DUQUESNE LIGHT COMPANY

Beaver Valley Power Station

Docket No. 50-334, License No. DPR-66

REPORT OF FACILITY CHANGES, TESTS AND EXPERIMENTS FOR 1982

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Report of Facility Changes, Tests and Experiments

The following is a compilation of facility changes, tests and experiments completed during the year 1982 at Beaver Valley Power Station Unit 1. The actual period covered is from 1/1/82 to 1/22/83, in order to make this report consistent with the annual FSAR update. This report is provided in accordance with the Code of Federal Regulations, Title 10; Paragraph 50.59, "Changes, Tests and Experiments". Several of these changes were previously reported to the NRC, as they involved Technical Specification changes. The safety evalutions for these changes, tests and experiments determined that there were no unreviewed safety questions.

Design Change No. 132, REPLACEMENT OF SAFETY INJECTION ACCUMULATOR LEVEL TRANSMITTERS

This design change replaced the existing transmitter electronics at the detector of the existing Safety Injection System Accumulator level transmitters with a more reliable, accurate and stable model. Also, the design change moved the physical location of the transmitter power supply to the primary process racks. The hydro-mechanical portion of the level transmitters was not affected; therefore, the pressure boundaries of the accumulator will not be altered.

The functions of the level transmitters are system pressure boundary and level indication. The system pressure boundary function is safety related, but this function is not affected. The system level indication function will be improved by the changeout of the detector electronics. The accumulator level instrumentation, which is non-safety related, is not necessary for mitigation of an accident. The seismic analysis of the level instrumentation and related components are unaffected since the new transmitters are considerably lighter than the old units.

The safety evaluation stated that the probability of an occurrence or the consequence of an accident or malfunction of safety related equipment important to safety as previously evaluated in the FSAR will not be increased because the level indicating function of the transmitters will not be degraded. Also, it was stated that the possibility for an accident or malfunction of a different type than any previously evaluated in the FSAR is not created. The safety related function, i.e. system pressure boundary, of the safety injection accumulators is not affected. Also, it was determined that the margin of safety defined in the basis of the applicable Technical Specification would not be reduced.

Design Change No. 180, Diesel Generator Loading Sequence Control Circuits

The objective of this task was to add two emergency Motor Control Centers and modify the load sequence circuitry of #1 and #2 Emergency diesel generators such that there will be no loss of generator capabilities when the following conditions exist simultaneously: either #1 or #4 inverter is out of service or bypassed, and offsite power is lost. Previously the possibility existed that under the above conditions, the load sequence control circuit would deenergize and therefore fail to sequence loads on to its associated diesel generator.

The safety analysis for this DCP stated that there would be no increase in the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR. The previous design would not in itself create an accident. It would however, in the right circumstances increase the chances of a malfunction of the sequencer. The new design precludes this possibility.

The possibility for an accident or malfunction of a different type than any previously evaluated in the FSAR has not been created. The new system is designed as QA Category I, Seismic and Electrical Class 1E and will function more reliably than the original sequencing system. The new Motor Control Centers will provide power directly from the diesel generator transformers to the sequencer transformers when the inverters are out of service. The breakers have no undervoltage protection, so that in the event of a loss of offsite power, the MCC will be powered again as soon as the diesel picks up load.

It was also determined that the margin of safety as defined in the basis for Tech. Spec. 3/4.8.1 (AC Sources) will not be reduced.

Design Change No. 194, Oil Collection System for Reactor Coolant Pumps

The purpose of DCP-194 was to install an oil spillage collection system for all three Reactor Coolant Pumps. This was accomplished by installing sheet metal splash guards, catch basins and enclosures around each RCP motor area, and installing piping which drains oil to collection tanks in the containment basement. This design change was installed to comply with NRC requirements for RCP oil spill protection contained in 10CFR 50, Appendix R.

The oil spill collection system is seismically designed to preclude it from becoming a missile and damaging the RCP or other safety related

equipment during a seismic event. This system enhances the safety of the plant by significantly reducing or eliminating the potential for a fire resulting from a RCP lube oil spill. This design change does not reduce the margin of safety as defined in any related Technical Specifications - 3/4.7.14 Fire Suppression Systems and 3/4.7.15 Penetration Fire Barriers. This design change does not impact the Safety Analysis; Section 14, of the FSAR.

Design Change No. 204, Replace Vital Bus UPS System and Add Voltage Regulators

The purpose of this DCP was threefold:

1. Reduce noise on the #3 and #4 station control batteries by replacing the #3 and #4 rectifier-inverters with new low noise units.

2. Reduce voltage fluctuations on the 120V ac alternate source for the vital buses by replacing the existing 480/120V ac transformers with voltage regulators.

3. Improve the reliability of the vital bus power supply by increasing the diversity of the supply, i.e., by replacing two existing units with new units from a different manufacturer.

The safety evaluation stated that since the new equipment performs the same functions as the existing equipment and equals or exceeds the specifications of the existing equipment, the probability or consequences of an accident will not be increased.

Also, by increasing the diversity of supply, i.e., having two of the rectifier-inverter units supplied by one manufacturer and two supplied by a different manufacturer, it is expected that the probability of common defects or failures affecting all of the rectifier-inverters will be reduced.

It was determined that no new type of accident would be created by these changes.

Also for the above reasons, it was determined that the margin of safety in the basis for Tech Spec 3/4.8 would not be reduced.

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Design Change No. 210, Installation of an Emergency Air Lock in Containment

This design change installed a second personnel air lock intended to provide an alternate means of entrance and egress from the Reactor Containment. It is intended to be used whenever the primary (existing) personnel air lock is non-functional, or during an emergency when its location would provide for more rapid exit of personnel.

To assure availability, the Auxiliary Air Lock is manually operated. Electrical power is provided for lighting, communications, remote door indication, D/P interlocks and security alarms.

The Auxiliary Air Lock is designed as an integral part of the existing Reactor Containment pressure boundary (liner), and as such is an "N" stamped penetration meeting the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Class MC. The Auxiliary Air Lock is installed in, and passes thru, the existing Equipment Hatch. To preserve the use of the Equipment Hatch, the Auxiliary Air Lock is detachable. This necessitated a flanged connection between the Auxiliary Air Lock and the Equipment Hatch, and a cart and railway to transport the Air Lock's barrel, when removed, outward to the Equipment Hatch access platform. To accommodate the Auxiliary Air Lock barrel's length while in place, the Equipment Hatch missile shield and its structural steel support were also modified.

Work on the EAL is not completely finished, so it is not considered operable at this time. The doors are administratively locked to prevent use of the airlock. The equalizing valves were removed and the penetrations capped.

The Safety Evaluation was performed based on the fact that even though the EAL is not operational, it still performs a containment integrity function while installed in the Equipment Hatch.

The probability of an occurrence or the consequence of an accident or malfunction of equipment important to safety as previously evaluated in the FSAR is not increased by this interim arrangement. The EAL was designed to meet the temperatures and pressures in containment during both normal operating and accident conditions. In addition, it is seismically designed. The containment integrity is not jeopardized by the installed (though out of service) air lock. In addition, the EAL was part of the pressure boundary for the Type "A" Leak Test that was successfully performed in May of 1982.

The Safety Evaluation also stated that there was no possibility for an accident or malfunction of a different type than any previously evaluated in the FSAR. Sections 2.5, 5.1, 5.2, 5.3 and all the accident analyses in Section 14 were reviewed. All of the possible modes of failure of the EAL were bounded by existing evaluations in the FSAR.

For the above reasons the margin of safety in the basis for Tech Specs 3/4.6.1 and 3/4.6.3 is not reduced.

Before the EAL becomes fully operational, a separate safety evaluation will be performed to include all operational aspects of plant and personnel safety.

Design Change No. 243, Main Steam Pipe Chase Deluge System

The purpose of the modification for the main steam pipe chase deluge system is to improve fire protection at BVPS, Unit 1. This change added a deluge system in the main steam pipe chase to minimize the chimney effect that the pipe chase may have should a fire occur in the vicinity.

The safety evaluation stated that the probability of an occurence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR will not be increased. Stone & Webster was asked to evaluate the affect of a deluge valve actuation onto the insulated main steam lines during operation. They concluded that thermal stresses would not be significant. Thus it was concluded that a Main Steam Line Break (FSAR 14.2.5) was no more likely to occur as a result of this modification . It was further stated that the possibility for an accident or malfunction of a different type than any previously evaluated in the FSAR was not created. The FSAR accident analysis specifically does not address fire protection system accidents. However, the fire protection system is designed such that a failure in the system will not jeopardize the capability to achieve and maintain a safe shutdown condition. Furthermore, even though the fire protection system is regarded as a moderate-energy system, loss of fluid from this portion of the system, in an uncontrolled manner, will not impact operation of safety related equipment.

The Tech Spec basis for the fire protection system (3/4.7.14) is not affected by this change. There is no safety related equipment in the vicinity of this deluge system.

Design Change No. 268, Fire Protection System Improvements

This modification involved extensive changes to the fire protection system as required by Amendment 18 to the Operating License, and by 10CFR 50 Appendix R. The details of these changes have been submitted to the NRC in previous correspondence.

The safety evaluation for this DCP stated that the probability of an occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the FSAR would not be increased. The new equipment installed and the modified existing equipment will not adversely affect adjacent safety related equipment. These changes are intended to help mitigate the consequences of an accident by providing fire protection capabilities in safety related areas of the plant. It was also determined that the possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR was not created. Failure of these fire systems by themselves will not create an accident. The chance for inadvertant actuation in critical areas is minimized by the installation of preaction systems. This will protect safety related equipment from being unnecessarily degraded by fire protection system actuation.

The margin of safety as defined in the basis for any Tech Spec will not be reduced. These modifications were made in conformance with fire protection system changes mandated by the NRC.

Design Change No. 290, Improve Regulation of the 480V Emergency Busses

This design change replaced the existing System Station Service transformers 1A and 1B with similar transformers that have automatic load tap changing capability (TCUL) on each low voltage winding. The TCUL transformers will maintain the 4160V busses at the necessary levels to accommodate the drops encountered thru the present 4160/ 480V transformers feeding the 480V emergency equipment. The improvement of the 480V bus voltage will reflect down to the lower voltage systems.

With the tap range selected for the TCUL transformers, the minimum and maximum credible system voltages can be accomodated so that proper voltage will be maintained on the low voltage busses for normal and accident conditions.

The Safety Evaluation stated that the probability of an accident or malfunction of equipment due to separation of safety related equipment from offsite power is reduced since the new transformers will more reliably maintain the 480V emergency bus voltages above 90%. This is accomplished by maintaining the 4160V busses at a sufficient level.

The possibility of an accident or malfunction of a different type than the loss of AC analysed in section 14.1.11 of the FSAR is not created.

The margin of safety described in section 3/4.8 of the Tech. Specs. will not be reduced since the modification adds to the assurance that

sufficient power will be available to supply safety related equipment during both normal operation and accident conditions.

Design Change No. 294, Containment Hydrogen Monitoring System

This DCP provides the control room operator with a positive continuous indication of containment atmosphere hydrogen concentration (0-10% range) as required by NUREG-0737-II.F.1.6 (hydrogen concentration). The modification installed new redundant hydrogen monitors which are capable of taking samples from the containment atmosphere and the pressurizer cubicle. The sampling lines tap off the existing containment vacuum pump suction lines, which extend to the high point inside containment. Also, samples lines are located high within the pressurizer cubicle. The analyzer units are closed systems and all sample gas will be discharged back to containment.

The hydrogen analyzer units are located in the cable vault areas (Train "A" in the west cable vault and Train "B" in the east cable vault). The analyzer control panels are located in the switchgear area.

New containment penetrations (numbers 95 and 109) were installed to accommodate this DCP. All penetrations are isolated by solenoid operated valves (SOV's) and are normally closed until such time that the system is required. These valves fail in the closed position, are not actuated by a CIA or CIB signal and are controlled from the vertical board section - A. Also, located on the control board are panel meters (% hydrogen for both trains) and a pen recorder (Train "A").

The components and supports were designed and qualified to assure seismic adequacy. The electrical and control equipment located in harsh environments have been specified to meet the requirements of IEEE-323-1974 and IEEE-344-1975.

The Safety Evaluation stated that because of the above design considerations, it was determined that the probability of an occurrence or the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the FSAR will not be increased. Also, the possibility of an accident or malfunction of a different type than previously evaluated in the FSAR will not be created, and the margin of safety as defined in the tech. specs. is not reduced.

Design Change No. 295, Reactor Coolant Gas Vent System (RCGVS)

The purpose of this design change is to provide the capability to vent non-condensible gas from the reactor vessel and pressurizer into containment during post accident conditions. This design change is an NRC commitment, originally to comply with NUREG-0578. The NRC requirements for the RCGVS are now contained in NUREG-0737.

The RCGVS has been installed so that gas from either the reactor vessel head or from the pressurizer can be vented through stainless steel piping either directly to containment or to the Pressurizer Relief Tank. A section of the vent piping from the reactor vessel head is flanged to allow removal of piping that could interfere with refueling. The system is operated from the control room. During normal plant operation the system will be isolated.

The safety evaluation stated that since this design change was installed to allow venting of the RCS which is expected to substantially increase the plant's ability to remove large quantities of non-condensible gas which could interfere with core cooling, this change could significantly reduce the consequences of an accident. The RCGVS is not required or designed to operate during normal power operation. It was designed for use in emergency situations and can be used during cold shutdown conditions. To preclude inadvertant operation of the system the solenoid valves are normally key locked shut and de-energized. Should inadvertant operation occur, 7/32" diameter flow limiting orifice is provided in each flow path to limit coolant loss from the RCS to less than the make-up capacity of a single charging pump. A pressure transmitter is installed in the system downstream of the isolation valves and provides pressure indication and a high pressure alarm in the control room to alert the operator to leakage into the system from the RCS during normal plant operation.

Administrative controls will be employed to prevent the opening of more than one vent flow path at a time. The Station intends to replace the administrative controls with electrical interlocks as soon as safety related auxiliary relays can be procured and installed.

The design takes into account LOCA considerations and no other type of accident or malfunction not previously evaluated is considered possible.

The Tech. Spec. bases were reviewed and it was determined that since the ability to safely operate the plant during normal operating conditions will not be degraded, and the ability to mitigate the consequences of an accident has been improved, the margin of safety is not reduced. It should be noted that until NRC approval of operating procedures is obtained, this system may only be used in Modes 5 and 6.

Design Change No. 303, Increase Range of Radiation Monitoring System

The purpose of this DCP was to provide improved radiation monitoring capabilities to comply with NUREG's 578, 660 and 737. New radiation monitors were installed for the following lines: ventilation exhaust, elevated release, process vent, Main Steam PORV & Safety Valve piping, and Auxiliary Feed Pump Turbine exhaust piping. Area radiation monitors were also installed in containment.

The Safety Evaluation determined that there would be no increase in the probability of an occurrence or consequence of an accident or malfunction for the following reasons:

All of the Radiation Monitors provided are new monitors which will provide additional extended range radiation information not previously provided. Existing Radiation Monitors RM-VS-101 A and B "Ventilation Exhaust Monitors", RM-VS-107 A and B "Elevated Release Monitors", and RM-GW-108 A and B "Process Vent Monitors" will be unaffected by this design change and will continue to provide automatic actions to mitigate the consequences of an accident (Reference: FSAR Section 9.13, 11.3.3 and 14.2.1). The PORV and MSSV Monitors, Auxiliary Feed Water Pump Turbine Exhaust Monitor, and Containment Area Monitors are all totally new monitors. These monitors will provide information on the concentration and dispersion of radioactivity enabling Station personnel to evaluate the severity and the consequences of an accident.

The probability of an occurrence or the consequence of an accident or malfunction of equipment important to safety as previously evaluated in the Final Safety Analysis Report is not increased because appropriate safety and seismic class boundaries were selected so as not to degrade existing safety related and seismic systems and equipment with the new non-safety and non-seismic equipment. For the same reasons, the margin of safety is not reduced.

Design Change No. 304, Installation of Low-Low Level Alarm on Demineralized Water Storage Tank WT-TK-10

This DCP was a response to an NRC requirement that a low level alarm be provided to give at least 20 minutes for operator action. The hi level alarms for WT-TK-10 were converted to low-low level alarms and set for approximately 4 feet.

The Safety Evaluation stated that the probability or consequences of an accident previously evaluated in the FSAR will not be increased due to the new alarm point providing additional operator awareness. The only accident that could result from the deletion of the high level alarm is the overflow of WT-TK-10 which would represent only the loss of

high quality demineralized water to the area drain system. Overfilling WT-TK-10 will not introduce the possibility of a different accident which has not been evaluated in the FSAR. The design of the tank, which is a seismic Category I water source, would be able to withstand any tank head to the overflow condition which would be above the high level alarm point. Hence, the probability or the consequences of a malfunction of safety related equipment will not be increased. The required quantity of water in WT-TK-10 is not changed thus the margin of safety is not reduced.

Design Change No. 320, Post Accident Sampling System

The Post Accident Sampling System (PASS) will provide improved post accident sampling capabilities which meet the requirements of NUREG 0737, Item 11.B.3. The PASS will enable plant personnel to monitor and collect samples of reactor coolant from the hot legs, the containment atmosphere from the Containment Vacuum and Leakage System and water from the containment sump. In-line boron, chloride, oxygen, hydrogen, pH and conductivity instrumentation will also be provided. The boron and chloride analyzers were not available prior to start-up after the second refueling. As an interim solution the boron can be analyzed by Chemistry in their hot lab. Post accident chloride analysis is available at Bettis Atomic Labs. The boron and chloride analyzers were installed during plant operation but are not yet fully operational. The microprocessors that control containment isolation valve operation are not installed yet.

The safety evaluation stated that the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR will not be increased because:

The PASS was designed to prevent an inadvertent radioactivity release to the environment. When the microprocessors are installed the safety-related rad monitors and microprocessors will automatically close containment isolation valves in the event of airborne activity within the sample box. Until then, no samples can be taken with a CIA signal present. The PASS operator will be able to remotely close the containment isolation valves in the event of a high reading on the Dual Counter Timer. The sample box is shielded for personnel safety and maintained at negative pressure for contamination control.

The existing river water radiation monitors RM-RW-100 and 101 will monitor the river water discharge from the new heat exchanger that is used to cool the samples.

It was further stated that the possibility for an accident or malfunction of a different type than any previously evaluated in the

FSAR is not created. The PASS sample lines branch off the existing sample lines outside containment. The new containment isolation valves installed in the existing sample lines are qualified for use in the environment following a DBA. As discussed before, there should be no inadvertant radioactivity release to the environment due to PASS operation.

The margin of safety as defined in the basis to any Technical Specifications (Sections 3/4.3.3.8 Accident Monitoring Instrumentation, 3/4.6.3 Containment Isolation Valves) will not be reduced.

Design Change No. 322, Miscellaneous Air Lock Modifications

This DCP was performed to increase the reliability and operability of the personnel airlock. The most significant work performed was:

1. The existing 18" emergency scuttles were replaced with easier to operate scuttles with handwheels and gear mechanisms.

2. The containment side door swing was increased by relocating the power pack on the north side of the airlock.

3. A key interlock was provided on the control panel to allow the interlock to be overridden. The key is controlled by operations and will only be used to open both doors in Mode 5.

4. The solenoid motor, limit switches, wiring and hydraulics associated with remote door swing mechanism were removed. The door is now hydraulically unlocked and manually swings open.

5. Manual equalizing capability was provided by adding an in series ball valve-globe valve arrangement on the inside and outside of both doors. The globe valves were throttled to get the optimum equalizing time, and the ball valves only are to be used subsequently.

6. The differential pressure monitoring was improved by adding differential pressure (vacuum/pressure) gages on both doors.

7. The solenoid equalizing valves have been removed and the holes plugged.

The safety evaluation was summarized as follows:

The personnel air lock, as part of the containment boundary described in Section 5 of the FSAR, is designed to limit doses at the site boundary and beyond to less than the 10CFR 100 criteria under conditions resulting from a Design Basis Accident. The modifications made as part of this

Design Change were designed and installed such that the reliability of the airlock to maintain containment integrity was not reduced.

Section 14 of the FSAR was reviewed and it was determined that this DCP will not increase the probability or consequences of any accident previously evaluated. Nor will it create the possibility of an accident different from any already evaluated.

Section 5 of the FSAR, was reviewed and it was determined that this DCP will not decrease the effectiveness of the airlock to perform as part of the containment boundary. Furthermore, the ability to perform leak tests on the airlock door was not impaired by this DCP. Thus, the margin of safety as defined in the basis to Technical Specification 3/4. 6.1, 3/4.6.2 and 3/4.6.3 was not reduced.

Design Change No. 324, MODIFY LHSI PUMP DISCHARGE HEADER RELIEF VALVES

The purpose of this modification was to increase the setpoints of relief valves RV-SI-845A, B, C from 220 psig to 235 psig. These valves are located on the Low Head Safety Injection (LHSI) Pump Discharge Header (10"-SI-16-153W-Q2 and 10"-SI-26-153W-Q2). New springs and associated hardware were obtained from the original vendor. The modification, recalibration and testing was conducted at an approved facility in accordance with ASME VIII code requirements. New nameplates were installed per ASME code requirements.

This design change was required, because during periodic testing in the recirculation mode, the relief valves were lifting. This was a result of pressure surges which exceeded the relief valve pressure set-point. Blowdown has been maintained at 10% of set pressure, thereby raising the reset pressure to 211.5 psig.

Any reactor coolant leakage past check valves and the motor operated valves, however unlikely, will still be relieved to floor drains by operation of these relief valves just the same as before this design change. The increased relief valve settings are still within the limitations of the safety injection system pump and piping. Table 6.3-8 of the BVPS-Unit #1 FSAR will be revised to show the new setpoint.

As a result of the above discussions, the safety evaluation for this DCP stated that the probability of an occurrence or the consequence of an accident or malfunction of safety related equipment previously evaluated in the FSAR would not be increased. In addition, the possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR was not created. For the same reasons, it was determined that the margin of safety defined in the basis for any Technical Specification would not be reduced.

Design Change No. 328, ADD 30 CARBON ADSORBERS TO EACH MAIN FILTER BANK

This design change added 30 additional carbon adsorbers (60 total) to each main filter bank. The modification will decrease individual filter flow rate from 600 cfm to 400 cfm while maintaining total flow at 36,000 cfm. The reduced flow rate will increase the residence time in the carbon adsorber units. This, along with the extra volume of carbon in the 60 additional cells will increase the useful life of the filter banks.

The seismic integrity of the filter bank housings, support members and associated components is unaffected since the original Beaver Valley Main Filter Seismic Analysis Report was calculated on full load capacity (total for both banks - 180 cells).

The safety evaluation for this DCP stated that the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR would not be increased. In addition, the possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR was not created.

The margin of safety as defined in the basis to Technical Specification (Section 3/4.7.8) will not be reduced. Actually, the margin of safety would be increased since the residence time in the filter bank is increased due to the lower air flow velocity.

Design Change No. 333, REACTOR VESSEL LEVEL INDICATION SYSTEM (RVLIS)

The design objective of this task is to provide the operator with additional instrumentation for detection of inadequate core cooling as required by NUREG 0737 Section II.F.2.

The design approach is to provide a redundant means to monitor reactor vessel water level using two sets (three transmitters per set) of level transmitters. These transmitters will measure the pressure drop from the bottom of the reactor vessel to the top of the vessel and from the vessel hotleg outlet to the top of the vessel. The transmitters will be of differing ranges to cover the various core conditions with and without pump operation.

Impulse and reference leg tubing will pass through the containment to level transmitters located outside of the containment building.

The capillary tubing will be hydraulically isolated from the reactor coolant system. Temperature sensors will be used to sense reference leg and impulse line temperature.

A microprocessor for each train will receive signals from the level transmitters, a temperature sensor, reactor coolant system, and reactor coolant pump to calculate the reactor vessel water level, and display the level in the control room.

Only a portion of this system was completed in 1982. The rest is scheduled for completion during the third refueling outage in 1983. The following connections were made to the Reactor Coolant System: head vent, A & B hot legs (RTD piping), and the seal table. These lines are presently capped, awaiting completion of the design change.

New containment penetrations 95 and 109 are shared by DCP 294 and DCP 333. Those portions of the penetrations included under DCP 333 have been isolated. Inside containment, the tubing at the penetration has been capped (first barrier). Outside containment in the Safeguards Area, the tubing has been installed to the first hydraulic isolator (second barrier). The installed tubing to the isolators in the Safeguards Area is adequately supported and protected.

The safety review noted that the RCS and containment pressure boundaries have not been compromised as a result of this interim arrangement RCS connections have been hydrotested and/or inservice leak tested. The new containment penetrations were part of the type A leak test that was performed successfully. For these reasons, it was concluded that the probability of an occurrence or the consequence of an accident or malfunction of equipment important to safety as previously evaluated in the Final Safety Analysis Report is not increased. These changes will not create accidents or malfunctions not already analyzed in the FSAR. It was also concluded that the margin of safety defined in the basis for RCS and containment integrity Technical Specifications is not reduced by this interim arrangement.

Design Change No. 337, DIESEL GENERATOR LOAD SEQUENCE TIMERS

The objectives for this design change was to improve the accuracy of the sequence timers and to provide isolation switches for the timers for ease of testing.

The previous timers had failed tech. spec. required tests on several occasions. New ATC 324C series timers were installed, with a 1/4% accuracy over the range of cycle time (90 seconds). The safety review determined that this change in itself would not decrease the ability of the Emergency Diesel Generators to respond to an accident condition. The new timers have a better accuracy over the range of cycle time. They were bought to seismic and environmental specifications.

In the past, reconnection of lifted leads at the end of testing or maintenance resulted in some loose connections. There was also the possibility of wiring errors. The switches will eliminate the possibility for these malfunctions. The use of the test switches are controlled administratively, by padlocking the cabinets to prevent inadvertant disabling of the timers when the diesels are in stand-by. Also, the appropriate maintenance procedures have a double verification for the as-left position of the test switches. For these reasons, the OSC concluded that no unreviewed safety question exists.

Design Change No. 348, ADDITION OF ALTERNATE RIVER WATER DISCHARGE LINES

This design change involved the installation of an alternate discharge path for the Reactor Plant River Water (RPRW) system. This alternate discharge path is necessary to allow the normal discharge line, 30"-WR-17, to be taken out of service if maintenance is required on the two (2) rubber expansion joints and the two (2) metal expansion joints installed in that line. A 30 inch butterfly valve was installed in the Primary Component Cooling Water Heat Exchanger discharge header. When closed, it will isolate the 'A' heat exchanger as well as all of the downstream discharge lines that contain the expansion joints. The flow path in this arrangement would be as follows:

When the 'A' River Water Header is in service, flow will be in through the B heat exchanger and out through the C heat exchanger (opposite the normal direction of flow) and back through the 'B' River Water header to the Alternate Intake Structure for discharge to the river.

When the 'B' River Water Header is in service, the flow path as described above will be reversed.

Also, for this arrangement, 3 inch crossties were installed to complete the flow path from the Charging Pump oil coolers, the Control Room Air Conditioning Condensers, and the Control Room Redundant Cooling Coils.

The safety evaluation for this DCP stated that the probability of occurrence or the consequences of an accident or malfunction of safety-related equipment previously evaluated in the FSAR would not be increased because the alternate flow path would increase the reliability of the river water system in respect to the isolation capability of the expansion joints contained in the river water discharge line. The alternate flow path would be limited to operation during Mode 5 (cold shutdown). Also, for the above mentioned reasons, the possibility of an accident or malfunction of safety-related equipment different than any already

evaluated in the FSAR will not be created. In addition, the margin of safety as defined in the basis to any Tech. Spec. will not be reduced.

Design Change No. 351, REPLACEMENT OF UNQUALIFIED ELECTRICAL EQUIPMENT

IE Bulletin 79-01B required that a review be conducted of certain safety related electrical equipment in BVPS Unit 1 to determine if the equipment was environmentally qualified. This DCP covers replacement, modification, and qualification testing of such items required as a result of that review.

The following equipment was modified or replaced:

1) Motor splice connections were upgraded for the Charging Pumps, Low Head Safety Injection Pumps, and the Motor Driven Aux Feed Pumps.

2) The control circuitry for MOV-CH-310 was upgraded.

3) The Inside Recirc Spray Pump sump RTD's were replaced.

4) The Outside Recirc Spray Pump motors were replaced.

5) The following SOV's were replaced: SOV-SI-884A, B & C, SOV-FW-103A & B, SOV-FW-102, & SOV-BD-100A, B & C.

6) The limit switches for TV-BD-100A, B & C were replaced.

The Safety Evaluation stated that there was no unreviewed safety question because this design change replaces, modifies, or tests items identified as lacking sufficient documentation to assure environmental qualification. The replacement, modification, or qualification testing of such items will not lead to degradation of the systems involve.

As new equipment becomes available, more work will be done under this DCP in the future.

Design Change No. 352, INSTALLATION OF ANTI-VORTEXING DEVICES

This task involved an evaluation of the Recirc Spray Pump startup transient that provides a fully evaluated and documented basis to confirm that this transient does not pose a safety concern for Beaver Valley Unit #1.

This design change also included the addition of anti-vortexing devices to the containment sump, including:

a. Perforated cruciforms installed within the circular screens over the LHSI Pump and Outside RS Pump inlets.

b. Guiding vanes within the circular screens over the Inside RS Pump wells.

c. Horizontal grating covering the sump plan area.

The purpose of this change was to provide additional assurance to prevent formation of vortexes in the containment sump which could degrade RS and LHSI pump performance.

Stone and Webster recommended installation of the vortex suppressors based on testing done at Alden Research Laboratory (ARL) for North Anna. The ARL testing indicated that without the suppressors, vortex formation could occur in the event of certain types of sump screen blockage. The vortex suppressors installed at Beaver Valley are of the same general design as those tested and recommended by ARL for North Anna.

The safety review stated that because they are intended to prevent undesirable vortex formation, the suppressors are expected to improve the reliability of the RS and LHSI pumps in functioning to mitigate the consequences of an accident. The design was evaluated to demonstrate that RS and LHSI pump available NPSH is not affected by any additional suction losses attributable to the anti-vortexing devices. The anti-vortexting devices were seismically designed.

This modification does not reduce the margin of safety as defined in the bases of any Technical Specification.

Design Change No. 356, HYDROGEN RECOMBINER INLET ISOLATION VALVES MODIFICATION

This design change involved fitting the Hydrogen Recombiner Inlet Isolation Valves (1HY-101, 102, 103 and 104), which are located in the pipe penetrations area of safeguards, with reach rods to facilitate remote operation from the West Cable Vault Area during Post Accident Conditions. These valves would be subjected to high levels of radiation, primarily from the Low Head Safety Injection Lines, following an accident. Reference: QUAD-1-80-040, "Design Review of Plant Shielding for Post Accident Operations" April 25, 1980 and NUREG-0578, Section 2.1.6.b.

The safety evaluation for this DCP stated that the probability of occurrence or the consequences of an accident or malfunction of safety-related equipment previously evaluated in the FSAR would not be increased because:

- The structural integrity of the valve was not compromised.
- Containment isolation requirements were met since the valves remained intact.
- Normal operation of the Post DBA Hydrogen Control System was not changed.
- Operator exposure would be reduced if the Hydrogen Recombiners are required to be put into operation.

Also, for the above reasons, it was determined that the probability of an accident or malfunction of safety-related equipment different than any already evaluated in the FSAR would not be created. In addition, the margin of safety as defined in the basis to any Technical Specifications would not be reduced.

Design Change No. 362, Hydrogen Recombiner Shielding Modification

This modification involved the erection of shielding directly above the Low Head Safety Injection lines in order to protect operating personnel at the nearby Hydrogen Recombiner Control Panels during post accident conditions. This shielding was deemed necessary as a result of a Post Accident Shielding Study and NUREG-0578, Section 2.1.6.B. The shielding consists of steel boxes filled with lead shot.

The safety review indicated that operability of plant equipment was not affected by this change. The only safety concern involved possible damage to the LHSI lines during accident conditions if the supports for the shielding failed. This possibility was taken into account in the design and as a result, the shielding and supports were seismically constructed.

Design Change No. 388, RELOCATION OF TV-MS-105A & B TO THE MAIN STEAM VALVE ROOM

This design change involved isolation of the steam supply line to the turbine driven auxiliary feedwater pump (FW-P-2) outside of the auxiliary feed pump room by relocating the supply trip valves TV-MS-105A & B for FW-P-2 from the auxiliary feed pump room to the main steam valve room.

The safety evaluation for this DCP stated that the probability or the consequences of an accident or malfunction of safety-related equip ment previously evaluated in the FSAR will not be increased because

isolation of the steam supply line will eliminate the possibility of a high energy line break in the auxiliary feed pump room which could cause failure of the auxiliary feed pumps. The possibility of an accident or malfunction of safety related equipment different than any already evaluated in the FSAR will not be created. The new location of the trip valves is in the Main Steam Valve room, and no other safety related equipment there will be affected. Also, the longer length of unpressurized line to the turbine will not affect its operation, according to the vendor. The operability of FW-P-2 will not be degraded; therefore, the margin of safety is not reduced.

Design Change No. 418, Piping Gang Support Modifications

This DCP was generated for reanalysis of certain QA Category I pipe gang supports, that is, structures supporting more than one pipeline. As-built data from field inspections is being obtained and analyses are being performed for all such supports. Any required support modifications are being done under this DCP. The design outputs for the support modifications made to date have been reviewed and it is concluded that none of these modifications reduces the safety of the plant. These modifications basically involve welding or bolting additional structural members to the existing supports to provide stiffening or added strength. Analysis work on DCP 418 is still in progress and any other resulting modifications will be the subject of a separate safety evaluation when the modifications are complete.

Design Change No. 423, REPLACE DISCS ON 3 " TYPE C-58 VELAN CHECK VALVES

This design change modified the 3" Velan swing check valves to correct a "disc hang-up" problem. These Velan valves had a history of failing to reseat following flow or pressure surges. This problem has been attributed to the anti-rotational rounds on the disc binding with the anti-rotational round on the hanger. This results in a partially open check valve. This modification will incorporate a new type disc and remove the anti-rotational stop on the hanger arm. The disc's are forged steel with a pin welded to the back as a non-binding anti-rotational stop.

The new disc's shall meet the original specification requirements as per Velan Engineering Company letter dated March 30, 1981.

The safety evaluation for this DCP stated that the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR was not created.

The margin of safety as defined in the basis for any Technical Specification is not reduced since the check valves will meet the operability requirements. This is a result of the new disc design being less susceptible to disc hang-up problems than the original design. Also, the improved check valves will provide increased protection against overpressurization of related system components.

Design Change No. 424, Concrete Block Wall Modifications

All concrete block walls in the Fuel Building, Auxiliary Building, Service Building, and Cable Vault were reanalyzed and reevaluated in accordance with the requirements of IE Bulletin 80-11. It was established that those walls which did not meet the evaluation criteria would subsequently be modified to satisfy that criteria.

The Safety Evaluation reasoned that the modified walls would decrease the probability of small bore piping rupture or electrical cable damage due to a wall failure. Adjacent equipment would also be safer. These modes of failure were the only ones considered possible, for the purposes of accident analysis. The margin of safety was not reduced as a result of the wall modifications, since they are now braced and supported by structural steel.

Design Change No. 426, PRESSURIZER SAFETY VALVES PILOT PRESSURE SWITCH

The purpose of this design change was to permanently install the three pressure switches and associated equipment, which were previously installed on DCP 399 to detect pilot valve seat leakage on each of the three pressurizer safety relief valves (RV-RC-551A, B, C). Installation of the pressure switches in conjunction with the existing Resistance Temperature Detectors will provide more information for detecting a leaking valve.

The probability of an occurrence or the consequence of an accident or malfunction of equipment important to safety as previously evaluted in the Final Safety Analysis Report is not increased. The inadvertant opening of a safety valve has been considered in paragraph 14.1.15 and in Question 15.18 of the FSAR. The use of information obtained from these pressure switches will enable a better determination of a situation where the safety valve may inadvertantly open. The switches themselves could not cause the valves to lift.

The possibility for an accident or a malfunction of a different type than previously evaluated in the Final Safety Analysis Report is not created. The margin of safety should be increased as these switches will better enable detection of a valve that may open inadvertantly.

Design Change No. 434, SAFETY INJECTION SYSTEM CHECK VALVE TEST RIGS

This design change involved installation of three (3) permanent test rigs, one each to root valve 1SI-19,9 and 18. These test rigs will be used to verify that the Safety Injection check valves to the cold legs properly seat following plant conditions where they may have opened.

The safety evaluation for this DCP stated that the probability of occurrence or the consequences of an accident or malfunction of safety-related equipment previously evaluated in the FSAR would not be increased because the addition of the permanent test rigs will not alter the operation of the Safety Injection System and the new test rigs will be installed downstream of the existing valves which were previously used for installation of temporary test rigs. Also, for the above reasons, it was determined that the possibility of an accident or of a malfunction of safety-related equipment different than any already evaluated in the FSAR will not be created. The test rig will be double valve isolated from the SI system during normal operation. In addition, the margin of safety defined in the basis to any Technical Specification will not be reduced.

Design Change No. 442, CHANGE-OUT DISC'S ON VELAN 6" C-58 SWING CHECK VALVES

The 6" C58 check valves, as originally designed and manufactured, were susceptible to anti-rotational round binding and subsequent seat leakage. BVPS has experienced this problem on two occasions and remedied the situation. A number of the 6" Velan check valves on the safety injection system lines serve as containment isolation valves and a malfunction of these valves, specifically disc leakage, has the potential for reduction of the margin of safety.

The disc back-fit program has eliminated the identified problem and significantly improved the reliability of the check valve. The probability of equipment malfunction will be lowered and the conclusions of the FSAR concerning safety remain unchanged. System configuration of the LHSI system remains unchanged.

The safety evaluation for this DCP stated that the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR would not be increased. In addition, the possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR was not created.

The margin of safety as defined in the basis for any Technical Specification is not reduced since the check valves will meet the operability requirements. This is a result of new disc design being less susceptible to disc hang-up problems than the original design.

Design Change No. 443, REPLACE NVR RELAY IN DIESEL GENERATOR ANNUNCIATOR PANEL

This modification consisted of a one for one replacement of the obsolete no voltage relays (NVR) in the control cabinets of both diesel generators with ASEA RXME1 relays. The relay's function is to give the operator an alarm if control power is lost to the Diesel Generator control circuits. The ASEA RXME1 relay was selected as the replacement relay because its voltage rating exceeds the DC supply voltage requirements experienced at Unit #1. The new relays have a heavy duty coil capable of sustained operation with a voltage supply in the 105 and 140 VDC range. The physical size of the replacement relays are larger than the obsolete SQUARE D relays and as a result are seismically mounted in an auxiliary panel installed by DCP 157. Report No. SCE-100, Interim Qualification Report for ASEA Relay RXME-1, has been prepared to summarize the available information relative to environmental and seismic qualification. The results of this review indicate that the ASEA Type RXME relay is qualified for use as an undervoltage relay in the mild environment of the Diesel Generator Building.

Since the replacement relay performs an identical function and is expected to be more reliable, it will not increase the probability or consequences of an accident. The relays are direct replacements, thus no new modes of failure or new accidents will be created.

Based on the above review, no margin of safety will be reduced.

Design Change No. 452, DIESEL GENERATOR MODIFICATIONS

This design change modified the lube oil system, replaced the vibration damper, oil cooler, turbo exhaust screen assembly, turbocharger unit, stub shaft assembly, and added a sampling connection in the lube oil system for the emergency diesel generators.

These changes recommended by the manufacturer are based on extensive testing and have been installed by other utilities. This design change improves reliability and performance of the emergency diesel generators and will reduce maintenance and downtime costs.

The safety evaluation for this DCP stated that the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR would not be increased. In addition, the possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR was not created.

Section 3/4.8 of the Technical Specifications was reviewed and it was determined that the margin of safety as defined in the basis for this Technical Specification is not reduced. The margin of safety should be increased, as these modifications all represent changes to correct known deficiencies.

Design Change No. 528, MODIFICATION TO ATMOSPHERIC STEAM DUMP VALVES

This design change was the result of a Copes-Vulcan recommendation to replace the orifice plugs with solid ones. Their older design valves allowed some steam to bleed off from above the plug through an orifice during valve actuation. This sometimes caused erratic operation because adequate steam pressure above the plug is relied on to assist in opening the valve. Later designs allowed full pressure buildup by plugging the orifice connection.

This change will improve valve response, enhance the safety aspects of the system and has modified the valves to match the present Copes-Vulcan design.

The safety evaluation for this DCP stated that the probability of an occurrence or the consequences of an accident or malfunction of safety related equipment previously evaluated in the FSAR would not be increased. In addition, the possibility of an accident or malfunction of a different type than any previously evaluated in the FSAR was not created.

The margin of safety as defined in the basis to any Technical Specification will not be reduced. The valves still function to relieve excess pressure in the steam generators and can prevent unwanted lifting of the code safety valves. The ability of the valves to relieve 10% of the full steam flow, as stated in the FSAR Section 10.3.1.2, is not decreased.

Design Change No. 531, MAIN CONTROL BOARD SEISMIC MODIFICATIONS

The new instruments added to the main control board (vertical and benchboard) during the life of the plant have resulted in a reduction in

the amount of support material in the face of the control board. This change adds stiffeners to insure that instruments mounted on the boards do not exceed their design limits during a seismic event.

The Safety Review stated that the accident of concern in this case is that of an earthquake (FSAR ..14). The probability of this event is not increased by this change. In addition, this modification should reduce the consequences of the event and reduce the probability of malfunction of equipment important to safety. It was further stated that the possibility for an accident or malfunction of a different type than any previously evaluated in the FSAR is not created. This structural change will not create the possibility for a different type of accident because the functions of all components remain the same.

The margin of safety in the basis of Technical Specification 3/4.3 is not affected by this change, as this basis does not address the support provided by the control board.

Design Change 548, REPLACE HEAT TRACE CIRCUIT ET-103

The objective of this DCP was to replace faulty Nelson heat trace cable with Chemelex for the heat trace circuit on the Boron Injection Tank outlet line. The Nelson controllers and thermostats were not replaced.

The Safety Review stated that since the new cable meets or exceeds the design requirements, and can be used with the existing controllers and thermostats, there is no reduction of safety as described in the design analysis or accident analysis with FSAR (Sections 6.3, 8.5, 14). The margin of safety in the basis for Tech. Spec. 3/4.5.4 (Boron Injection System) is not reduced.

SPECIAL LIQUID WASTE TEMPORARY OPERATING EXPERIMENT

A temporary operating procedure involving processing of liquid waste with an auxiliary liquid waste demineralizer and associated piping was approved and implemented in 1980. This experiment was continued through 1982. See the 10CFR 50.59 Annual Report for 1980 for details of the safety evaluation. Design Change 471, which will replace this system with a permanent one, is in the design and procurement phase. Installation is expected to start in 1983.

Several other significant temporary operating procedures were developed and utilized during 1982. They were required as a result of a steam generator tube leak discovered in July. They are summarized as follows:

Temporary Operating Procedure (TOP) 82-42, Installation and Operation of Temporary Blowdown Demineralizers

This procedure was written for installation and operation of two (2) temporary 35 gpm demineralizers in the Steam Generator Blowdown Room. This was necessary because the Station's interim blowdown demineralizer system in the water treating area is not designed to handle radioactive blowdown. The temporary demineralizers were installed downstream of the blowdown heat exchanger. The outlet was routed to the hotwell after passing through a 5 micron filter.

The OSC reviewed this procedure and concurred that the controls placed on the system would help ensure plant safety. All temporary equipment and hoses, etc. that could carry radioactive liquid was located in the Blowdown Room, so that any leakage would not escape to the environment. The system was initially placed in service lined up to a clean steam generator, so that any leaks would not be contaminated. Once the system was lined up to the leaking generator, surveys were performed each shift by RadCon to determine rad levels. The Safety Evaluation also stated that in the event of CIA or CIB that blowdown would be isolated automatically. It was determined that this temporary set-up did not increase the risk of any accident or malfunction of safety systems, and no new accident or malfunction would be created. It was also determined that the margin of safety would not be reduced. The primary to secondary leak was below tech spec. limits (3/4.4.6.2 and 3/4.4.7) during the time period this system was used.

Temporary Operating Procedure (TOP) 82-44, Steam Generator Tube Leakage

This temporary operating procedure was administrative in nature and did not alter the configuration of plant equipment or line ups that were not already in the Operating Manual. It gave guidelines for monitoring the leakage, identified Rad monitors that required close attention, and directed Operations personnel to specific Operating Manual sections dealing directly or indirectly with steam generator tube leakage. Because this procedure did not deviate from previously approved procedures, but merely highlighted existing procedures in various sections of the Operating Manual, no unreviewed safety question existed.

Temporary Operating Procedure (TOP) 82-49, Pressure and Leak Test of 'C' Steam Generator

This procedure detailed valve and equipment line-ups needed to fill the 'C' steam generator secondary side and pressurize to 800 psig to locate the leaking tube, and to subsequently leak test the repair (plugged tube).

The Safety Evaluation stated that since,
1) all testing was to be performed in Mode 5,
2) the affected generator was isolated from the rest of the RCS, and
3) the pressure temperature design curves for the steam generator were not exceeded, that no unreviewed safety equestion existed.

Temporary Operating Procedure (TOP) 82-53, Pumping Turbine Building Sumps to Chemical Waste Sump

This procedure described the necessary steps to transfer water from the turbine building sumps to the chemical waste sump, for discharge to the river via Cooling Tower blowdown. A submersible pump was installed in the turbine sump with a hose running into Water Treatment to the Chemical Waste Sump. Before transferring, RadCon determined the activity in the turbine sump and calculated how much to transfer and how much dilution to add to the Chemical Waste Sump to keep the resultant activity less than the values specified in 10CFR20, Appendix B, Table II, Column 2. Once the sump transfer was made and the proper dilution water added, the waste sump was placed in recirculation for 2 volumes then sampled to verify the expected activity levels. The sump was then discharged to the river via the Cooling Tower blowdown line, which is the same line used for normal liquid waste system discharges. Discharge Permits were used.

The applicable guidelines in Circular 80-18 "Safety Review for Liquid Waste Systems" were observed for set-up and operation of this temporary system. For the above reasons the OSC concurred that there was no unreviewed safety question.

Temporary Operating Procedure (TOP) 82-54, Pumping Turbine Building Sumps to the Tunnel Sump

This procedure detailed the set-up and operation of a system to transfer water from the turbine building sump to the safeguards tunnel sump. This was to allow contaminated water to be sent to the liquid waste system when activity was too high to discharge to the river via cooling tower blowdown. A hose was run from a submersible pump in the turbine basement to the tunnel sump in safeguards. The system was installed per the instructions in the Rad Con Manual for

temporary hoses. The applicable guidelines in Circular 80-18 were followed. Airborne and liquid monitors were installed in the turbine basement to alert personnel of any problems. The open fire/security door at safeguards was manned continuously when the hose was in service. Between pump-down evolutions, the hose was disconnected, and the safeguards door was closed. For the above reasons, the OSC concurred that an unreviewed safety question did not exist.

Challenges to Safety and Power Operated Relief Valves

As per item II.K.3.3 of NUREG 0737 Duquesne Light is required to report challenges to the Pressurizer Safety and Power Operated Relief Valves (PORV's). During 1982, no challenges to any of the safety valves occured. PORV actuations are listed below. In all cases, the PORV(s) lifted at the appropriate setpoint. No reseat problems were encountered.

Month	Challenges	Cause
June 15	1	Single pump (RC-P-1B) operation during RCS testing (Mode 3) caused lower than normal spray flow. This led to sluggish pressurizer pressure control.
July 6	1	When returning a pressurizer pressure controller channel to service, the pressure transmitter spiked as the root stop valve was opened (Mode 2).
Sept. 6	2	Over Pressure Protection System (OPPS) actuation* (Mode 5)
Sept. 8	1	OPPS actuation * (Mode 4)

* The present OPPS setpoint is 350 psig. RCS pressure must be maintained as close to this pressure as possible in order to achieve sufficient #1 seal leakoff when running a coolant pump. These conditions led to the PORV actuations in September. DLCo is presently working with Westinghouse to investigate the possibility of raising the OPPS setpoint.