

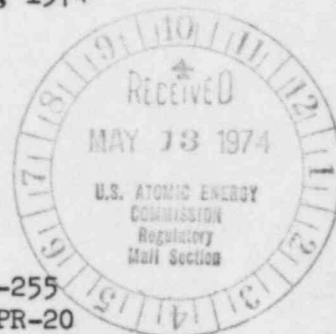


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General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

May 10, 1974



Mr. John F. O'Leary, Director
Directorate of Licensing
US Atomic Energy Commission
Washington, DC 20545

Re: Docket 50-255
License DPR-20
Palisades Plant

Dear Mr. O'Leary:

Attached is a copy of an abnormal occurrence report (A-02-74)
for the Palisades Plant.

This is the first written report submitted to the Directorate
of Licensing concerning this abnormal occurrence even though it oc-
curred on April 7, 1974. A similar report with the exception of the
detailed information present in Item 8 was submitted by TWX to the
Directorate of Regulatory Operations, Region III, on April 15, 1974.
At that time, Mr. R. Cook of DRO, Region III, informed us that we
could delay submitting a written report until the detailed information
concerning the chemical decomposition was available. This information
is included in this report.

Yours very truly,

Ralph B. Sewell (Signed)

RBS/ce

Ralph B. Sewell
Nuclear Licensing Administrator

CC: JGKeppler, USAEC

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ABNORMAL OCCURRENCE REPORT
Palisades Plant

1. Report Number: AO-2-74, Docket 50-255
- 2a. Date: May 10, 1974
- 2b. Occurrence Date: April 7, 1974
3. Facility: Palisades Plant
4. Identification of Occurrence: Plexiglas Dropped Into Reactor Cavity
5. Conditions Prior to Occurrence: Refueling in Progress
6. Description of Occurrence: While inserting fuel assemblies into the reactor, the underwater lights are normally adjusted to better illuminate the field of view of the refueling machine TV camera. One of the lights which is used is positioned through a viewing port on the deck of the refueling machine trolley. The viewing port has standard 3" x 1" deck grating which rests over a piece of plexiglas. The grating provides support for personnel standing in the vicinity and the plexiglas is provided to prevent objects from falling through the grating into the reactor cavity.

During the insertion of the underwater light, a piece of the plexiglas (estimated to be 3" wide and 18" long and 1/16" thick) broke off the large piece and fell into the reactor cavity. A thorough search of the reactor vessel, reactor cavity and tilt pit revealed that the plexiglas piece had come to rest on the top of the core shroud former plate at the northeast side of the reactor. While attempting to retrieve the plexiglas, it subsequently fell through the annulus between the shroud former plate and the core support barrel.

7. Designation of Apparent Cause of the Occurrence: Inadequate Design of the Viewing Port
8. Analysis of Occurrence: The 3" x 15" x 1/16" piece of plexiglas, polymethyl methacrylate, is apparently located in a compartment or void bounded by the bolted core shroud plates, core shroud formers and a portion of the core barrel. All components are wrought Type 304 stainless steel. No component is furnace sensitized. The core barrel weld heat affected zones are remote from the location of the plexiglas sheet. In this location, the plexiglas sheet is effectively trapped and cannot adversely perturb core hydraulics nor can it be retrieved. The probability of the plexiglas exiting the void prior to decomposition is very low.

A literature review indicates that thermal decomposition occurs at about 200°F and the major by-product of polymethyl methacrylate is acrylic acid. This by-product is mildly corrosive toward stainless steels with general corrosion rates being of the order of 2 mils per year for acid concentrations greater than 30 weight percent. A sample piece of the plexiglas, which was obtained from a remaining piece of the original, was exposed at 600°F in an autoclave. In contact wrought and wrought/welded 304 stainless steels exhibited no localized corrosion. Following 24 hours at 600°F, 90 percent of the plexiglas had dissolved. By-product liquid residues contained 1.1 ppm chloride and 0.05 ppm fluoride. The plexiglas to water volume ratio in the autoclave was 540 times that in the primary system. The 10 percent gel-like residue is expected to contain halide concentrations equivalent to that detectable in the as-received material, viz, 100 ppm chloride and no fluoride.

9. Corrective Action:

- a. A screen will be used to replace the plexiglas so that it is not likely to fall off and, even if it does fall off, it will be easier to retrieve.
- b. Although no chemical attack was detected in the test described in 8 above, care will be exercised during the next heatup to minimize the oxygen concentrations. This will minimize the possibility of halide induced attack during start-up. If either the chloride and/or fluoride concentrations are determined to be greater than Technical Specifications limits, the primary coolant system will not be heated further until the concentrations are reduced below the limits.
- c. After the plant is heated to the hot standby condition, it will be held there for two days. This will ensure thermal decomposition of the plexiglas and contaminant removal via the purification system prior to resuming reactor operations.

10. Failure Data: No Previous Similar Experiences