Harrison, Dow Chemical Company
6 - C. L. Schuske, Dow Chemical Company
7 - H. C. Paxton, Los Alamos Scientific Laboratory
8 - Dixon Callihan
9 - ORNL Laboratory Records, RC

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
POST OFFICE BOX Y
OAK RIDGE, TENNESSEE

October 3, 1961

Mr. Luther Evans, Manager
Rocky Flats Plant
Dow Chemical Company
P. O. Box 2131
Denver, Colorado

Dear Mr. Evans:

During each of the past few years H. C. Paxton, of the Los Alamos Scientific Laboratory, and I have enjoyed discussions of fissionable-material processes with supervisory personnel at the Rocky Flats Plant. As a result of these discussions and concomitant field surveys we have suggested a few ways in which the probability of critical accumulations might be reduced and in which nuclear safety might be enhanced. Following the previous practice, suggestions and other relevant comments arising from our most recent visit, on September 28 and 29, 1961, are submitted in the attached memorandum, Nuclear Safety Audit.

We express our appreciation of the hospitality afforded during our stay at the Plant.

Very cordially yours,

Dixon Callihan

DC:mlr

NUCLEAR SAFETY AUDIT

Dow Chemical Company, Rocky Flats Plant

September 28 and 29, 1961

H. C. Paxton and Dixon Callihan

An audit of the nuclear safety practices at the Rocky Flats Plant, on September 28 and 29, 1961, included a discussion with many members of the production supervisory staff, with the Criticality Group, and with representatives of management. All areas processing fissionable materials were visited except 47 and 91.

In our review of the minutes of the meetings of the Nuclear Safety Committee there was cognizance of the few infractions of nuclear safety practices which were reported during this past year and of the remedial measures effected. It is believed that reports of deviations and of the actions taken can continue to be of value to the entire nuclear safety program.

The latest issue of the Nuclear Safety Policy Guide for Rocky Flats Plant, dated September 1959, was read again. It is recommended that the Guide be reviewed to establish that it carries current managerial approval and that it be up-dated if necessary. It is also recommended that the document assert managerial approval.

The generation at Rocky Flats of valuable nuclear data and of process designs recognizing unique nuclear requirements was pointed out during an audit in 1960 (ORNL CF-60-9-56). Emphasized again is the importance of making this information available to the industry, within bounds imposed by national security, through open-literature publication. Recognition of individual accomplishment, desirable in any technical community, is also achieved by publication.

We note the recent adoption of borosilicate-glass rings as a primary safety in tanks containing plutonium solution. In view of the unknowns about rates of plutonium deposit and of chemical attack of the Raschig rings, we recommend periodic inspections until behavior is adequately established. In addition, we strongly encourage the present developmental program of instrumentation to detect plutonium deposits in these tanks as well as in other pieces of equipment. It is suggested that similar precautions be included in the plans for resin columns protected by boron-loaded steel.

In general, the experience with Raschig rings in tanks for uranium solutions is highly encouraging. We have some reservations about the possibility of major breakage and settling of rings in case of an accident

during moving of solution-transfer drums.

Proposals for the normalization of α-phase plutonium components in oil baths were brought to our attention and plans for defining a safe array were discussed with members of the Criticality Group. We foresee no major problem in this operation.

The concern about large melts and ingots of both uranium and plutonium, which we expressed a year ago, has in no way diminished. There is need for the continued recognition of hazards such as those associated with crucible failure and with abnormal handling of massive ingots.

We believe that the observed storage of large numbers of plutonium ingots in conveyor lines is poor practice.

The continuing program of reducing the number of process operations carried out in equipment not safe solely because of its geometry was observed and is commended. This equipment includes both individual units and components of continuous process lines. Care must be observed in the installation of large tanks to assure that the tanks do indeed contain any neutron absorbers specified as a safety requirement and that lines carrying solution be connected to the proper tank.

Hugh C. Paxton
H. C. Paxton

Dixon Callihan
Dixon Callihan

Oak Ridge, Tenn.
10/3/61