

U. S. ATOMIC ENERGY COMMISSION
REGION I, DIVISION OF COMPLIANCE

Title: WATERTOWN ARSENAL REACTOR

By : John R. Seers, Reactor Inspector
Region I, Division of Compliance

SUMMARY

A brief visit was made to the Watertown Arsenal Reactor. The swollen control rod has been removed from the core and replaced with a spare, and the reactor is operating normally and routinely. Generation of Argon-41 during 24-hour operation will exceed Part 20 limits and construction of a stack is under consideration. Pre-Pakt contractors will pressure grout the concrete pool walls. O'Connor asserts that he is a firm believer in management responsibility. Dr. Cochran is still employed as a consultant. The reactor has been inspected by a military inspection team.

Reviewed by:

Robert W. Kirkman, Director

Period of
Inquiry:

October 17, 1961

Distribution:

2 cys - HQ.
2 cys - NY

DETAILS OF VISIT

I. Scope

A visit was made to the Watertown Arsenal Reactor at Watertown, Massachusetts, by John R. Sears, Reactor Inspector, Division of Compliance, Region I, and Frank Nolan, Headquarters, on October 17, 1961. The visit was brief, unscheduled and unannounced. The principal person contacted during the visit was Mr. John O'Connor, the Manager of the facility.

II. Results of Visit

The inspectors were conducted on a brief tour of the facility by Mr. O'Connor. The reactor was operating at 1 mw, in a routine manner during the visit.

O'Connor stated that he has removed the artificial startup source from the reactor, since there is such a high gamma-neutron background from the beryllium reflector. He stated that he has adjusted the compensation on the log-n period chamber so that there is now some indication on the period meter before the reactor goes critical.

The inspectors observed the control rod which had been removed from the reactor because of swelling. The rod appeared normal in every respect, and a visual inspection did not indicate the source of the leak, which resulted in the swelling of this rod.

O'Connor stated that their present schedule of operation is for the reactor to run at full power, 1 megawatt, 8 hours per day, and then shutdown for sixteen hours. Health physics results were reviewed by the inspectors which indicate that the average value for Argon-41 in the building, for eight hours of reactor operation, is about 4.3×10^{-6} uc/ml. The equilibrium concentration is 6.4×10^{-6} uc/ml. In order to operate 24 hours a day, O'Connor stated that they are contemplating the installation of a stack which will be 2-1/2 times the height of any surrounding buildings. He stated that the stack would probably be installed so that it can handle the effluent from the reactor building, and also the effluent from the hot laboratories in the adjoining building.

The Health physics records indicate that there have been no overexposures to personnel. During the tour of the facility, the inspectors were furnished with a beta-gamma and a neutron film badge.

Mr. Dady, the Health Physicist of the facility, stated that the liquid waste concentration plant has not been in operation up to the present time. He said that, while they investigated

the problem of leaks through the concrete walls - that water had been drained from the pool and also from the annulus. This water had been discharged from the reactor to the 40,000 gallon holdup tank. He said that this water had been held in the holdup tanks until the activity decayed to a value considerably less than the concentrations allowed for discharge as specified in Part 20. A sample was then taken for analysis and approval by the Metropolitan District Commission, and the water was then discharged to the sewer system. Dady also stated that they had calibrated the Tracerlab gaseous monitor by irradiating a sample of air in the reactor, placing the sample in a glove box of known inside dimensions, breaking the vial containing the sample in the glove box, and monitoring the effluent from the glove box with the Tracerlab monitor. He said that the calibration of the monitor made in this fashion agreed very closely with the calibration which was furnished by the manufacturer.

Mr. O'Connor stated that he has signed a contract with the Pre-Pakt people to commence pressure grouting on the concrete shield. In order to do the pressure grouting, the core will be unloaded, since most of the locations which will require the grouting are opposite the core. He said the coring for the pressure grouting is done in a step fashion, that is, toward the outside the core is a larger diameter than the inside. Thus, when the core is refilled with heavy concrete grout, there is a step in the resulting plug to cut down any stray radiation along any crack between the old and new concrete.

The inspectors held a discussion with Mr. O'Connor on the responsibility of operation. Mr. O'Connor stated that, in his opinion, he was the man who was finally responsible for the safety of the reactor. He thoroughly disagreed with the philosophy that such responsibility can be delegated either to the shift supervisor or to the operators of the console. He affirmed that he was the final responsible individual. He also disagreed with the proposition that shift supervisors should be licensed as the individuals responsible for safety, and that they should then delegate authority and responsibility to operators. He stated quite strongly that he felt that he, as the top representative of management, was the responsible individual. O'Connor, during the discussion, brought out an interesting point, that is, that the Watertown Arsenal operates under U. S. Civil Service Rules, and thus it would be perfectly within regulations for a prospective reactor operator to refuse to take the AEC operators' examination, on the grounds that this examination was not an exam approved and administered by the U. S. Civil Service Commission. O'Connor also pointed out that anyone taking such a stand would be simply hoisting himself on his own petard, since he would not be eligible to operate the reactor without an AEC license.

O'Connor also stated that, during the past summer, this facility had been inspected by a military inspection team consisting of twelve people. He said that the inspection team had required him to operate

and to shutdown the reactor. They also requested that he unload and reload the reactor. He said that he refused to do the latter, since it would interfere considerably with operations. He said the military inspection team had given him "a clean bill of health" on items with any safety implications, but that they had a few adverse comments on some minor items of recordkeeping and storage.

O'Connor stated that Dr. Robert Cochran is still employed as a consultant by the Watertown Arsenal. He said that Dr. Cochran made a visit to the reactor since the swollen control rod had been removed. O'Connor said that Cochran did not express concern over this occurrence and thought that the course of action taken by the Watertown operators, after the discovery of bubbles coming from this rod, had been prudent and conservative.