

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

REGION III

IE Inspection Report No. 050-010/75-10

Licensee: Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dresden Nuclear Power
Unit 1
Morris, Illinois

License No. DPR-2
Category: C

Type of Licensee: GE BWR, 200 MWe

Type of Inspection: Special unannounced

Dates of Inspection: May 13, 14, and 20, 1975

Principal Inspector:

W. L. Fisher
W. L. Fisher

6/20/75
(Date)

Accompanying Inspector: R. C. Knop

Other Accompanying Personnel: None

Reviewed By:

R. C. Knop
R. C. Knop
Senior Reactor Inspector
Project Unit 1

6/20/75
(Date)

8009250560

SUMMARY OF FINDINGS

Inspection Summary

Inspection on May 13, 14, and 20 (75-10): Review of cause, consequences, and followup actions associated with May 10 radwaste spill. One non-compliance item, related to use of operating procedures.

Enforcement Items

The following item of noncompliance was noted during the inspection:

Infraction

Contrary to Technical Specification 6.2.A.1., a Moyno pump in the Unit 1 radwaste area was operated without approved procedures on May 10, 1975, resulting in a significant spill of radwaste.

This infraction was identified by the inspector and caused an occurrence with safety significance.

Licensee Action on Previously Identified Enforcement Items

None reviewed.

Other Significant Items

A. Systems and Components

Unresolved Item - Radwaste sludge and resin tanks frequently overflow to their vaults. Vault sump and tank dewatering pumps appear to have been out of service for several years. This situation apparently has gone uncorrected. The licensee does not know whether the vaults have leaked.

B. Facility Items (Plans and Procedures)

None

C. Managerial Items

The licensee is currently reviewing minutes of safety meetings to determine if a safety analysis was performed evaluating the possible effects of routinely overflowing the tanks into the vault area.

D. Noncompliance Identified and Corrected by Licensee

None.

E. Deviations

None.

F. Status of Previously Reported Unresolved Items

None within the scope of this inspection.

Management Interview

The following items were discussed on May 20, 1975, with Messrs. Stephenson, Roberts, and other plant personnel:

- A. The inspector stated that the spill appeared to have warranted prompt analytical attention, inasmuch as isotopic analysis was not even begun until the afternoon of May 13, 1975.
- B. The inspector stated that the licensee had not considered the possibility of a contamination spread from the area of the spill. The licensee replied that this would be considered.
- C. The inspector stated that the Unit 1 resin and sludge tank vaults appeared to be regarded and used as tankage. The licensee agreed that resin and sludge tank overflow was an old problem but denied that the vaults were regarded as tankage. The licensee stated that minutes of the safety review committee meetings would be reviewed to determine if a safety analysis was performed evaluating the effects of routinely overflowing the tanks into the vault area.
- D. The inspector indicated concern that through the years the resin and sludge tank vaults might have leaked. The licensee stated that core borings would be made to determine whether such leakage had occurred.
- E. The inspector stated that operation of the Moyno pump without approved procedures was an item of noncompliance.
- F. The licensee stated that disciplinary action was being taken against the operator who started the Moyno pump.

REPORT DETAILS

Part I

Personnel Contacted

D. Adam, Radiation/Chemistry Supervisor
R. Crandall, Engineer
G. Klopp, Radwaste Operating Engineer
A. Roberts, Assistant Plant Superintendent
S. Gurney, ANEFCO
J. Murphy, ANEFCO

On May 10, 1975, the erroneous starting of a resin transfer pump led to an uncontrolled release of 20,000 gallons of spent resins, filter sludge, and liquid to the grade level floor of a waste solidification building. Most of the liquid and some of the solids then flowed to the ground outside the building. The solidification facility, which since August 1973 has been operated by ANEFCO under contract to Commonwealth Edison, was not operating or manned at the time of the release.

ANEFCO had been contracted to solidify a specified volume of Unit 2/3 resins in accordance with written procedures identified as Exhibit A to the contract. These procedures describe only the solidification of Unit 2/3 waste, except that the solidification procedure, Section F.D.5, concerns the use of Unit 1 radwaste sludge as a diluent to prevent loading the liners beyond the appropriate curie limit.

The initial solidification of Unit 2/3 resins was completed in early 1974. ANEFCO was then retained to solidify Unit 1 resins. This work plus solidification of additional Unit 2/3 resins continued until recently. The processing of Unit 2/3 resins ended in March 1975. The processing of Unit 1 resins ended on April 28, 1975, upon expiration of the contract. At that time ANEFCO began to clean up the solidification facility and equipment, and continued to ship solidified resins for disposal.

Unit 1 spent resins are normally backwashed to the spent resin tank (T-113) in a radwaste building vault. Unit 1 filter solids are backwashed and centrifuged, and the sludge flows to the sludge tank (T-112) in the same vault. The 30'x60'x22' vault is divided by a 10' wall into two 30'x30'x22' sections housing the two tanks, neither of which has level instrumentation. Both the resin and sludge tanks overflow frequently, and the vaults frequently fill and overflow into each other.

According to an ANEFCO report, at some time in the past the sludge tank had broken free from its mounting and had floated.^{1/} This was not

^{1/} "Interim Report of ANEFCO Radwaste Service at Commonwealth Edison Co., Dresden Plant," March 1974.

confirmed by plant personnel; nor were the inspectors able to confirm it by direct observation, because the sludge vault was full.

Overflowing the sludge and resin tanks appears to have become an accepted practice. Although the vaults appear to have been intended only to provide secondary containment in the event of tank leakage or overflow, they appear to have been regarded as additional tankage. Thus, in March 1974 ANEFCO reported that "...exhausted resin is mounded over the top (of the tank) and has spilled over into the vault...." and "The vaultis flooded.....approximately eight feet above the top of the resin tank."^{2/}

The vault sump pumps appear to have been out of service for several years. Portable pumps have been used to return water to the rad-waste collector, allowing sludge and resins to accumulate in the vaults.

The licensee apparently has never attempted to determine whether the vaults leak.

ANEFCO's facilities include:

1. A 12'x24' temporary building housing a six-inch, variable speed Moyno pump and its controls used to pump sludge and resins to the solidification building.
2. A 24'x70' solidification building containing a batch tank, four silos in which liners are placed for filling, and the solidification system.
3. A tank farm.
4. An outdoor storage area for filled liners.

The ANEFCO waste solidification operation ended on April 28, 1975, at which time cleanup and decontamination of facilities and equipment began. The Moyno pump and piping was flushed out, and the suction valve to the resin vault was left open for the system to drain. This was the status of the pump when turned on by a Dresden operator on May 10, 1975.

At about 7:00 a.m. on May 10, a Dresden operator started the Moyno pump instead of a small dewatering pump. The error was apparently not recognized even though:

1. The operator was familiar with the area and the dewatering operation.

^{2/} Ibid.

2. The Moyno and dewatering pump controls are located in different (adjacent) buildings.
3. The Moyno pump control is considerably different from the dewatering pump control.
4. Dresden personnel never operate the Moyno pump.
5. The Moyno pump, which is only a few feet away from the control, has a very loud, characteristic noise.

The Moyno pump apparently pumped 20,000 gallons of liquid, filter sludge, and resin containing an estimated 10 curies or less to the solidification building and then tripped on thermal overload after losing suction when the vault was nearly empty. At about noon on May 10, the radwaste foreman and an operator observed that the vault was nearly dry. Being unaware that the Moyno pump had operated, they attributed the dryness of the vault to successful decant efforts made by the previous shift.

The resins and liquid pumped to the solidification building overflowed the 100 cubic foot batch tank and then filled and overflowed the 200 cubic foot batch tank silo. Although most of the resins and activity probably remained in the batch tank and silo, some were carried by the overflow onto the building's grade level floor. The resins deposited as the water flowed across the floor, so that only suspended solids (resin fines and filter sludge) appear to have been carried out of the building.

Analysis of a resin vault water sample taken on May 12 showed a gross beta activity of $1E-2$ microcuries per milliliter. Isotopic analysis of a resin tank sample taken on May 13 showed the following:

| | <u>Solids*</u> | <u>Filtrate</u> | <u>Total</u> |
|-------|--------------------------|--------------------------|---------------------------|
| 54Mn | $3.4E-4 \mu\text{Ci/ml}$ | $1.1E-5 \mu\text{Ci/ml}$ | $3.5 E-4 \mu\text{Ci/ml}$ |
| 58Co | $3.6E-4$ | $2.8E-5$ | $3.9E-4$ |
| 60Co | $3.7E-3$ | $1.4E-4$ | $3.8E-3$ |
| 134Cs | $8.4E-4$ | $1.9E-4$ | $1.0E-3$ |
| 137Cs | $2.0E-3$ | $2.5E-4$ | $2.2E-3$ |
| Total | $7.2E-3$ | $7E-4$ | $7.9E-3$ |

*Filterable Solids

On the basis of the above analyses, it appears that liquid containing less than 1 curie, about 90 percent of which was contained in easily removable solids, flowed to the ground outside the solidification building. For the filtrate fraction, the MPC for release to restricted areas is $2E-5$ microcuries per milliliter, while the MPC based on values found in Appendix B, Table I, Column 2 of 10 CFR 20 is $5 E-4$ microcuries per milliliter.

Upon flowing out of the solidification building, the liquid accumulated in two depressions east and north of the building. Some liquid flowed north from the depressions, through culverts beneath the solidification building access road, and into a shallow ditch paralleling and just inside of the radwaste area fence. All of the liquid appears to have soaked into the ground within the radwaste area. The licensee has estimated the area of contaminated soil to be 30,000 square feet.^{3/} Assuming the release of 1 curie, the average contamination level would have been 30 microcuries per square foot or 0.2 microcuries ($5E5$ d/m) per square inch. Contamination levels found in small surface soil samples appear to be consistent with the above estimate. Samples taken at various depths at several locations indicate that the activity is largely near the surface but that some penetration occurred, the extent of penetration depending on the nature of the soil and the depth of the depression.

At the time of the inspection, the licensee had not considered the possibility of a spread of the Unit 1 radwaste area contamination in the event of strong winds.

The fate of the 20,000 gallons of liquid is unknown. Shallow geologic formations could force it to flow horizontally into the Unit 1 intake canal, in which case the soluble activity would be diluted to extremely low concentrations and released to the Illinois River. On the other hand, the liquid might reach a water table and eventually reach a potable water supply. In any event, the radionuclide concentrations would be insignificant.

To determine, if possible, whether the liquid flowed into the Unit 1 intake canal, the licensee analyzed the intake canal composite samples daily for the first week after the release. At the end of the first week, the normal weekly frequency was resumed. To date, canal samples have shown no evidence of a release. The licensee also initiated a special soil sampling program in which weekly surface soil samples from eleven locations along or near the intake canal will be composited monthly by location for gamma analysis.

^{3/} Ltr, Commonwealth Edison to IE:III, dtd 5/20/75.

There are no wells in or near the Unit 1 radwaste area. Therefore, no direct measurement of groundwater concentration can be made. However, the licensee does periodically sample well water at several locations, including the following:

Dresden Well # 1

Dresden Well # 2

Thorsen Farm

MFRP Well

Dresden Lock and Dam

Drinking Fountain - Unit 1

Anderson Farm

The analytical results of these samples are reported semiannually in the licensee's "Radioactive Waste, Environmental Monitoring and Occupational Personnel Radiation Exposure" report.

Contamination inside the solidification building ranged from very high in the region of the resin batch tank to low in areas not wetted by the 20,000 gallon overflow. Exposure rates ranged from about 90 mR/hr at the doors to 10 R/hr near the resin batch tank. Decontamination was not promptly initiated by the licensee, nor by ANEFCO, whose contract had expired.

REPORT DETAILS

Part II

Prepared by R. C. Knop

Operator Training and Experience

The Operator who erroneously turned on the Moyno pump has been a Commonwealth Edison Employee since May of 1973. Previous to that time he had experience in the Nuclear Navy. He had been promoted to a "B" Operator in January, 1974.

The Operator had been exposed to the operation of the dewatering pump at periodic intervals during March and April of 1975.

All Radwaste Operators including the subject Operator were in process of completing training, including radwaste control procedures and operation of the equipment.

Procedural Controls

The inspector reviewed the radwaste procedures for the Dresden 1 Unit. It was noted that procedures were prepared and being used for most of the operation of the radwaste facility.

The operation of the dewatering pumps, however, was not controlled with procedures. The Licensee stated that procedures were not prepared for this operation, since the equipment was temporary and was considered to be too simple an operation to require a procedure.

Operation of the Moyno pump was only authorized by ANEFCO personnel. Commonwealth personnel were not authorized to operate the pump.

The procedures for operation of the pump by ANEFCO personnel had been approved by the Dresden review group in April 1974.

Contamination Surveillance

Subsequent to the inspection the licensee stated that boring was accomplished to determine the depth and extent of the fluid soaking into the ground. The dirt was then to be packaged for shipment to a licensed facility.

The licensee stated that boring would be made in the near future in the area of the vault building to determine if any contamination had leaked from the concrete vault over the past several years. The inspector stated that this would be carried as an unresolved item.