Duquesne Light
Nuclear Construction Division
Robinson Plaza, Building 2, Suite 210
Pittsburgh, PA 15205

2NRC-4-099
(412) 787-5141
(412) 923-1960
Telecopy (412) 787-2629
July 02, 1984

United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. George W. Knighton, Chief
Licensing Branch 3
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2
Docket No. 50-412

Gentlemen:

This letter forwards responses to twenty-four of the twenty-eight draft SER open items provided by the Auxiliary Systems Branch. This draft SER material, which was officially transmitted from the NRC to Duquesne Light Company on May 14, 1984, contains open items 122 through 149.

All of the attached responses except for those for open items 138 and 145 were transmitted informally to you during the weeks of June 11th and June 18th. It should also be noted that a few of the formal responses include changes which provide additional information or clarifications.

The draft SER open items not addressed in the attachment are 125, 135, 139 and 148. Responses for these four items will be submitted shortly.

DUQUESNE LIGHT COMPANY

By E. J. Woolever
E. J. Woolever
Vice President

JJS/ms

Attachment

cc: Ms. M. Ley, Project Manager - w/attachment
Mr. E. A. Licitra, Project Manager - w/attachment
Mr. G. Walton, NRC Resident Inspector - w/attachment

SUBSCRIBED AND SWORN TO BEFORE ME THIS
2nd DAY OF July, 1984.
Elva G. Lesondak
Notary Public

ELVA G. LESONDAK, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

B001
1/1

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this 2nd day of July, 1984, before me, a Notary Public in and for said Commonwealth and County, personally appeared E. J. Woolever, who being duly sworn, deposed and said that (1) he is Vice President of Duquesne Light, (2) he is duly authorized to execute and file the foregoing Submittal on behalf of said Company, and (3) the statements set forth in the Submittal are true and correct to the best of his knowledge.

Elva G. Lesondak
Notary Public

ELVA G. LESONDAK, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

ATTACHMENT

OI 122

THE APPLICANT SHOULD ADDRESS THE POSSIBILITY OF WATER ENTERING THE INDIVIDUAL INTAKE STRUCTURE CUBICLES HOUSING THE SAFETY-RELATED PUMPS AND ASSOCIATED EQUIPMENT DUE TO INADEQUATE WATERPROOF SEALS AT THE FOLLOWING LOCATIONS:

1. THE ENTRY OF WATER THROUGH ALL PUMP SHAFTS (INCLUDING NON SAFETY-RELATED PUMPS WITHIN THE CUBICLES)

2. THE ENTRY OF WATER THROUGH THE FOUR OUTSIDE CUBICLE SLIDING FLOOD DOORS AND THE TWO SLIDING FLOOD DOORS INTERCONNECTING THE CUBICLES.

3. ENTRY OF WATER THROUGH THE EQUIPMENT HATCHES (CONCRETE PLUGS) LOCATED IN THE CEILING OF EACH OF THE CUBICLES AT ELEVATION 730

4. THE ENTRY OF WATER THROUGH ALL OTHER FLOOR, WALL AND CEILING PENETRATIONS IN EACH OF THE CUBICLES HOUSING UNIT 1 AND OR UNIT 2 SAFETY-RELATED EQUIPMENT (INCLUDING THE JUNCTION OF THE VENTILATION AIR INTAKE STRUCTURE WITH THE INTAKE STRUCTURE AT ELEVATION 730.

RESPONSE

THE INTAKE STRUCTURE CUBICLES ARE DESIGNED TO PREVENT IN-LEAKAGE FOR THE PMF LEVEL OF 730FT. PLUS COINCIDENT WAVE ACTION. THE CUBICLE FLOOD DOORS HAVE INFLATABLE SEALS WHICH ARE PERIODICALLY TESTED TO VERIFY FUNCTIONAL CAPABILITY AS DESCRIBED IN THE RESPONSE TO DRAFT SER OPEN ITEM 123. FLOOD PROTECTION PROCEDURES WHEN THE FLOOD REACHES 695 FT. INCLUDE SEALING THE WATERPROOF DOORS, BOLTING VENTILATION DUCTS TO THE COMPARTMENT AIR EXHAUST PORTS AT ELEVATION 730FT. AND GASKETING THE EQUIPMENT HATCHES. THE VENTILATION AIR INTAKES ARE LOCATED AT ELEVATION 737 FT. TO ALLOW FOR THE 6.7 FT. RUN-UP ABOVE THE STANDING WATER LEVEL OF 730 FT. LEAKAGE RATE THROUGH A PUMP SHAFT IS ESTIMATED TO BE ONLY A SMALL FRACTION OF A GALLON PER MINUTE. ASSUMING SUCH A LEAKAGE RATE INTO THE CUBICLE, THE WATER LEVEL WOULD ONLY RISE AT A SMALL FRACTION OF AN INCH PER HOUR. IT IS ALSO NOTED THAT THE WATER LEVEL RISE TO 730 FT. WOULD TAKE PLACE OVER DAYS. ACCORDINGLY THERE WOULD BE TIME TO TAKE OTHER ACTIONS TO REDUCE OR STOP THE LEAKAGE. IN ADDITION, THE SUMP PUMPS LOCATED IN EACH CUBICLE ARE RATED AT 65 GPM.

AS NOTED IN THE RESPONSE TO Q410.4, AMENDMENT 5, THE INTAKE STRUCTURE CUBICLES ARE ISOLATED FROM EACH OTHER AND ARE REDUNDANT; ACCORDINGLY THERE IS AN ALLOWANCE FOR FAILURE DUE TO LEAKAGE.

OI 123

A DISCUSSION SHOULD BE PROVIDED TO DEMONSTRATE THAT THE RESPECTIVE WATERTIGHT SEALS ARE CAPABLE OF AND WILL BE PERIODICALLY TESTED TO VERIFY THEIR FUNCTIONAL CAPABILTY. WITH RESPECT TO INFLATABLE SEALS, THE DISCUSSION SHOULD INCLUDE A) THE POSSIBILITY OF THEIR RUPTURE DUE TO OVER INFLATION AND (B) LOSS OF SEAL DUE TO ITS LEAKAGES AND INADEQUATE PRESSURIZING GAS INVENTORY OVER THE TIME OF THE PMF.

RESPONSE

THE CUBICLE FLOOD DOORS ARE ANNUALLY AIR PRESSURE TESTED TO VERIFY THEIR FUNCTIONAL CAPABILITY. THE SEALS ARE INFLATED TO 50 PSIG THEN ISOLATED FROM THE FILL VESSEL. THE SEAL PRESSURE IS CHECKED OVER A PERIOD OF 100 HOURS (DURATION OF PMF) FOR PRESSURE LOSS. IF AFTER 100 HOURS PRESSURE DOES NOT FALL BELOW 40 PSIG THE SEAL IS CONSIDERED TO BE IN GOOD CONDITION. A LOSS OF PRESSURE FROM 50 TO 40 PSIG WITHIN 100 HOURS SATISFIES THE RECOMMENDATIONS OF THE MANUFACTURER FOR MAXIMUM ACCEPTABLE AIR LOSS. IF THE SEAL DOES NOT MAINTAIN AT LEAST 40 PSIG AT THE END OF 100 HOURS OR IF IT SHOWS MARKED WEAR OR SURFACE PEELING AND CRACKING, THE SEAL IS REPLACED. RELIEF PROTECTION, SET AT 75 PSIG, IS PROVIDED TO PROTECT AGAINST OVER-PRESSURIZATION OF THE SEALS, WHOSE MAXIMUM ALLOWABLE PRESSURE IS 100 PSIG. THE AIR VESSEL PROVIDED, ONE FOR EACH DOOR SEAL, ARE CHARGED TO 200 PSIG AND ARE CAPABLE OF INFLATING THE SEALS AND MAINTAINING THE SEAL PRESSURE OF 50 PSIG FOR 100 HOURS WITH TEN TIMES THE MAXIMUM ANTICIPATED LOSS OF AIR. THE AIR VESSEL WILL BE REPLACED WHEN, DUE TO LEAKAGE OR AS A RESULT OF TESTING DURING NORMAL PLANT OPERATION, THE AIR PRESSURE FALLS TO 100 PSIG. AT A PRESSURE OF 100 PSIG THE AIR VESSEL CAN STILL INFLATE THE SEAL IT SERVES AND CAN MAINTAIN 50 PSIG FOR 100 HOURS WITH THE MAXIMUM ANTICIPATED AIR LEAKAGE. AN ADDITIONAL SAFETY MARGIN IS BUILT IN SINCE THE SEALS CAN MAINTAIN SPECIFICATION REQUIREMENTS WITH AN INTERNAL PRESSURE OF 40 PSIG. THE 10 PSI MARGIN ALLOWS FOR AN ADDITIONAL 5 DAYS OF SEAL PRESSURIZATION ABOVE THE MINIMUM OF 40 PSIG SEAL PRESSURE. THEREFORE, CONSIDERING THE DESIGN OF THE SEALING SYSTEM AND THE DESIGN MARGINS INCORPORATED INTO THE SYSTEM, IT IS NOT ANTICIPATED THAT ANY BOTTLE REPLACEMENT WOULD BE NECESSARY DURING THE PROBABLE MAXIMUM FLOOD.

OI 124

ACCESS TO SAFETY-RELATED EQUIPMENT AT THE INTAKE STRUCTURE IS BY MEANS OF A FOOT BRIDGE LOCATED AT ELEVATION 705'-0'' OR A STAIRWAY LEADING TO A GRADE AT ELEVATION 675'-0''. CONSEQUENTLY THE SAFEY-RELATED INTAKE STRUCTURE IS NOT ACCESSIBLE DURING THE PMF. (THEREFORE, THE APPLICANT SHOULD PROVIDE A DISCUSSION THAT DEMONSTRATES FOR ALL CREDIBLE EVENTS WITHIN THE CUBICLES OR RELATED TO THE INTAKE STRUCTURE, THAT ACCESS TO THE INTAKE STRUCTURE IS NOT REQUIRED TO BRING AND MAINTAIN UNIT 2 TO A SAFE SHUTDOWN CONDITION.)

RESPONSE

THE SYSTEMS IN THE INTAKE STRUCTURE ARE DESIGNED TO MAINTAIN SAFE SHUTDOWN ASSUMING A SINGLE FAILURE AND LOSS OF OFFSIE POWER. NO OTHER EVENTS ARE POSTULATED CONCURRENT WITH THE PROBABLE MAXIMUM FLOOD. THE TECHNICAL SPECIFICATIONS WILL REQUIRE THAT BVPS-2 BE SHUTDOWN WHEN THE RIVER WATER LEVEL EXEEDS 695 FEET MSL. THE ACTION REQUIRED TO SEAL THE SERVICE WATER PUMP CUBICLES IS DESCRIBED IN SECTION 2.4.14 AND IN THE RESPONSE TO Q210.4. AS STATED IN THE RESPONSE TO Q210.16 OF THE BVPS-2 PSAR, IT TAKES APPROXIMATELY TWO DAYS BEFORE THE FLOOD LEVEL REACHES ELEVATION 705 FT. AFTER THE INCEPTION OF THE STORM.

IN ADDITION, SYSTEM ALIGNMENT AND THE MODE OF OPERATION OF THE EQUIPMENT IN THE SERVICE WATER PUMP CUBICLES REQUIRED DURING THE PROBABLE MAXIMUM FLOOD IS NO DIFERENT FROM THE ALIGNMENT AND OPERATION REQUIRED DURING NORMAL OPERATING CONDITIONS PRECEEDING THE FLOOD. THEREFORE, NO OPERATOR ACTION IN THE INTAKE

WILL BE REQUIRED DURING THE PERIOD THAT THE RIVER WATER LEVEL EXCEEDS 705 FEET MSL.

OI 126

THE APPLICANT HAS NOT ADEQUATELY ADDRESSED FLOODING DUE TO THE FAILURES OF NON-SEISMIC CATEGORY 1 TANK, PIPING AND VESSEL INSIDE SAFETY-RELATED STRUCTURES PER SRP SECTION 3.4.

RESPONSE

REFER TO SECTION 3.6B.1.3.4. THE EFFECT OF POTENTIAL FLOODING DUE TO PIPING FAILURES OR RUPTURES OF LARGE TANKS IN AREAS WHICH CONTAIN SAFETY-RELATED EQUIPMENT ARE DISCUSSED. SECTION 3.4 REFERS TO SECTION 3.6B.1.3.4.

OI 127

RESPONSE

THESE OPEN ITEMS ARE ALL CONCERNED WITH POTENTIAL HAZARDS FROM MISSILES OR PIPE BREAKS. EVALUATIONS OF SUCH HAZARDS ARE CURRENTLY IN PROGRESS ON A PLANT AREA-TO-AREA BASIS. RESULTS OF THOSE CACULATIONS WILL BE COMPLETED THROUGH 1985 AND FINAL DOCUMENTATION WILL BE COMPLETED BY THE END OF 1985. (IT IS NOTE THAT OPEN ITEN 26 FROM MEB IS ALSO IN THIS CATEGORY). THESE OPEN ITEMS SHOULD ALL BE GROUPED AS A SINGLE CONFIRMATORY ITEM BECAUSE THEY ARE ALL BEING ADDRESSED BY A SINGLE COMPREHENSIVE HAZARDS EVALUATION AND THE METHODOLOGY THAT IS EMPLOYED IN THESE EVALUATIONS IS DESCRIBED IN THE FSAR.

OI 128

RESPONSE

REFER TO THE RESPONSE TO OI 127

OI 129

RESPONSE

REFER TO THE RESPONSE TO OI 127

OI 130

RESPONSE

REFER TO THE RESPONSE TO OI 127

OI 131

IN RESPONSE TO OUR CONCERN REGARDING THE ADEQUACY OF THE TORNADO DESIGN PROTECTION PROVIDED FOR THE AUXILIARY BUILDING ABOVE ELEVATION 773'-6'' THE APPLICANT STATES THAT THE RESPONSE WILL BE PROVIDED AT A LATER DATE.

RESPONSE

REFER TO THE RESPONSE TO QUESTION 220.12 WHICH WAS PROVIDED IN AMENDMENT 6.

OI 132

IN RESPONSE TO THE STAFF'S CONCERN OVER MISSILE PROTECTION PROVIDED BY THE MAIN STEAM VENT PANELS, THE APPLICANT STATES FIGURE 3.11-2 "MAIN STEAM VALVE HOUSE PRESSURE/TEMPERATURE TRANSIENTS" WILL BE REVISED IN A LATER AMENDMENT TO SHOW THEIR DESIGN CAPABILITY.

RESPONSE

FIGURE 3.8-6 WAS REVISED IN AMENDMENT 6 TO SHOW THE ARRANGEMENT OF THE MAIN STEAM VALVE HOUSE VENT PANELS. THE FIGURE WAS CHANGED TO SHOW THAT THE MAIN STEAM HOUSE VENT PANELS ARE LOCATED IN A STRUCTURE ON THE ROOF NOT IN THE WALLS AS PREVIOUSLY STATED IN THE FSAR TEXT. THE RESPONSE TO Q410.9 IN AMENDMENT 5 WAS NOT REFERING TO FIGURE 3.11-2.

OI 133

RESPONSE

REFER TO RESPONSE TO OI 127

OI 134

THE APPLICANT STATED THAT THE FUEL POOL HEAT LOADS HAVE BEEN CALCULATED IN ACCORDANCE WITH BRANCH TECHNICAL POSITION ASB 9-2. THE APPLICANT STATES THAT UNDER NORMAL HEAT LOAD (DEFINED BELOW), THE POOL TEMPERATURE WOULD BE MAINTAINED BELOW 140 DEGREES FAHRENHEIT ASSUMING THE FAILURE OF ONE COOLING TRAIN. THIS HEAT LOAD HAS BEEN DEFINED AS ONE THIRD CORE AFTER 150 HOURS OF DECAY, ONE-THIRD CORE WITH ONE YEAR OF DECAY PLUS ONE-THIRD CORE WITH 400 DAYS DECAY. WE CONSIDER THE MAXIMUM NORMAL HEAT LOAD TO BE THAT WHICH WOULD EXIST WHEN THE POOL IS COMPLETELY FILLED WITH SUCCESSIVE NORMAL REFUELING BATCH DISCHARGES.

WE WILL REQUIRE THE APPLICANT TO DEMONSTRATE THAT THE SPENT FUEL POOL COOLING SYSTEM IS CAPABLE OF MAINTAINING THE POOL WATER TEMPERATURE AT OR BELOW 140 DEGREES F WHEN THE STORAGE POOL IS COMPLETELY FILLED WITH NORMAL DISCHARGES ASSUMING THAT ONE COOLING TRAIN HAS FAILED.

THE MAXIMUM ABNORMAL HEAT-LOAD IS DEFINED BY THE APPLICANT AS ONE FULL CORE DISCHARGE WITH 150 HOURS OF DECAY PLUS ONE THIRD CORE DISCHARGE WITH 36 DAYS DECAY AND ONE THIRD CORE WITH 400 DAYS DECAY. WITH THIS HEAT LOAD, THE APPLICANT STATED THAT THE POOL TEMPERATURE IS MAINTAINED AT OR BELOW 165 DEGREES F. WE CONSIDER THE MAXIMUM ABNORMAL HEAT LOAD AS ONE FULL CORE DISCHARGE PLUS ALL OTHER FUEL STORAGE CELLS IN THE STORAGE POOL FILLED WITH SUCCESIVE NORMAL REFUELING BATCH DISCHARGES. WE WILL REQUIRE THE APPLICANT TO DEMONSTRATE THAT THE SPENT FUEL POOL COOLING SYSTEM IS CAPABLE OF MAINTAINING THE POOL WATER TEMPERATURE BELOW BOILING WHEN THE POOL CONTAINS A FULL CORE DISCHARGE AND ALL OTHER STORAGE SPACES ARE FILLED WITH NORMAL DISCHARGES.

RESPONSE

BVPS-2 HAS DESIGNED AND EVALUATED THE FUEL POOL COOLING SYSTEM IN ACCORDANCE WITH NUREG-0800 REV. 1, SRP 9.1.3 AND NRC BTP ASB 9-2. SECTIONS III.1.D AND III.1.H OF SRP 9.1.3 SPECIFICALLY ADDRESS THE DECAY TIMES AND HEAT LOADS TO BE CONSIDERED, THE TEMPERATURES TO BE MAINTAINED AND UNDER WHICH CONDITIONS SINGLE FAILURES MUST BE ADDRESSED. THE HEAT LOAD CASES, SINGLE FAILURE ASSUMPTIONS AND FUEL POOL TEMPERATURES DESCRIBED IN FSAR SECTION 9.1.3 MEET THE ACCEPTANCE CRITERIA OF SRP 9.1.3 (INCLUDING ASB 9-2). THE TWO ADDITIONAL CASES IDENTIFIED IN SER OPEN ITEM 134 ARE BEYOND THE ACCEPTANCE CRITERIA OF SRP 9.1.3. THE REVIEWER SHOULD CITE THE BASIS FOR STATING THAT THESE ARE REQUIREMENTS.

OI 136

THE PHASE II PORTION OF THE REVIEW RELATES TO THOSE HEAVY LOADS HANDLING SYSTEMS COVERED IN THE PHASE I REVIEW. THIS REVIEW CONFIRMS THAT EITHER THE HANDLING SYSTEM, DESIGN IS IN COMPLIANCE WITH NUREG-0554 "SINGLE-FAILURE-PROOF CRANES FOR NUCLEAR POWER PLANTS" OR THE CONSEQUENCES OF A LOAD DROP ACCIDENT WILL NOT EXCEED THE RECOMMENDED GUIDELINES PRESENTED IN SECTION 5.1 OF NUREG-0612. WE WILL REPORT ON THE RESOLUTIONS TO BOTH PHASE I AND PHASE II OF NUREG-0612 IN SUPPLEMENTS TO THE SER.

RESPONSE

THE PHASE I REVIEW WAS DISCUSSED IN A JUNE 15, 1984 MEETING WITH MR. SINGH OF THE NRC STAFF AND AGREEMENTS WERE REACHED. DOCUMENTATION OF THIS MEETING WILL BE TRANSMITTED UNDER SEPARATE COVER.

OI 137

WE CANNOT CONCLUDE THAT THE SSWS ADEQUATELY ENSURES A SUFFICIENT SUPPLY OF SERVICE WATER TO ACCOMPLISH UNIT SHUTDOWN AND SUBSEQUENT COOLDOWN IN THE EVENT THE SWS SEISMIC CATEGORY I INTAKE STRUCTURE IS LOST DUE TO A GASOLINE BARGE IMPACT/EXPLOSION SINCE WE CANNOT CONFIRM THAT THE REQUIREMENTS OF GENERAL DESIGN CRITERIA 45 AND 46 ARE MET.

THE APPLICANT HAS NOT ADDRESSED THE MEASURES (E.G DESIGN AND PROCEDURES) THAT WILL BE TAKEN TO PREVENT FOULING AND DEGRE[illegible]TION OF THE SSWS AS A RESULT OF MARINE GROWTH NOR HAS THE APPLICANT CONFIRMED THAT THE PERIODIC SSWS TESTING AND INSPECTION WILL BE ASSURED BY TECHNICAL SPECIFICATIONS.

RESPONSE

THE SWS AND SSWS PUMPS AND PIPING ARE BOTH PROVIDED TO SUPPLY WATER TO THE SERVICE WATER HEADERS LOCATED IN THE SWS VALVE PIT. FROM THIS TIE IN CONNECTION, THE WATER LINES OF THESE SYSTEMS ARE COMMON. THE INJECTION OF CHLORINATED WATER, AS DESCRIBED IN THE RESPONSE TO QUESTION 410.7, AMENDMENT 5, OCCURS DOWNSTREAM OF THIS CONNECTION POINT.

OI 138

THE APPLICANT HAS NOT COMMITTED TO PERFORM PERIODIC TESTS TO VERIFY THAT THE INSTRUMENT AIR QUALITY IS BEING MAINTAINED. THE APPLICANT SHALL PROPOSE SUCH A PROGRAM.

RESPONSE

IN ORDER TO ENSURE ADEQUATE OPERATING PERFORMANCE, INSTRUMENT AIR QUALITY AT THE FILTER DISCHARGE WILL BE TESTED FOR DEWPOINT AND PARTICULATE CONTAMINATION ANNUALLY.

OI 140

THE APPLICANT HAS INDICATED COMPLIANCE WITH REGULATORY GUIDE 1.95 "PROTECTION OF NUCLEAR POWER PLANT CONTROL ROOM OPERATORS AGAINST AN ACCIDENTAL CHLORINE RELEASE" POSITION C.4.D.4, THE OTHER POSITIONS C.4.D (1), (2), (3), (5) AND (6) HAVE NOT BEEN ADDRESSED.

RESPONSE

THE REQUESTED INFORMATION HAS BEEN PROVIDED IN SECTIONS 6.4, [illegible].5, 1.8 AND 1.6.

OI 141

IN REFERENCE TO POSITIONS C.3, C.7 AND C.14 OF REGULATORY GUIDE 1.78 "ASSUMPTIONS FOR EVALUATING THE HABITABILITY OF A NUCLEAR POWER PLANT CONTROL ROOM DURING A POSTULATED HAZARDOUS CHEMICAL RELEASE," WE FIND THAT THE APPLICANT HAS IDENTIFIED VARIOUS HAZARDOUS CHEMICALS STORED ON SITE AND BEING TRANSPORTED

ON THE CONRAIL LINE ADJACENT TO THE BVPS-2 SITE. HOWEVER THE REVIEW OF THIS MATERIAL AND THE APPLICANTS EVALUATION OF THE POTENTIAL HAZARD TO THE HABITABILITY OF THE CONTROL ROOM IS NOT SUFFICIENT. THE APPLICANT SHALL ADDRESS THE ABOVE REGULATORY GUIDE POSITIONS. THERFORE, COMPLIANCE WITH THE GUIDELINES OF REGULATORY GUIDE 1.78 IS AN OPEN ITEM AT THIS TIME.

RESPONSE

THE REQUESTED INFORMATION IS PROVIDED IN SECTIONS 6.4, 2.2, 2.3, 1.8, AND 1.6.

OI 142

THE APPLICANT HAS FAILED TO INDICATE THAT THE BVPS-2 COMPRESSED AIR SYSTEM SHARED WITH BVPS-1, WHICH IS UTILIZED DURING THE FIRST HOUR AFTER A RADIOACTIVE RELEASE, IS DESIGNED TO SEISMIC CATEGORY I REQUIREMENTS. THIS SYSTEM SHOULD BE DESIGNED TO SEISMIC CATEGORY I REQUIREMENTS PER THE CONTROL ROOM HABITABILITY ANALYSIS.

RESPONSE

THE BOTTLED COMPRESSED AIR SYSTEM SHARED WITH BVPS-1 IS DESIGNED TO SEISMIC CATEGORY I REQUIREMENTS.

OI 143

THE APPLICANT'S RESPONSE TO OUR CONCERN REGARDING COOLING FOR SAFETY RELATED EQUIPMENT ASSOCIATED WITH SYSTEMS SUCH AS THE SERVICE WATER SYSTEM, PRIMARY PLANT COMPONENT COOLING WATER SYSTEM AND CONTAINMENT ISOLATON SYSTEM LOCATED IN THE FUEL BUILDING IS NOT SUFFICIENT. SINCE THE FUEL AND DECONTAMINATION BUILDING VENTILATION SYSTEM IS A NONSAFETY-RELATED SYSTEM, WE WILL REQUIRE THAT THE APPLICANT DEMONSTRATE THAT THE ESSENTIAL EQUIPMENT HOUSED IN THE FUEL BUILDING, IS BOTH ACCESSIBLE TO PERSONNEL AS NEEDED AND THAT IT IS ENVIRONMENTALLY QUALIFIED FOR THE CONDITIONS WHICH COULD EXIST WHEN THE FUEL BUILDING VENTILATION SYSTEM IS UNAVAILABLE DURING EMERGENCY CONDITIONS.

RESPONSE

NO ACCESS TO THE FUEL BUILDING IS REQUIRED DURING EMERGENCY CONDITIONS. THE FUEL POOL COOLING PUMPS CAN BE OPERATED FROM THE CONTROL ROOM. THE FUEL POOL LEVEL AND TEMPERATURE ARE INDICATED IN THE CONTROL ROOM. SERVICE WATER CAN BE USED FOR EMERGENCY MAKE-UP BY INSERTING A SPOOL PIECE AND OPENING A VALVE IN THE SERVICE WATER VALVE PIT IN THE YARD (FIGURE 9.2-1). ISOLATION VALVES FOR PRIMARY PLANT COMPONENT COOLING WATER ARE LOCATED IN THE AUXILIARY BUILDING (FIGURE 9.2-13). THE ONLY PART OF THE CONTAINMENT ISOLATION SYSTEM IN THE FUEL BUILDING IS THE GATE VALVE ISOLATING THE FUEL TRANSFER TUBE (ITEM 6 ON FIGURES 9.1-1 AND 9.1-2). THIS VALVE IS OPEN ONLY DURING REFUELING OPERATIONS, AND NO EVENT REQUIRING CONTAINMENT ISOLATION IS POSTULATED DURING REFUELING.

SAFETY-RELATED EQUIPMENT IN THE FUEL BUILDING IS QUALIFIED FOR THE ENVIRONMENTAL CONDITIONS LISTED IN TABLE 3.11-2. THE FUEL BUILDING ENVIRONMENTS FOR

ANTICIPATED OPERATIONAL OCCURRENCES AND ACCIDENTAL CONDITIONS INCLUDE THE EFFECTS OF LOSS OF THE FUEL BUILDING VENTILATION SYSTEM.

OI 144

WE CANNOT DETERMINE WHETHER THE MCC'S (MCC 2-E03 AND MCC 2-E04) ARE SAFETY RELATED. IF THEY ARE, WE WILL REQUIRE THE APPLICANT TO DEMONSTRATE THAT THE TWO RECIRCULATION TRAINS MEET THE APPROPRIATE REQUIREMENT FOR A SAFETY RELATED SYSTEM SUCH AS PROTECTION AGAINST NATURAL PHENOMENA AND ESSENTIAL POWER SUPPLIES.

RESPONSE

MCC 2-E03 AND MCC 2-E04 ARE SAFETY RELATED, REFER TO TABLE 3.2-1.

THE VENTILATION EQUIPMENT FOR THESE CUBICLES IS SAFETY RELATED, REFER TO TABLE 3.2-1. THE EQUIPMENT IS POWERED FROM CLASS 1E BUSES AND IS HOUSED IN A QA CATEGORY II STRUCTURE.

OI 145

ALL AIR EXHAUSTED FROM THE AUXILIARY BUILDING AND RADWASTE AREA PASSES THROUGH THE SAFETY-RELATED (SEISMIC CATEGORY I), REDUNDANT FILTERS OF THE SLCRS. AIRBORNE PARTICULATE AND NOBLE GASES ARE CONTINUALLY SAMPLED AND ANALYZED BY A RADIATION MONITORING SYSTEM. HOWEVER, WE WILL REQUIRE THAT THE APPLICANT DEMONSTRATE THAT THE PRESENT AIRBORNE PARTICULATE AND NOBLE GASES MONITORING SYSTEM SUFFICIENTLY COVERS THE SPECTRUM OF POTENTIAL RADIOLOGICAL RELEASES (INCLUDING IODINE).

RESPONSE

AS INDICATED IN SECTION 11.5.2.4.2, AMENDMENT 4, THE OFF-LINE GAS AND PARTICULATE MONITOR FOR THE ELEVATED RELEASE POINT PROVIDES THE SAMPLING CAPABILITY AND THE NECESSARY RANGE TO MEET THE INTENT OF NUREG-0737, ACTION ITEM II.F.1, ATTACHMENTS 1 AND 2. THE DETECTABLE RANGE FOR THE PARTICULATE DETECTOR IS 10 E-10 TO 10 E-5 MICRO-CURIES/CC. THE DETECTABLE RANGE FOR THE THREE GAS DETECTORS ARE 10 E-7 TO 10 E-1, 10 E-4 TO 10 E+2 AND 10 E-1 TO 10 E+5 MICRO-CURIES/CC.

OI 146

THE APPLICANT HAS NOT INDICATED WHETHER THE EMERGENCY SWITCHGEAR ROOM VENTILATION SYSTEM IS LOCATED IN AN AREA WITHIN THE SERVICE BUILDING WHICH IS PROTECTED FROM NATURAL PHENOMENA. WE NOTE THAT THE TOP STORY OF THE SERVICE BUILDING IS STEEL FRAMED, NONSEISMIC STRUCTURE WHICH IS NOT DESIGNED TO WITHSTAND NATURAL PHENOMENA INCLUDING TORNADOS AND TORNADO MISSILES.

RESPONSE

THE ENTIRE EMERGENCY SWITCHGEAR ROOM VENTILATION SYSTEM, INCLUDING DISTRIBUTION DUCTWORK, IS LOCATED WITHIN THE SEISMICALLY AND TORNADO MISSILE DESIGN STRUCTURES. THE SYSTEM IS DESIGNED TO SEISMIC QA CATEGORY I REQUIREMENTS. NO PORTION OF THE EMERGENCY SWITCHGEAR ROOM VENTILATION SYSTEM IS LOCATED IN THE NONSEISMIC/TORNADO PROTECTED PORTION OF THE SERVICE BUILDING.

OI 147

THE APPLICANT STATES THAT THE SLCRS IS LOCATED IN THE SLCRS VENTILATION EQUIPMENT ROOM ON THE TOP OF THE AUXILIARY BUILDING AND IS NOT PROTECTED FROM TORNADOES, HURRICANES OR MISSILES GENERATED BY NATURAL PHENOMENA. THIS AREA IS SEISMIC CATEGORY I. THE BASIS GIVEN FOR THIS IS THAT IT HAS BEEN ASSUMED THAT THOSE EVENTS REQUIRING SLCRS FUNCTION (SUCH AS A LOCA) WILL NOT OCCUR CONCURRENT WITH THESE NATURAL PHENOMENA.

FROM OUR REVIEW, WE CONCLUDE THAT THE SLCRS DESIGN AND THE APPLICANT'S EXPLANATION IS ACCEPTABLE PROVIDED IT CAN BE SHOWN THAT THE SLCRS SERVES NO EMERGENCY SHUTDOWN FUNCTION. WE WILL REQUIRE THE APPLICANT TO VERIFY AND DEMONSTRATE THAT THE SLCRS IS NOT REQUIRED FOR A SAFE SHUTDOWN (INCLUDING HOT STANDBY).

RESPONSE

THE SLCRS IS NOT REQUIRED FOR SAFE SHUTDOWN. THE DESIGN CALCULATIONS FOR COOLING AVAILABLE SAFETY-RELATED EQUIPMENT TAKE NO CREDIT FOR THE SLCRS.

OI 149

THE APPLICANT HAS NOT PROVIDED A RESPONSE TO OUR MARCH 10, 1980 GENERIC LETTER CONCERNING THE AUXILIARY FEEDWATER SYSTEM (AFWS) DESIGN INCLUDING THE CRITERIA OF TMI TASK ACTION PLAN, NUREG 0737, ITEM II.E.1.1. THIS RESPONSE SHOULD INCLUDE THE FOLLOWING:

A. A DETAILED POINT BY POINT REVIEW OF THE AFWS DESIGN AGAINST THE CRITERIA OF THE SRP SECTION 10.4.9 AND BRANCH TECHNICAL POSITION ASB 10-1.

B. A POINT-BY-POINT REVIEW OF THE AFWS DESIGN, TECHNICAL SPECIFICATIONS, AND OPERATING PROCEDURES AGAINST THE GENERIC SHORT-TERM AND LONG-TERM RECOMENDATIONS DISCUSSED IN THE MARCH 10, 1980 LETTER AND NUREG-0611.

C. AN EVALUATION OF THE DESIGN BASIS FOR THE AFWS FLOW REQUIREMENTS, AND VERIFICATION THE THE AFWS WILL MEET THESE REQUIREMENTS (REFER TO ENCLOSURE 2 OF THE MARCH 10, 1980 LETTER).

D. A CURSORY REVIEW OF THE AFWS SIMPLIFIED RELIABILITY ANALYSIS AS DESCRIBED IN THE FSAR APPENDIX 10A TO SECTION 10.4.9 HAS SHOWN THAT THE INFORMATION PROVIDED IS INADEQUATE IN THAT THE QUANTIFICATION OF THE ANALYSIS CANNOT BE

VERIFIED. THEREFORE, THE APPLICANT SHOULD PROVIDE AN AFWS RELIABILITY ANALYSIS CONSISTENT WITH THAT DESCRIBED IN THE MARCH 10, 1980 LETTER AND NUREG-0611, OR PROVIDE A COMPARISON OF THE DATE BASES, METHODOLOGY, ASSUMPTIONS, AND NUMERICAL RESULTS USED IN AFWS SIMPLIFIED RELIABILITY ANALYSIS DISCUSSED IN APPENDIX 10A AGAINST THAT CONTAINED IN NUREG-0611. INCLUDE A VERIFICATION OF COMPLIANCE WITH THE 10 TO THE MINUS 4 POWER TO 10 TO THE MINUS 5 POWER DEMAND NUMERICAL RELIABILITY ACCEPTANCE CRITERIA FOR THE LOSS OF MAIN FEEDWATER AND LOSS OF OFFSITE POWER (LOOP) CASES.

RESPONSE

A. AS STATED IN TABLE 1.9-1, THE BVPS-2 AUXILIARY FEEDWATER SYSTEM IS IN CONFORMANCE WITH THE ACCEPTANCE CRITERIA OF STANDARD REVIEW PLAN SECTION 10.4.9 AND BRANCH TECHNICAL POSITION ASB 10-1. REFER TO TABLE Q410.52-1, WHICH PROVIDES A CROSS REFERENCE BETWEEN THE SRP, GDC/SUBJECT AND BTP.

B. REFER TO TABLE Q410.52-2, WHICH ADDRESSES NUREG-0611 RECOMMENDATIONS TO IMPROVE THE RELIABILITY OF THE AFWS.

C. REFER TO TABLE Q410.52-3, WHICH PROVIDES THE BASIS FOR THE AFWS FLOW REQUIREMENTS.

D. THE RELIABILITY ANALYSIS PROVIDED IN APPENDIX 10A IS CONSISTENT WITH THE RELIABILITY ANALYSIS GIVEN IN NUREG-0611. THE DATA BASES, METHODOLOGY, ASSUMPTIONS, AND NUMERICAL RESULTS OF APPENDIX 10A COMPARE WITH NUREG-0611 AS FOLLOWS:

   THE DATA BASES USED TO DETERMINE THE AFWS UNAVAILABILITY VALUES GIVEN IN APPENDIX 10A WAS OBTAINED FROM A NUMBER OF DOCUMENTED SOURCES. THE UNAVAILABILITY VALUES FOR CERTAIN COMPONENTS AND SOURCES ARE PRESENTED IN TABLE Q410.52-4. OTHER UNAVAILABILITY VALUES AND THEIR SOURCES ARE GIVEN IN APPENDIX 10A.

   THE METHODOLOGY AND ASSUMPTIONS USED IN APPENDIX 10A ARE DESCRIBED IN SECTION 10A.3. THE RELIABILITY APPROACH PRESENTED IN NUREG-0611, APPENDIX III, SECTION 4, WAS FOLLOWED IN THE PERFORMANCE OF THIS RELIABILITY ANALYSIS.

   THE GENERIC EVENT TREE DESCRIBED IN NUREG-0611, APPENDIX III, SECTION 4.3, DEPICTS THE IMPORTANCE OF THE AFWS DURING A LOSS OF MAIN FEEDWATER EVENT. THE BVPS-2 ANALYSIS USES EVENT SEQUENCE DIAGRAMS TO SHOW IN MORE DETAIL THE POTENTIAL FAILURES THAT COULD DOMINATE THE UNAVAILABILITY OF THE AFWS. THIS DETERMINISTIC APPROACH PROVIDES THE BASIS FOR THE UNAVAILABILITY CALCULATIONS PRESENTED IN APPENDIX 10A. THE FAULT TREE LOGIC APPROACH FROM NUREG-0611, APPENDIX III, SECTION 4.4, WAS USED TO DEVELOP THE LOGIC FOR THE UNAVAILABILITY CALCULATIONS PRESENTED IN APPENDIX 10A.

   THE NUMERICAL RESULTS OF THE ANALYSIS ARE GIVEN IN FIGURES 10A-1 AND 10A-2 OF APPENDIX 10A. THE UNAVAILABILITY OF THE AFWS FOR A LOSS OF MAIN FEEDWATER EVENT WIH OFFSITE POWER AVAILABLE WAS CALCULATED TO BE 8.7 TIMES 10 TO THE MINUS 6 POWER. THE FOLLOWING TABULATION PROVIDES A COMPARISON OF THE RESULTS OF THE UNAVAILABILITY CALCULATIONS FOR BVPS-2 WITH THE RELIABILITY STUDIES OF OTHER UNITS OF SIMILIAR DESIGN.

UNIT	UNAVAILABILTY/DEMAND	SOURCE
WASH 1400 (SURRY)	.000037	USNRC 1975a
SAN ONOFRE 2&3	.000022	USNRC 1981b
ZION 1&2	.0000042	USNRC 1981c
BVPS-2	.0000087	BVPS-2 FSAR APPENDIX 10A

IN GENERAL, DATA VARIATION IS DOMINATED BY COMMON CAUSE FAILURES, OPERATING ERRORS, AND TEST AND MAINTENACE ERRORS.

TABLES Q410.52-1 THROUGH Q410.52-4 FOLLOW.

TABLE Q410.52-1

Conformance Review of Standard Review Plan Section 10.4.9
and Branch Technical Position ASB 10-1

SRP Section	Subject	FSAR Sections
10.4.9.II.1	General Design Criterion (GDC) 2	3.4; 3.7; 3.8; 10.4.9.1
10.4.9.II.2	GDC 4	3.5; 3.6; 3.11; 10.4.9.1
10.4.9.II.3	GDC 5	10.4.9.1
10.4.9.II.4	GDC 19	10.4.9.1; Appendix 5A
10.4.9.II.5	GDC 34/44	10.4.9.1; 10.4.9.3
10.4.9.II.6	GDC 45	6.6.2; 10.4.9.1
10.4.9.II.7	GDC 46	3.9B.6; 10.4.9.1

BTP ASB Section	Subject	FSAR Reference (Section)
10-1.B.1	System Arrangement and Power Sources	10.4.9.2
10-1.B.2	Separate and Multiple Sources of Motive Energy	10.4.9.2; 10.4.9.3
10-1.B.3	Feedwater Supply to any Combination of Steam Generators	10.4.9.2; 10.4.9.3
10-1.B.4	Redundancy	10.4.9.3
10-1.B.5	High Energy Line Break	10.4.9.3

TABLE Q410.52-2

Review of NUREG-0611 Recommendations to Improve
Reliability of Auxiliary Feedwater Systems

Short-Term Recommendations

GS-1 Technical Specification Time Limits

The outage time limit and subsequent action time limit for an inoperable auxiliary feedwater pump and associated train are as required by the Standard Technical Specifications. The limits will be given in the BVPS-2 Technical Specifications (Chapter 16 of the FSAR).

GS-2 Administrative Controls on Manual Valves

Not applicable to BVPS-2. BVPS-2 does not have common suction piping between the primary water source (*TK 210) and the auxiliary feedwater pump suction (Figure 10.4-24). there are no single valves or multiple valves in series which could interrupt all auxiliary feedwater flow if inadvertently left closed.

GS-3 Throttling of auxiliary Feedwater Flow

Not applicable to BVPS-2. The auxiliary feedwater flow control valves are normally in an open position in readiness for system operation.

GS-4 Emergency Procedure for Initiaging Backup Water Supply

Procedures will be written and made available to plant operators which will describe the proper operator actions necessary under the two cases of the recommendation.

GS-5 Initiation of Auxiliary Feedwater Following a Loss of AC Power

Not applicable to BVPS-2. Following a loss of a.c. power, the turbine-driven auxiliary feedwater pump is capable of providing the required flow for at least 2 hours without any operator action.

GS-6 Flow Path Verification

Plant procedures to verify that valves are properly aligned following testing or maintenance shall be implemented. BVPS-2 will follow, where possible, the Standard Technical Specification, Rev. 4.

GS-7 Non-Safety Grade, Non-Redundant, Automatic Initiation Signals

Not applicable to BVPS-2. The automatic start signals and associated circuitry are safety grade.

GS-8 Automatic Initiation of Auxiliary Feedwater System

Not applicable to BVPS-2. The auxiliary feedwater system is automatically initiated.

Additional Short-Term Recommendations

5.3.1 Primary Water Source Low Level Alarm

Redundant safety grade level indication for the primary plant demineralized water storage tank (PPDWST) is provided in the main control room. A low level alarm is provided to indicate if the PPDWST inventory has decreased to a level sufficient to supply auxiliary feedwater for at least 20 minutes.

5.3.2 Pump Endurance Test

As stated in the response to Question 640.23(a) Amendment 7, the auxiliary feedwater pumps will undergo 48-hour endurance tests in accordance with SRP Section 10.4.9. (Reference Sections 14.2.12.32.1 and 14.2.12.32.2)

5.3.3 Indication of Flow to Steam Generators

Safety grade, redundant flow transmitters located upstream of the cavitating venturis provide main control room indication of the flow to each steam generator. These transmitters meet the power diversity requirements of Branch Technical Position ASB 10-1.

5.3.4 System Availability During Periodic Surveillance Testing

Not applicable to BVPS-2. The limiting condition of operation requires all three steam generator auxiliary feedwater pumps to be operable during modes 1, 2, and 3.

Long-Term Recommendations

GL-1 Automatic Initiation of Auxiliary Feedwater System

See recommendations GS-7 and GS-8.

GL-2 Single Valves in Flow Path

See recommendation GS-2.

GL-3 Elimination of System Dependency on AC Power Followig a Complete Loss of AC Power

See recommendation GS-5.

GL-4 Prevention of Multiple Pump Damage due to Loss of Suction Resulting from Natural Phenomena

Not applicable to BVPS-2. The PPDWST and all interconnected piping is protected from earthquakes and tornadoes.

GL-5 Non-Safety Grade, Non-Redundant Initiation Signals

See recommendation GS-7.

TABLE Q410.52-3

Basis for Auxiliary Feedwater System Flow Requirements

Item*	Subject	FSAR Reference (Table-T) (Section-S)
1.a	Plant transients and accident conditions	S-10.4.9.1
1.b	Maximum RCS pressure	T-5.4-13
	Fuel temperature or damage limits	S-4.4
	RCS cooling rate	S-5.3.2.1
	Minimum steam generator level	S-5.4.2
2.a	Maximum reactor power	T-15.0-3 S-15.0.3.1
2.b	Time delay from initiating event to reactor trip	T-15.0-4
2.c	Plant parameters which indicate AFWS flow	S-10.4.9.5
	Time delay before introduction of AFWS flow to steam generators	S-10.4.9.2
2.d	Minimum steam generator water level when initiating event occurs	T-15.0-4
2.e	Initial steam generator water inventory and depletion rates	T-15.1-3 T-15.2-2 T-15.3-3 T-15.4-3 T-15.6-5
	Reactor decay heat rate	S-15.0.10
2.f	Maximum pressure in steam generators	S-15.1.4.1 S-15.1.5.1 S-15.2.2.1 S-15.2.3.1 S-15.2.6.1 S-15.2.7.1 S-15.6.3.1 S-15.6.5.2
2.g	Minimum number of steam generators that must receive AFWS flow	S-10.4.9.1
2.h	RC flow condition - RC pump operation or natural circulation	T-15.0-2 T-15.0-3

Item*	Subject	FSAR Reference (Table-T) (Section-S)
2.i	Maximum AFWS inlet temperature	S-10.4.9.2
2.j	Time delay to direct AFWS flow to intact steam generators after postulated steam or feedwater line break	S-10.4.9.3
2.k	Volume and maximum temperature of water in main feedwater lines	S-15.0.11 T-15 0-3
2.l	Operating condition of steam generator blowdown following initiating event	S-10.4.8.5
2.m	Primary and secondary water and metal sensible heat	S-15.0.11
2.n	Time at hot standby and time to cooldown RCS to RHR system cut in temperature	S-10.4.9.2
3.	Verify AFWS pumps will supply necessary flow to the steam generators considering a single failure	S-10.4.9.3

Note:

*Refer to Enclosure 2 in NRC letter of March 10, 1980, to near-team operating license applicants concerning auxiliary feedwater system design.

TABLE Q410.52-4

Basic Component Probability of Failure on Demand

Component	Failure Probability (Q)	Reference
Pump (Motor)	.00581	USNRC 1981c
Pump (Turbine)	.0116	USNRC 1981c
Valves (MOV, HCV)	.000201	USNRC 1981c
Valves (SOV)	.001	USNRC 1975a
Valves (Manual) Operator Error	.003	USNRC 1975b
Valves (Manual) Mechanical Failure	.0000193	USNRC 1981c
Tank Failure	.00000031	USNRC 1981c
Service Water	.00000372	USNRC 1981c
Steam Generator	.000133	SWEC 1975
Emergency Diesel Generator Failure	.053	USNRC 1975a
Pipe Length	.00000014	Melvin and Maxwell 1974