Duquesne Light

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

2NRC-4-130
(412) 787-5141
(412) 923-1960
Telecopy (412) 787-2629

August 21, 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
Hydrology/EPP Open Item Response

Gentlemen:

This letter forwards responses to the issues listed below. Duquesne Light Company plans to incorporate the responses to the FSAR questions into a future FSAR amendment. The following items are attached:

Attachment 1: Revised response to Outstanding Issue 3 of the Beaver Valley Power Station Unit No. 2 Draft Safety Evaluation Report.

Attachment 2: Response to Outstanding Issue 165 of the Beaver Valley Power Station Unit No. 2 Draft Safety Evaluation Report.

Attachment 3: List of Emergency Plan changes required to reflect Unit 2 Operation

Attachment 4: Copies of instructions and evacuation maps for the public are included for staff review.

DUQUESNE LIGHT COMPANY

SUBSCRIBED AND SWORN TO BEFORE ME THIS
20th DAY OF August, 1984.

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

Anita Elaine Reiter
Notary Public
ANITA ELAINE REITER, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

TJZ/wjs
Attachments

cc: Mr. H. R. Denton, Director (NRR) (w/o)
Mr. D. Eisenhut, Director Division of Licensing (w/o)
Mr. E. A. Licitra, Project Manager (w/o)
Ms. M. Ley, Project Manager (w/o)
Mr. G. Walton, NRC Resident Inspector (w/o)

A001
1/1

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this 20th day of August, 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.

Anita Elaine Reiter
Notary Public

DUQUESNE LIGHT COMPANY
ANITA ELAINE REITER, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

ATTACHMENT 1

Response to Outstanding Issue 3 of the
Beaver Valley Power Station Unit No. 2
Draft Safety Evaluation Report

Draft SER Open Item No. 3

Draft SER Open Item No. 3 concerns the basis of the technical specification limiting plant operation to Ohio River elevation 654 ft. msl. and above and also the ability to shut down the plant if the river level falls below elevation 654 ft. msl. (OSER Section 2.4.11.2).

Response

The technical specification, described in FSAR Section 2.4.14, was established for BVPS-1 and has been adopted by BVPS-2. This technical specification requires that plant shutdown be initiated when the river level falls to 654 ft. msl. The basis for the 654 ft. msl. shutdown elevation is described in detail in Applicant Response to NRC Regulatory Staff Position 1 (7/19/73), BVPS-1 FSAR Section 2.14 (attached). In summary, the design minimum net positive suction head for the BVPS-1 raw water pumps, which are necessary for normal station operation, is reached at 654 ft. msl.

Although the technical specification requires initiating a plant shutdown at river elevation 654 ft. msl., the intake structure can provide quantities of service water adequate for the shutdown and cooldown of BVPS-2 down to the design low river water level of 648.6 ft. msl. The water level of 648.6 ft. msl. is established in the March 29, 1973, letter from the U.S. Army Corps of Engineers (USCOE) to Mr. R. J. McAllister of Duquesne Light Company (attached).

Based on a reasonable scenario of events as described in the USCOE letter of November 1, 1973 (attached), which was originally agreed to by the NRC in the BVPS-1 SER pages 2-9 and 2-10 (attached), the river level will not drop below the design low water level of the BVPS-2 service water pumps. Therefore, BVPS-2 will always be able to draw sufficient water to achieve cold shutdown.

Question 2.14

We believe that Figure 2.3-1 of the FSAR is incorrect. Provide an instantaneous low-flow frequency curve based upon a statistical analysis of historical and anticipated future regulated flows using probability or exceedance frequency as the abscissa in your presentation. To substantiate your analysis discuss the historical low flows recorded in the vicinity of the site and the potential future effects of flow regulation.

Response

A low flow frequency curve for the Ohio River at Shippingport is shown in [redacted]. This curve represents the lowest continuous 7 day mean flows that would occur. It is based on a statistical analysis of historical flows during the past 44 years (1929-date) as modified by the present reservoir system. An instantaneous low flow could be slightly lower, but with the large impoundments behind the locks and dams, the 7 day flow could be provided continuously by temporarily drawing on the river storage when needed.

The lowest flow of record occurred during the extreme drought of 1930. A minimum of 1,250 cfs flowed past Shippingport in August of that year. Since that time eight reservoirs with low flow augmentation capabilities have been constructed. [redacted] the contemporary reservoir system to 100 cfs.

Several reservoirs in the authorized or planning stages would have a substantial influence on low flows. Included in this group are Stonewall Jackson, Rowlesburg, and St. Petersburg. Collectively, they would increase the minimum flow to approximately 6,000 cfs at Shippingport.

[redacted] from the previous El. 649.0. The following margin remains for safety related pumps in the intake structure:

Pump	Submergence (ft) [redacted]	Minimum Submergence Required (ft)	Margin (Percent)
River Water	9	4	100
Fire Pump	5	1.6	210

AEC Regulatory Staff Position 1 (7/19/73)

The response to Question 2.14 concerning low-flow occurrence on the Ohio River is not acceptable because your assumption that the minimum flow results from reservoir regulation, does not provide adequate assurance of a dependable water supply during drought periods, more severe than have occurred historically. By extrapolating an unregulated low-flow frequency for drought conditions, which may be characterized as the most severe reasonably possible at the plant site, we and our consultant (Nunn, Snyder and Associates), believe an instantaneous low flow of about 800 cubic feet per second could occur.

Therefore, we require that you provide an analysis which indicates the expected river water levels at the intake structure and which demonstrates the capability of the safety-related pumps (service water and fire water) to provide their required flow in such a situation. If safety-related pumps would not be capable of performing their function in a plant shutdown mode of operation in such a condition of low flow, provide the bases for a technical specification which requires a plant shutdown at a s ified condition of river water flow that would assure at l t thirty days supply of water. Provide sufficient information to allow us to make an independent review of your analysis.

Response ((To AEC Reg. Staff Pos. 1 (7-19-73))

Information on the regulation of the New Cumberland Pool during extreme low flow conditions was requested from the Pittsburgh District, Corps of Engineers. A copy of the request and the Corps' answering letter are attached.

At a flow of 800 CFS coincident with lock damage which could reasonably be expected to occur the pool would drop 1.8 ft to elevation 662.7 feet M.S.L.

The New Cumberland Pool is maintained at El 664.5 through the use of locks, dams, and storage reservoirs in the river basin. Records indicate that this elevation can be maintained at flows up to 20,000 cfs.

Normal plant operation can be continued at river levels between El 695 and El 654. At El 695 the plant is shutdown as discussed in Response 2.16. At El 654, the river water, raw water, and f water pumps still have adequate NPSH to meet design r irements as summarized below:

Pump	Minimum Submergence Required (Ft)	Submergence (Ft) at El 654
River water	4	13.4
Fire	1.6	10.4
Raw water	5	5

Since the raw water pumps design minimum NPSH is reached at El 654, Unit 1 shutdown will be initiated. The occurrence of river levels below El 654 is highly improbable. It is further concluded that when the pool level declines below El 659, an unusual occurrence is taking place. In this situation, the operator will contact the New Cumberland Dam Lock Master to determine the possible cause of the pool level excursion. If the pool level cannot be maintained above El 654, the operator will initiate a Unit 1 shutdown.

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
FEDERAL BUILDING, 1000 LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA 15222

ORPED-O

29 March 1973

Mr. Robert J. McAllister
Structural Engineer
Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Minimum River Flows at the
Beaver Valley Power Station

Dear Mr. McAllister:

We have made a reanalysis of low flows in the Ohio River. Computerized simulation models were developed to reproduce the hydrologic system of the Pittsburgh District. Included in this system were all of the reservoirs that normally augment low flows. The model was then used to simulate regulated stream flows for the period of record (1929-1966) according to the operating schedules adopted for each reservoir.

Results of these computer analyses show that, with the contemporary system of reservoirs, a minimum flow of 4000 c.f.s. would have occurred at Shippingport during the record drought of 1930. This value supersedes the minimum value of 4700 c.f.s. furnished several years ago. The corresponding minimum water surface elevation at the Beaver Valley Power Station site would be 648.6 instead of 649.0.

Sincerely,

DAN A. CONNER
Major, Corps of Engineers
Acting District Engineer

Copy furnished:

Mr. Richard C. Miller
Hydraulic-Environmental Engineer
Stone & Webster Engineering Corp.
225 Franklin Street
Boston, Mass. 02107

Q 2.14-4

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
FEDERAL BUILDING, 1000 LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA 15222

ORPED-O

1 November 1973

Mr. Richard C. Miller
Senior Hydraulic-Environmental Engineer
Stone & Webster Engineering Corporation
P. O. Box 2325
Boston, Massachusetts 02107

Beaver Valley Power Station -
Loss of Pool

Dear Mr. Miller:

In response to your letter of 2 October 1973, we are submitting the following information relative to the possibility of a drop in the New Cumberland normal pool level during extreme low flow conditions.

Should such an event occur or be anticipated, the Pittsburgh District Emergency Center will be alerted. The Center will then be responsible for directly notifying the Beaver Valley Power Station, landings, intakes and other interested parties affected by a drawdown in the pool. It will also notify the public through press releases to the various news media.

During any low flow period, navigation pools such as New Cumberland would not be intentionally lowered. Locking activities could be continued at normal rates without any drawdown of the pool, even if the flow was at the minimum rate of 800 c.f.s. stated in your letter.

The only lock or tainter gate damage reasonable to assume during a drought period would be the loss of a lock gate due to a navigation accident. Sabotage is not considered in this evaluation. Inclosed is a copy of a letter sent to Mr. Robert J. McAllister of Duquesne Light Company explaining the situations which could cause loss of pool and the resulting measures that could be taken to correct the problem. In that letter, a flow of 4,700 c.f.s. was used for the analysis. Loss of more than one gate was also discussed. It was assumed that any such incident would occur during a flood and that repairs would be made within two weeks. At that time the flow would be no less than 20,000 c.f.s. with a corresponding elevation of 654 feet above mean sea level (m.s.l.) at the plant.

1 November 1973

ORPED-O
Mr. Richard C. Miller

Our present analysis considers an extreme drought with a flow of 800 c.f.s. Since the only damage that could reasonably be expected to occur with this flow is the loss of a lock gate, the bulkheads could be installed within four hours and there would be no further loss of pool. During these four hours of open lock flow, the pool would drop 1.8 feet to elevation 662.7 feet m.s.l.

Computations were made to evaluate the loss of a tainter gate or lock gate without placing the bulkheads, although we do not consider this a reasonable possibility. Since you are interested in the rate of fall to your critical elevation of 948.0 m.s.l., we have included Plate 1 showing the pool recession for these conditions.

Sincerely,

N. G. DELBRIDGE
Colonel, Corps of Engineers
District Engineer

2 Incl
As stated

FLOW = 800 CFS.
LOCK SILL ELEV. = 647.5 FT. M.S.L.
TAINTER GATE SILL ELEV. = 645.0 FT. M.S.L.

NEW CUMBERLAND LOCKS
AND DAM
ANALYSIS OF POOL DRAWDOWN
WITH LOSS OF A GATE
U.S. ARMY ENGR. DISTRICT, PITTSBURGH
WHS 17 OCT 73

ELEVATION IN FEET ABOVE MEAN SEA LEVEL

666
662
658
654
650
647
645
646

0 1 2 3 4 5 6 7 8 9

DAYS AFTER LOSS OF GATE

LOSS OF LOCK GATE (OPEN LOCK)

LOSS OF TAINTER GATE
(OPEN BAY)

MINIMUM ELEVATION

To provide assurance that flood protection will be effective for the river water intake structure (the only safety-related structure that would be affected) we have taken the position that technical specifications limiting plant operation would provide for such situations. Accordingly, the applicants have proposed a technical specification which provides for flood protection in the event of rapid river rises as well as for runoff floods up to and including a PMF. We find this acceptable.

Site drainage includes the hillside drainage south of the plant, the plant area itself, and Peggs Run which parallels the highway road fill just east of the plant between the highway and cooling tower area. Although the design basis selected for site drainage is substantially less severe than would be produced by local probable maximum precipitation, the ground in the plant area slopes toward the Ohio River and Pegns Run, and runoff in excess of storm drainage inlet and piping capacity is not expected to cause water levels greater than a few inches above the ground surface. The applicants have concluded, and we concur, that such levels should not constitute a flood threat to safety-related facilities.

Peggs Run is constricted in a deeply incised channel between the highway embankment and the cooling tower area at elevations as low as about 670 feet above MSL. A structure across Peggs Run about 700 feet east of the proposed location of Beaver Valley Unit 2 containment provides the base for the railroad track stream crossing serving the plant area. The railroad crossing and grade in the area is sufficiently below plant grade such that Peggs Run flooding from severe storms, even with the railroad structure waterway blocked, should not reach safety-related structures located to the west and on higher ground.

Another potential source of plant flooding of safety-related features is associated with the failure of the roofs of buildings. At our request, the applicants have provided design bases for roof drainage systems that will prevent rainfall accumulations from exceeding the structural design bases of the roofs of safety-related buildings during storms as severe as a local probable maximum storm.

We have also analyzed the potential for ice flooding based upon historical records in the region and consideration of local topography. Although such flooding is possible at the site, the PMF is the controlling flood and was used in establishing the design flood level for the site.

Water will be drawn from the Ohio River through the intake structure for plant cooling purposes. This includes make-up to the cooling tower basins for plant operation (non-safety-related), and for safety-related purposes.

A sill at elevation 616 feet above MSL will limit the river water level for which water can be supplied to the intake structure sump for plant use. The applicants have proposed a minimum design river level at elevation 649 feet above MSL based on a 4,700 cfs minimum river flow coincident with an arbitrarily postulated downstream dam failure. The minimum safety requirements are an emergency river water system flow of 9,000 gallons per minute (20 cfs) coincident with fire pump demand of 2,500 gallons per minute (6 cfs).

In examining the analysis of potential low river flows, it was determined that the 4,700 cfs minimum river flow assumed by the applicants was predicated on the ability of upstream reservoirs to augment low river flows. Since the dependability of such augmentation is based on others providing reservoir storage for approximately a drought of record, we and our consultant (Nunn, Snyder and Associates) analyzed the potential river flow that could be expected under very severe drought conditions.

We estimated that the minimum river flow rate could be as low as 800 cfs. This flow rate is considered adequate for safety-related plant water supply. We had originally determined that such a low flow could result in a river level well below the minimum design level selected by the applicants. On this basis we informed the applicants that we required an analysis to demonstrate the long-term residual heat removal capability for river flows as low as 800 cfs, the lowest river flow considered reasonable possible of occurring. We have reviewed and concur with the applicants' analysis which shows that under reasonably severe river conditions that could be expected with flows as low as 800 cfs the river water level can be maintained above the minimum design level selected by the applicants.

The potential for channel diversion or blockage of the Ohio River such that safety-related water supplies would not be available is not considered credible because of the lack of adverse floodplain topography along the river where diversion or blockage could adversely affect the plant.

Operating procedures employing the use of technical specifications to limit plant operations are required for severe floods to assure the operability of safety-related equipment. At the request of the staff, the applicants have provided the bases for a technical specification that contains the following elements: (1) provisions for a flood alert at river levels of 690 feet MSL or above, (2) provisions for plant operating personnel to maintain contact with operators of upstream dams, (3) immediate plant shutdown to be undertaken and protection of required safety-related equipment to be initiated at rising river levels above 695 feet MSL, and (4) a detailed emergency procedure to be developed for such situations.

The site is on a predominantly permeable sand and gravel terrace, underlain by bedrock at about elevation 630 feet above MSL. Although some ground water migrates in bedding and joint planes and some permeable seams in the bedrock, the major movement of ground water at the site is through the permeable surface terrace materials toward a direct hydraulic connection with the river. Ground water levels, because of the direct hydraulic connection, can be expected to be slightly higher than river levels, except where influenced by well pumping. The only wells within the influences of the operating plant are two wells at the adjacent Shippingport Atomic Power Station and two temporary Beaver Valley plant construction wells.

We have concluded that acceptable flood design bases have been provided, that an acceptable water supply can be assured for safety-related purposes, and that ground water flow is not intercepted by any wells beyond the control of the applicants before reaching the Ohio River. Acceptable bases for technical specifications which limit plant operation during high river water levels have been incorporated in the application, and acceptable hydrologically-related design bases for the auxiliary river water system (further discussed in Section 9.3.4 of this report) have been established.

2.5 Geology and Seismology

We and our advisor, the U.S. Geological Survey (USGS), reviewed the geology of the site as presented in the PSAR and its amendments for Unit 1 at the construction permit stage of our review, and compared this information with the available literature. The USGS stated, and we concurred, that the analysis appeared to be carefully derived and to present an adequate appraisal of those aspects of the geology that would be pertinent to an engineering evaluation of the site.

ATTACHMENT 2

Response to Outstanding Issue 165 of the
Beaver Valley Power Station Unit No. 2
Draft Safety Evaluation Report

Draft SER Open Item No. 165: Section 13.3.2, "Evaluation of the Applicant's Onsite Emergency Plan," and Section 13.3.3, "Conclusions"

Item 1: Page 120, Section 13.3.3, Reference Section 13.3.2.1

Revise the emergency plan to include Unit 2 as an operating unit vice a construction site.

Response:

A list of changes to show Unit 2 as an operating unit has been compiled (Attachment 3). These changes will be included in the scheduled February, 1985, and April, 1985, submittal of the revised Emergency Preparedness Plan and Implementing Procedures, respectively.

Item 2: Page 120, Section 13.3.3, Reference Section 13.3.2.3

The plan should specify the persons, by title, who are authorized to request Federal assistance (C.1.a).

Response:

A statement assigning this responsibility has been added to Section 5.5.2.1, "Emergency Director Responsibilities," and Section 5.2.2, "Emergency Recovery Manager Responsibilities," of Issue 8 of the BVPS-1 Emergency Preparedness Plan (EPP) due to be issued in August 1984.

Item 3: Page 121, Section 13.3.3, Reference Section 13.3.2.3

The plan should specify licensee, State, and Local resources available to support the Federal response (C.1.c).

Response:

A reference to the Greater Pittsburgh International Airport and its location will be added to Section 2. Also included in Section 2 will be a statement referencing the Resource Manuals developed by the three counties in the EPZ. The other examples mentioned in Section C.1.c of NUREG 0654 are currently addressed in the plan.

Item 4: Page 121, Section 13.3.3, Reference Section 13.3.2.4

Correct the deficiencies in the EAL sets as listed in Section 13.3.2.4.

Response:

The EAL's will be reviewed and revised as necessary. The revised EAL's will be included in the February 1985 revision of the EPP.

Item 5: Page 121, Section 13.3.3, Reference Section 13.3.2.7

The printed instructions and evacuation maps for the public shall be developed and submitted for staff review (G.1).

Response:

The instructions and evacuation maps (Annual Mailer) are reviewed annually by Pennsylvania, Ohio, and West Virginia, and Beaver, Hancock, and Columbia Counties and approved by each. Comments are incorporated and copies are sent to the applicable FEMA regions. A copy of the instructions and evacuation maps (Attachment 4) have been included for staff review.

Item 6: Page 121, Section 13.3.3, Reference Section 13.3.2.11

The plan should specify methodology for initial accountability (to be accomplished within 30 minutes) and the methodology to be used to maintain accountability on a continued basis (J.5).

Response:

Statements addressing the 30 minute criteria and the detailed accountability Emergency Implementing Procedure have been included in Issue 8 of the EPP.

Item 7: Page 121, Section 13.3.3, Reference Section 13.3.2.12

The plan lacks a letter of agreement for ambulance service (A.3).

Response:

A letter of agreement with Medic Rescue ambulance service (effective April 3, 1984) has been included in Issue 8 of the EPP.

Item 8: Page 121, Section 13.3.3, Reference Section 13.3.2.12

Licensee shall certify annually as to the currency of the letters of agreement (P.4).

Response:

The letters of agreement are addressed in Section 2.6 of the plan. A statement has been included in Issue 8 of the EPP stating that the letters of agreement will be reviewed and certified to be current on an annual basis.

ATTACHMENT 3

Emergency Plan Changes Needed to Incorporate Unit 2

Section 1

1. Definitions - #5 eliminate Unit 2 "jobsite."

Section 2

1. Remove statement in first paragraph concerning construction of Unit 2.

Section 4

1. Section 4.2, "Spectrum of Postulated Accidents," will need revised due to major differences between BVPS-1 and BVPS-2 FSAR assumptions and parameters.

2. Table 4.1, "Action Level Criteria for Classification of Emergency Conditions," will need revised due to possible Technical Specifications changes for BVPS-2.

3. Table 4.2, "Radiation doses Resulting from Postulated Accidents," will need revised due to the same reasons as #2 above.

Section 5

1. Section 5.4.2, "BVPS Construction Organizations," will need revised.

Section 6

1. Section 6.7, "Protective Actions," needs to have references to Unit 2 construction forces eliminated.

2. Section 6.7.1, "Onsite protective Actions," will need revised due to various references to Unit 2 "jobsite." Also, inclusion of Unit 2 in write-ups with modifications of protective areas.

3. Table 6.2, "Notification Matrix," needs to be revised to eliminate BVPS-2 Construction section.

Section 7

1. Section 7.4.3.2, "Seismic Equipment," may need possible modification based on Unit 2 location and instruments.

2. Section 7.5.2, "Station Assembly Areas," will need added for Unit 2.

3. Section 7.5.2.3, "BVPS Unit 2 Jobsite," will be eliminated.

4. Section 7.6.1, "Bell of Pennsylvania Telephone System," will need to eliminate BVPS-2 Construction Offices.

Section 8

1. Appendix D, Enclosures 8, 9, and 10, "Process Effluent Radiation Monitoring System," will need revised to reflect Unit 2.

DSA
County of Columbiana
Disaster Services Agency
51009 Richardson Avenue
Negley, OH 44441

IMPORTANT
EMERGENCY INFORMATION
DO NOT DISCARD

Place in your telephone directory for safekeeping

ATTACHMENT 4

Hancock County
Office of Emergency Services
102 Court Street
New Cumberland, WV 26047

IMPORTANT
EMERGENCY INFORMATION
DO NOT DISCARD

Place in your telephone directory for safekeeping

Beaver County
Emergency Management Agency
250 EAST END AVENUE
BEAVER, PA 15009

IMPORTANT
EMERGENCY INFORMATION
DO NOT DISCARD

Place in your telephone directory for safekeeping