

Jersey Central Power & Light Company



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MEMBER OF THE
General  Public Utilities Corporation

March 22, 1978

Mr. Boyce H. Grier, Director
Office of Inspection and Enforcement
United States Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Grier:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
IE Bulletin No. 78-03

The purpose of this letter is to respond to the directives set forth in IE Bulletin No. 78-03 which is concerned with potential detonable gas mixture accumulations associated with BWR offgas system operations. The Oyster Creek Offgas System is comprised of piping and components which are part of the plant's original construction along with piping and components installed recently as part of the Augmented Offgas (AOG) System. Originally, offgas release via the plant stack was delayed by the use of a holdup pipe which provides for a holdup time of approximately one hour. With the installation of the AOG System, the delay time can be substantially increased prior to release through the plant stack. The AOG System is an air dilution, recombination, charcoal absorption system designed to provide a minimum holdup time of 20 days for Xenon and 26 hours for Krypton.

The Oyster Creek entire offgas system was reviewed in accordance with the action items listed in Bulletin No. 78-03. Our response to each action item is given below:

Item No. 1 - Operations and maintenance procedures have been reviewed and are considered to be satisfactory with regard to the operation of the system in accordance with the design parameters used in the construction of the system. Inadvertent actions (such as arc strikes) which might cause ignition of the mixture of gases contained in the offgas piping are prevented by the prerequisites, precautions and limitations, and specific operator actions incorporated into the present procedures.

New procedures being drafted for use associated with the offgas systems will continue to contain the necessary steps to prevent any inadvertent actions which would ignite the gases contained in the offgas piping.

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VERMONT YANKEE NUCLEAR POWER CORPORATION

SEVENTY SEVEN GROVE STREET

RUTLAND, VERMONT 05701

April 14, 1978

REPLY TO:

ENGINEERING OFFICE

TURNPIKE ROAD

WESTBORO, MASSACHUSETTS 01581

TELEPHONE 617-366-5011

WVY 78-37

United States Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Attention: Office of Inspection and Enforcement
Boyce H. Grier, Director

Reference: (a) License No. DPR-28 (Docket No. 50-271)
(b) Letter USNRC to VYNPC dated February 10, 1978.
(c) IE Bulletin 78-03 dated February 8, 1978.
(d) Letter VYNPC to USAEC dated June 16, 1972;
Proposed Change No. 1.
(e) Letter VYNPC to USAEC dated July 25, 1972;
Proposed Change No. 1, Supplement 1.
(f) Letter VYNPC to USAEC dated July 26, 1973;
Proposed Change No. 1, Supplement 2.
(g) Letter USAEC to VYNPC dated August 29, 1973.
(h) Telephone conversation R. H. Groce, YAEC, to
E. McCabe, USNRC, March 27, 1978.

Dear Sir:

Subject: Potential Explosive Gas Mixture Accumulations Associated
with BWR Off-gas System Operations

References (b) and (c) required that Vermont Yankee Nuclear Power Corporation verify the adequacy of the current operational and procedural practices associated with the Advanced Off-Gas (AOG) System and, if necessary, describe actions that can be taken to mitigate the potential for future hydrogen detonations.

Our responses to the items listed in Reference (c) are as follows:

Item 1.

Review the operations and maintenance procedures related to the off-gas system to assure proper operation in accordance with all design parameters. Include in this review measures you have taken or will take to prevent inadvertent actions (such as arc strikes) which might cause ignition of the mixture of gases contained in the off-gas piping.

Response 1.

A review of Vermont Yankee procedures has been conducted and it has been determined that operation is within the parameters of the Advanced Off-Gas (AOG) System design.

The original off-gas system at Vermont Yankee is no longer in use. In 1972, a modification to the originally installed off-gas system was made operable. References (d), (e), (f), and (g) provide information related to that modification.

To prevent inadvertent actions which might cause ignition of mixtures of gases, Plant Fire Protection Procedure A.P. 0042 restricts Hot Work (welding, grinding, heating of base metals, etc.) in permanent or temporary Fire Control Areas, including the entire AOG building. Vermont Yankee will revise this procedure to include the Steam Jet Air Ejector (SJAE) Room, and any other area where temporary openings in the off-gas piping are made, as temporary Fire Control Areas.

It should be pointed out that the possibility of a hydrogen explosion in the AOG system is considered extremely unlikely because the steam dilution provided in the second stage air ejectors and the control and instrumentation systems are designed to prevent an explosive mixture of hydrogen from propagating beyond the air ejector stages, i.e., an explosive mixture of hydrogen should never exist in the recombiner subsystem, "30 minute" delay pipe, condenser/dryer, or charcoal adsorber beds. During shutdown, steam or air purge is utilized to force the residual off-gas steam mixture containing hydrogen through the preheater and recombiner to prevent an explosive mixture from occurring in the recombiner/preheaters and upstream lines. Start-up procedures insure that sufficient steam is introduced upstream of the preheater to dilute any hydrogen entering the AOG system as the air ejector line is made ready for operation. Also, the recombiner subsystem is purged with steam to remove any remote explosive mixture before it is brought on the line. Instrumentation would detect an explosive mixture and prevent inadvertent unsafe operation.

Hydrogen control is accomplished by providing fully redundant hydrogen analyzers on the outlet from the recombiner system. These analyzers initiate recombiner system shutdown and switchover if the hydrogen concentration at the system outlet exceeds 2% by volume. Two hydrogen analyzers are used on each train to assure sufficient redundancy and the systems are periodically tested to confirm continued operability. During an automatic shutdown, two main process valves close to isolate the recombiner system. Alarms associated with low recombiner mass flow warn of impending lack of dilution steam in the fluid stream from the SJAE's to the recombiners. Additionally, the

recombiner bed temperatures provide insight into recombiner performance to insure that flammable hydrogen mixtures do not get beyond the recombiner. Typically, the recombiners reduce the amount of hydrogen present to less than 0.1% by volume in any downstream gas flow.

Item 2.

Review the adequacy of the ventilation of spaces and areas through which off-gas system piping containing explosive mixtures of gases pass. The review should consider ventilation losses and off-normal off-gas system operation, such as lack of dilution steam, lost loop seals, blown rupture disks, bypassing recombiners, and leakage of off-gas into isolated portions of systems.

Response 2.

Redundant ventilation systems are provided for the AOG building and Turbine building essentially eliminating the possibility of a loss of ventilation in these areas.

System operation following off-normal conditions such as lack of dilution steam, or a blown rupture disc is not allowed by procedural control. Bypassing the recombiners is not possible with the current system configuration.

The only loop seal in the AOG System prior to the recombiners is the intercondenser loop seal which is self-filling and drains back to the main condenser. The other loop seals on the AOG piping are not exposed to hydrogen gases in excess of 0.1% and pose no threat to explosions even if they were blown due to transient conditions.

Leakages into unused portions of the old off-gas system have occurred at Vermont Yankee and consequently became the subject of a comprehensive engineering evaluation. As a result, several system changes have been implemented to prevent possibility of future leaking.

Item 3.

For those spaces and areas identified, describe what action you have taken or plan to take to assure that explosive mixtures cannot accumulate, that monitoring equipment will warn of such an accumulation, and that disposal of such mixtures will be controlled without resulting in a damaging explosion.

Response 3.

See our response to Item No. 1.

Item 4.

Loop seals are potential off-gas leakage paths following a pressure transient in the off-gas system piping. Describe your design features to minimize and detect the loss of liquid from loop seals and describe operating procedures which assure prompt detection and reseal of the blown loop seals.

Response 4.

As discussed in our responses to Items 1 and 2, loop seals downstream of the recombiners pose no problem due to possible explosive concentrations of gas. The loop seals on the mechanical vacuum pump line to the stack also do not present a problem since the mechanical vacuum pump is operated only in shutdown, refuel or startup modes when hydrogen generation is not a problem. Present operating procedures require that loop seals be refilled on a monthly basis.

Should loop seals in the Radwaste Building deteriorate in spite of the monthly inspections, a Radiation Monitor would alarm to alert Control Room personnel of off-normal conditions. The remaining loop seals at the stack base will be isolated following a modification planned for the 1978 refueling outage.

Item 5.

Review operating and emergency procedures to assure that your operating staff has adequate guidance to respond properly to off-gas system explosions.

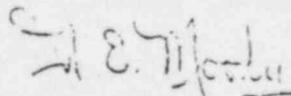
Response 5.

We have reviewed our operating and emergency procedures and conclude that our operating staff has adequate guidance to respond properly to off-gas system explosions.

We trust you will find this information satisfactory; however, should you desire additional information, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION



D. E. Moody
Manager of Operations