50-333

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

CORBIN A. McNEILL, JR.
Resident Manager

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315-342-3840

October 19, 1982

SERIAL: JAFP-82-1106

Ronald C. Haynes, Regional Administrator
United States Nuclear Regulatory Commission
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Reference: Docket No. 50-333

Dear Mr. Haynes:

We have enclosed a report concerning hydrogen combustion in the Off-Gas System which may be of special interest to the Nuclear Regulatory Commission but which was determined not to be reportable under current US Nuclear Regulatory Commission guidelines for Licensee Event Reports.

If there are any questions concerning this report, please contact Mr. Radford J. Converse at 315-342-3840, Extension 202.

Very truly yours,

CORBIN A. McNEILL, JR.

CAM:RJC:jjh
Enclosure

CC: Internal Power Authority Distribution
NRC Resident Inspector
Document Control Center
OR File

IE22

COMBUSTION IN THE OFF-GAS SYSTEM

Monday, June 28, 1982 - approximately 1605

GENERIC APPLICATION:

The following is an explanation of what combustion in the off-gas system consists of, symptoms associated with it and how to extinguish it.

The hydrogen mixture in some portions of a boiling water reactor off-gas system is combustible, all that is needed is a spark to ignite it. When it ignites it either explodes or, as in James A. FitzPatrick's case, it burns like a propane flame inside the piping (usually the after condenser). The symptoms are as follows:

1. The stack discharge radiation levels decrease because the hydrogen is being consumed prior to reaching the thirty minute holdup volume, without the hydrogen the holdup time increases to approximately five hours. This allows a lot more decay time for the elements with short half lives.

2. Off-gas flow rate decreases because the hydrogen is being consumed prior to reaching the flow element.

3. The radiation levels around the off-gas piping increase due to heavier concentration of elements with more energetic emissions. The method of putting it out is to remove the fuel to stop the combustion.

SPECIFIC EVENT DESCRIPTION:

The operators were attempting to place the off-gas recombiner in service. The system had been previously warmed up and all that was necessary was to open the gas inlet and outlet valves. Two or three attempts were made to open the valve but the system tripped on each attempt. This is not unusual because if the temperature out of the recombiner does not reach a certain level after starting the system, it trips. While making the final attempt, the following events occurred:

1. The off-gas filter high differential pressure alarm actuated.

2. The off-gas sample Hi/Lo flow alarm actuated.

3. The high off-gas radiation alarm actuated.

4. The stack radiation levels decreased.

IMMEDIATE CORRECTIVE ACTION:

The Shift Supervisor immediately ordered the recombiner removed from service. A "SNAP" test was completed and the results indicated zero hydrogen. The lack of hydrogen indicated the hydrogen was being consumed by combustion within the piping. The "SNAP" test generates a spark inside a small vial of off-gas to determine if hydrogen is present.

The Shift Supervisor then ordered power reduced to aproximately forty percent and shut the first stage air ejector suction valves in accordance with an approved plant procedure. The indications previously discussed returned to normal so the Shift Supervisor had another "SNAP" test accomplished. The results from this test indicated hydrogen was present, proving the combustion was extinguished.

LONG TERM CORRECTIVE ACTION:

The piping was visually inspected and no damage was found.

The incident was investigated and the probable cause was an improper valve lineup which allowed more gas to the recombiner than the dilution flow rate could support. The catalyst over heated and ignited the gas. The flame traveled back to the after condenser and continued to burn there until the fuel was removed.

The corrective action was to discuss the incident with the Shift Supervisor and training will be accomplished on this incident during the annual training cycle. Incorporated in the training will be this report and several General Electric Service Information Letters (SILs) that explain why the valve lineup is so critical on this system.