

PPR

**NSP**

NORTHERN STATES POWER COMPANY

Minneapolis, Minnesota 55401

April 4, 1975

Mr. A. Giambusso, Director  
Division of Reactor Licensing  
U S Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Giambusso:

MONTICELLO NUCLEAR GENERATING PLANT  
Docket No. 50-263 License No. DPR-22

Follow-Up Report - Modified Off-Gas System Ignitions

While conducting tests of the Modified Off-Gas System, hydrogen ignitions occurred on May 20, 1974 and June 10, 1974 which resulted in rupture of both air ejector discharge line rupture discs and a release of off-gas from the reactor building vent. These Abnormal Occurrences were reported by letters from Mr. L. O. Mayer to Mr. J. F. O'Leary, on May 29, 1974 and June 20, 1974.

This letter is intended to inform you of the results of subsequent testing and corrective actions taken to prevent recurrence of off-gas hydrogen ignitions.

Prior to resumption of Modified Off-Gas System testing in July, 1974, special monitoring instrumentation was installed between the air ejectors and the recombiner train eductors. The instrumentation included fast response pressure transducers, off-gas flow control valve position, fast response strain gauges and thermocouples. In addition, the air ejector rupture discs were blank flanged to preclude the inadvertent release of activity if another detonation occurred.

Shortly after reaching 25% power on July 8, 1974, a third off-gas hydrogen ignition occurred and the off-gas system automatically isolated due to high pressure. The plant was immediately shutdown, the off-gas holdup system was returned to the original design configuration and the plant was returned to operation. Since no physical damage or radioactivity releases resulted from the ignition, the event was determined not to represent an Abnormal Occurrence. An analysis of data received from the special test instrumentation disclosed that the hydrogen ignition originated in the Train B inlet piping near the off-gas flow control valve. The detonation wave traveled to Train A, causing the bypass valve to open slightly, and through the piping to the air ejector discharge. The shock wave traveled at 7,000 to 10,000 feet per second with

3773

9211230440 750404  
PDR ADOCK 05000263  
S PDR

instantaneous pressures as high as 200-300 psi existing for 1 to 2 seconds and then readjusting to + 3 psi of the initial pressure within 5 to 6 seconds. The air ejector suction Isolation valves were automatically tripped closed approximately three seconds following the detonation. Analysis of temperature data disclosed that limited recombination had been occurring in the off-gas 24" diameter holdup pipe and in the vicinity of the inlet flow control and bypass valves of both recombiner trains. This recombination action had been most significant in the vicinity of the B train inlet flow control valve.

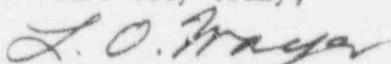
Material samples from the off-gas piping and valves were analyzed for the presence of catalyst using neutron activation and differential scanning calorimetry. Both techniques gave positive indication. Further investigation revealed the presence of catalyst pellets in both recombiner vessels below the retention screen, in both preheaters, in the A train pressure control valve and in two capped low point drains. It is postulated that the catalyst pellets were transported from recombiner "A" during a system flush and from both recombiners during system operating transients.

An extensive mechanical and chemical cleaning program was developed to remove all traces of catalytic material from the off-gas piping and valves. The program involved excavating below the recombiner building, cutting sections of the 6" inlet return piping from the 24" delay pipe, and removing one end of the 24" delay pipe. These lines were cleaned using a 10,000 psi hydro laser, dry and wet sand blasting and a final chemical cleaning using a solution of phosphoric acid. The off-gas piping inside the recombiner building was cut into sections and cleaned using a 10,000 psi hydro laser and a final chemical cleaning using a phosphoric acid solution. The bonnets and internals of control and isolation valves were removed and hand cleaned. After completion of all cleaning and flushing operations, material removed from off gas system pipes and valves, when tested for the presence of catalyst using the differential scanning calorimetry technique, exhibited a response less than or equal to the response received from material removed from the control (un-contaminated) piping. This was considered as positive evidence that all catalyst had been removed.

To prevent recurrence of catalyst contamination of the off-gas piping, both recombiners were unloaded and the catalyst retention screens were modified to prevent pellets from leaving the recombiner. Additionally, a second screen was installed at the recombiner inlet nozzle.

No further ignitions have occurred and off-gas inlet piping temperatures have remained at normal levels during operational testing conducted following completion of the cleanup and recombiner modifications.

Yours very truly,



L. O. Mayer, PE  
Manager of Nuclear Support Services

LOM/mmm

cc: J G Keppler  
G Charnoff  
Minnesota Pollution Control Agency  
Attn: E A Pryzina