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SUBJECT: Forwards responses to comments received by NRC re facility  
 aes.

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November 13, 1979

Mr. Donald E. Sells, Acting Branch Chief  
Environmental Projects Branch 2  
Division of Site Safety and Environmental Analysis  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUSQUEHANNA SES  
RESPONSES TO DES COMMENTS  
DOCKET NOS 50-387 AND 50-388  
ER 100450 FILE 991-2  
PLA-413

Dear Mr. Sells:

In your letters of September 6 and September 21, you transmitted comments received by NRC on the Draft Environmental Statement for Susquehanna SES. Attached are our responses to those comments.

Very truly yours,



N. W. Curtis

WEB:cak  
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ATTACHMENT  
RESPONSES TO DES COMMENTS

1. Pennsylvania State Clearing House letters dated August 20 and September 5, 1979.

COMMENT: NUCLEAR ACCIDENT

Applicants presently anticipate increasing the number of direct radiation monitors.

COMMENT: SPENT FUEL STORAGE

The spent fuel pool will not reach capacity until at least 1994. Applicants are developing a spent Fuel Disposition Plan which recognizes the possible need for additional onsite storage of spent fuel as well as several other options which may be available.

In 1977, the federal government announced a policy under which it agreed to accept and take title to spent fuel from domestic utilities in exchange for a one time fee covering cost of temporary storage and eventual geologic disposal. Congress is currently considering legislation to implement that policy.

COMMENT: RADIATION RELEASES

The direct radiation dose rates as stated in the SSES ER-OL and FSAR have been calculated using a Monte Carlo type code. The turbine deck equipment was treated as a series of point sources which closely models the actual distribution and location of Nitrogen 16. The shielding was based upon as built dimensions.

The computer code employed in the calculations (Skyshine) has been shown to calculate dose rates which are in good agreement with measured dose rates. (See EPRI Report NP-243, analysis of N-16 radiation measurements at the Cooper Nuclear Station.)

Because SSES used the Skyshine code with as built shielding dimensions, Applicants do not believe the N-16 shine has been underestimated.

In reference to DES Table 4.5, routing the mechanical vacuum pump exhaust through the off-gas system is not feasible because the mechanical vacuum pump exhaust flow rate greatly exceeds the off-gas system design flow rate.

Applicants' existing gaseous radwaste system is described in Section 3.5.3 of the ER-OL and Section 11.3 of the FSAR.

COMMENT: WATER QUALITY

The NPDES permit for the Susquehanna SES has specified no average limitation on iron but a daily maximum of 7 mg/l. The iron content in the Susquehanna River normally does not meet PA department of Environmental Resources, Chapter 93, Water Quality Criteria. On DES pages 4-4 through 4-7 and Table 4-3, the discussion of the discharge from the station does not indicate the settling rate of suspended solids in the cooling tower basins. The ratio of suspended solids of the water in the cooling tower basins to the water in the discharge is about 3 to 1 which approximately offsets the concentration factors listed in Table 4-3. If the concentration of iron in the river exceeds DER criteria, the station will discharge approximately the same concentration. This is noted in the NPDES permit which states that the effluent quality need not exceed the quality of the raw water supply.

The National Interim Drinking Water Standard (40CFR141) for Gross Beta activity in drinking water is 4 mrem to the total body or any internal organ. This value is equivalent to 8 pCi/L average annual concentration. The average annual concentration of corrosion, activation and fission products from the plant is calculated to yield a value of 0.66 pCi/L at Danville, the closest downstream public drinking water intake. For tritium, calculations yield a value of 24.4 pCi/L which can be compared with the standard of 20,000 pCi/L.

COMMENT: FISH POPULATION

Based on studies done by Ichthyological Associates, Inc. at the Hunlock Steam Electric Station (Hunlock SES) in 1974-75 (Ichthyological Associates 1975), Applicants believe that impingement and entrainment will be "relatively small." The Hunlock SES is a small, coal-fired station operated by the Luzerne Electric Division of UGI Corporation, Kingston, Pennsylvania with an intake structure similar to that of Susquehanna SES. It is located about 15 km upriver from the Susquehanna SES and utilizes a once through cooling system that draws about 245 m<sup>3</sup>/min of water through two intake canals with velocities up to 0.11 m/s. Once each month, from May 1974 through April 1975, impingement samples were collected. Extrapolation of results from these samples showed that approximately 230 kg of fish flesh were impinged throughout the one-year period. It was therefore concluded that impingement losses of about 0.6 kg/day which is about the same as an angler catching one 15 inch walleye weighting 1.5 lbs. (0.68 kg) or three 9 inch small mouth bass weighing 0.5 lb. (0.22 kg) each. Conservatively assuming that 0.6 kg/day is the equivalent of one sport fish per day, impingement losses would total 365 sport fishes per year. While no sport fishing data is available for the reach of the river where the plant is located, a creel survey on another reach of the river showed sport fishing yields of about 28,000 fish per year. It was therefore concluded that impingement losses would have a negligible effect on the sport fishing on the Susquehanna River in the vicinity of the plant. Because the Susquehanna SES at maximum generation will withdraw only about 150 m<sup>3</sup>/min (but at

slightly higher velocities than Hunlock SES), it is reasonable to conclude that impingement losses would be similar to those experienced at Hunlock SES. Larval fish were also sampled at Hunlock SES once per month in May, June, and July 1974 to evaluate entrainment. Mean densities of entrained larvae were always less than one larvae/m<sup>3</sup>. This was concluded to be an acceptable loss because less than 5% of the river flow was drawn into the plant on the days sampled. Similar results are expected at Susquehanna SES.

With respect to scouring of the river bed, the river substrate near the discharge diffuser of the Susquehanna SES is coated with ferric hydroxide precipitate for much of the year as a result of acid mine drainage from various sources upriver. This ferric precipitate has been shown to impair the standing crops of periphytic algae and benthic macroinvertebrates. Those types of chironomids found in the vicinity of the discharge are not adversely affected by this precipitate. Any turbulence, created by jetted discharge water, would tend to dislodge the precipitate, thus cleaning the substrate at least immediately downstream from the diffuser. It is therefore likely that this turbulence would be beneficial rather than detrimental to the periphytic and benthic communities. In addition, it is also probable that some species of river fishes, such as spotfin shiner (Notropis spilopterus), bluntnose minnow (Pimephales notatus), and tessellated darter (Etheostoma olmstedi), would prefer to spawn in the turbulent area because of the availability of clean substrate.

2. Mr. Thomas R. Duck letter dated August 29, 1979.

COMMENT: DES PAGE 4-2

The availability of water from the Susquehanna River is not required for safe shutdown on the plant. A self-contained water source is available on site sufficient to cool the reactor core for a thirty-day period.

3. Susquehanna River Basin Commission letter dated August 30, 1979.

COMMENT: DES SECTION 3.2.1, PAGE 3-1

The station water requirements are approximately the same in the ER-CP (Sec. 3.4) and the ER-OL (Sec. 3.3). The 1972 numbers listed in Table 3.1 of the DES are the estimate of average and not maximum flow. The difference in the intake flows is only 0.04 in m<sup>3</sup>/s and not 0.45 m<sup>3</sup>/s. The values for withdrawal rate vary depending on meteorology; however, the range should be between 1.8 and 2.45 m<sup>3</sup>/s as indicated in Table 3.1 of the DES.

COMMENT: POND HILL STORAGE FOR PP&L USE

PP&L has applied to SRBC for review of a reservoir project at Pond Hill having 10,000 acre-feet of active storage. This volume of water will compensate for an average Susquehanna SES (SSES) consumptive use of 50 cfs for 96 days plus an allowance for losses and for maintaining



a conservation flow in the downstream channel. It was recognized that the consumptive use at SSES and the concurrent reservoir releases will exceed the average part of the time. The consumptive use could approach 64 cfs about 1% of the time under very stringent weather conditions. However, it had been concluded that the expected average use over several months, accounting for probable plant load reductions and varying weather conditions, would be less than 50 cfs.

The worst evaporative conditions experienced in the region of the site were in 1964 with a 106 day drought. Using U.S. Weather Bureau data for this period, PP&L calculated that the total consumptive use for the station at full load is 52.5 cfs.

COMMENT: Q-7-10 FLOW

PP&L has reviewed all the available water records for the Wilkes-Barre gage and agree that based on the latest available data, a value for Q-7-10 of 800 cfs is appropriate. This value will be used in sizing the reservoir for final design.

COMMENT: INTAKE STRUCTURE

See response to EPA-Water Quality, DES Page 3-3.

COMMENT: CONSUMPTIVE WITHDRAWAL

Adverse effects on the aquatic habitat as a result of consumptive withdrawal of river water during periods of low flow will be substantially mitigated as a result of compliance with Susquehanna River Basin Commission regulations requiring low flow augmentation.

COMMENT: POST-OPERATIONAL MONITORING PROGRAM

Applicants currently anticipate measuring plant intake and discharge flows.

4. U.S. Department of the Interior letter dated September 10, 1979.

COMMENT: DES PAGE 2-28 AND PAGE 4-33

McClintock Hall and Catlin Hall, located on the campus of Wilkes College, Wilkes-Barre, PA, and the Denison House, located in Forty Fort, PA, are several miles east of the closest transmission line which is the Susquehanna-Stanton 500 kV Line. The Susquehanna transmission lines are not visible from these registered landmarks.

Also, see response to Susquehanna Alliance-Cultural Resources.

COMMENT: DES PAGE 3-8

See response to EPA-Water Quality, Page 3-8.



COMMENT: DES PAGE 4-9

A proposed study program related to entrainment and impingement is presently being prepared by Applicants and will be submitted to the DER in accordance with the NPDES permit.

COMMENT: DES Page 5-2

As shown in Figure 4.1 of the DES, the exposure pathway to humans from liquid releases is through the Susquehanna River. Ground water gradients in the vicinity of SSES are such that accidental liquid discharges to the groundwater would flow to the river and do not significantly affect ground water supplies. Refer to Section 2.4.4. of the SSES ER-OL for a discussion of groundwater in the vicinity of the site. A more detailed discussion, including an analysis of a hypothetical liquid release, is provided in Section 2.4.13 of the FSAR.

COMMENT: DES PAGE B-5

The current Right-of-Way Management Policy promotes the natural establishment of both food and cover for wildlife to the extent possible, while still allowing achievement of safe and reliable service.

Handcutting and herbicide spray programs are both conducted on a selective basis with only the undesirable species (woody species which could conceivably grow tall enough to cause a service interruption) chemically treated or removed.

Where permissible, brush cut from rights-of-way is piled along the edge. Embankments along access roads and structure locations where grading was necessary are seeded with grasses and/or legumes. Both practices provide food and cover for wildlife.

Rugged terrain and poor soil conditions often are unsuitable for planting game foods. In many areas, the only vegetation that can be established on a particular site is that which currently exists there. In order to prepare other sites for planting, natural existing food sources could be destroyed with no guarantee that the vegetation planted would survive.

A policy of handcutting and spraying selectively will, in the long run, establish a stable low growing plant community. This will reduce use of herbicides in the future while improving existing wildlife habitat.



5. Jepps Letter - 8/8/79

See Response to Susquehanna Alliance - Anthracite Alternative.

6. U.S. Department of Transportation letter dated August 9, 1979

COMMENT 1: ACCESS POINTS

Fuel shipment access points have not been designated at this time since spent fuel will not be shipped from the site until the mid 1990's. It is anticipated that DOT and NRC rulemaking may eventually require predetermined shipping routes and at that time shipping efforts will be coordinated with the appropriate Pennsylvania agencies including PennDOT.

COMMENT 2: TRAVEL TRIPS

It is unlikely the 400 operational employees traveling to and from the station will increase traffic volume to exceed the design capacity of the existing highways for several reasons.

First, the 400 employees will be distributed among three shifts. Eighty percent or 320 employees will be assigned to the first shift which starts at 7:30 a.m. and ends at 4:00 p.m. The remaining 80 employees will be assigned to second and third shifts. Second, the settlement pattern will be similar to that during the construction phase. This dispersed settlement pattern permits using seven major roads to commute to and from the station rather than the one or two roads available from a concentrated settlement pattern. It is not anticipated the workers' settlement pattern's will have an adverse effect on traffic flow.

7. U.S. Department of Agriculture, Forest Service letter dated August 14, 1979.

COMMENT: 2, 4, 5-T

Since March 1, 1979, with the emergency suspension by the U.S. Environmental Protection Agency (EPA) of 2,4,5-T, this herbicide is no longer used along transmission lines, rights-of-way or for any other reason. Only EPA approved herbicides will be used on Applicant's transmission line rights-of-way.

Applicants presently anticipate using primarily Dicamba and Fosamine. Ammonium sulfamate may also be used to a limited extent in watershed areas. The use of these agents is, of course, subject to change based on future regulatory and industry developments as well as further study by Applicants.



8. Sierra Club, Pa. Chapter, letter dated August 15, 1979.

COMMENT: ARCHEOLOGICAL SURVEY

See Response to Susquehanna Alliance - Cultural Resources.

COMMENT: CROSSING LEHIGH RIVER GORGE

The location of the transmission lines crossing over the Lehigh River Gorge was selected to minimize the environmental impact of the lines. The Pa. Department of Environmental Resources agreed that the corridor chosen represents the best location under the circumstances involved.

COMMENT: NUCLEAR VS. COAL

See Response to Susquehanna Alliance - Anthracite Alternative.

9. Susquehanna Alliance letter dated August 17, 1979.

COMMENT: CULTURAL RESOURCES

Prior to construction of the Susquehanna SES, recreation area and transmission lines there were archaeological surveys. The detail and type of survey depended on the recommendation of archaeologists as to the potential socio-cultural value of the particular area and the then current regulations for the protection of historic and cultural resources. The Susquehanna site is divided by U.S. Route 11. The station is located on a plateau west of U.S. Route 11 (655 acres) where habitation tends to be minimal because of the bedrock subsurface and the hilly forested terrain. Emphasis was placed on surveying the floodplain area along the river. In 1968 the floodplain areas were surveyed by Bloomsburg State College in conjunction with the Penn. Historical and Museum Commission, and it was decided not to pursue additional archaeological investigations on the floodplain because the evidence of existing undisturbed cultural deposits did not seem to warrant a salvage excavation. This site has been affected over the years by flooding, soil erosion, canal and railroad construction, farming and amateur archaeologists.

Transmission line rights-of-way leaving the Susquehanna SES are for the most part acquired in easements. These easements still allow the owners to use the transmission line rights-of-way in such manner as will not interfere with the safe and efficient operation and maintenance of the transmission lines and structures. Prior to selection of rights-of-way, the Nation Register of Historic Places (U.S. Department of Interior, Heritage Conservation and Recreation Service) was reviewed to make certain that no historic places were affected by the rights-of-way. No historic places were determined to be affected.

If any historic or socio-cultural artifacts are found during construction, the Penn. Historical and Museum Commission will be contacted.

COMMENT: ANTHRACITE ALTERNATIVE

Applicants agree that an anthracite generation project could produce socio-economic benefits for the anthracite region. There are, however, of a number of negative influences that could be important. For example, anthracite's complex geology, its limited sources of large amounts in a single area, and the problems associated with water treatment in the anthracite area all create risks that must be more fully evaluated.

Current estimates are that siting/licensing/construction of an anthracite fired generation plant could require in excess of 10 years to complete. Because of this lead time and the previously noted uncertainties, it is unrealistic to delay operation of Susquehanna because of the potential long range benefits of a future anthracite plant. As discussed in the DES, operation of Susquehanna enables a considerable savings of oil, provides reliability benefits, and in addition makes possible substantial savings in operating costs.

While PP&L/PJM reserve levels with the Susquehanna units are higher (in the near term) than required to meet current reliability standards, the relatively low operating costs of the units is such that they are expected to operate almost all the time they are available.

Operation of the units will enable the replacement of substantial amounts of higher cost oil and coal fired generation on the PP&L/PJM systems. This will produce significant operating cost savings for both PP&L/PJM, and will make possible the conservation of a relatively large amount of oil. (See DES - Chapter 7)

In addition to the preceding, it also is important to note that because of the benefits of fuel diversity that the units provide, Applicants will be better prepared to meet unexpected changes in the supply of coal and oil. Furthermore, Susquehanna will provide a supplemental margin of service reliability for other unforeseen contingencies.

COMMENT: DECOMMISSIONING COSTS

The estimates for "clean-up" of TMI-2 cannot be compared with decommissioning estimates for Susquehanna SES because the TMI estimate includes the cost of replacement fuel as well as the cost of returning the plant to an operating condition. Such costs are not relevant to end-of-life decommissioning estimates.

10. U.S. Environmental Protection Agency letter dated August 17, 1979.

COMMENT: IODINE

Increased gaseous iodine releases are due to a design change from a cryogenic to charcoal off-gas removal system. This increase in projected iodine releases did not result in a significant change in dose to a child's thyroid for the following reasons:

1. on-site meteorology was used in making dose calculations.
2. the distance to the site boundary increased due to property acquisitions, and
3. use of improved computational techniques for dose calculations.

COMMENT: DIRECT RADIATION FROM NITROGEN-16

The direct radiation dose from Nitrogen-16 at site boundaries and closest residence or public facility can be found in SSES-ER-OL, Table 5.2-27. Also SSES-ER-OL, Table 5.2-25 and 5.2-26 summarize data for the Critical Boundary, Vegetable Garden and Dairy Farm.

The direct radiation dose of 2.7 mrad/yr was calculated using the 1972 version of the "Skyshine" computer code and assuming a 100% occupancy factor. (SSES-ER-OL, 5.2-18)

Applicants are unaware of the specific methods used by NRC to calculate the direct radiation doses for Susquehanna SES.

COMMENT: WATER QUALITY

DES Page 2-12

The following is a list of internal station flows:

<u>Flow Path</u>	<u>Quantity</u>
Raw Water Treatment Plant to Radioactive Area Waste Uses	0-200 gpm
Raw Water Treatment Plant to Demineralizer	120 gpm (batch)
Demineralizer to Radioactive Area Water Uses	0-200 gpm
Demineralizer to General Plant Uses	0-145 gpm
Raw Water Treatment Plant to General plant Uses	0-145 gpm

It should also be noted that there is a demineralized water storage tank and transfer pumps of 200 gpm capacity located on the common line from the demineralizer to radioactive area water uses and general plant uses.

The chloride ion is not listed by the Pa. DER as a standard for the Susquehanna River in the vicinity of the Plant.

The sewage plant effluent is discharged into the Susquehanna River. This plant is designed to have three separate, parallel treatment units to provide flexibility in operation depending on need. The three units assure efficient operation at 1/3, 2/3 or full capacity. A full description is contained in the Application for a Sanitary Waste Discharge Permit to the Pa. DER.

#### DES Page 3-3

The EPA comment is relevant to high velocity intake structures in thriving ecosystems such as an estuary. The Susquehanna SES intake structure is not this type and operates at a very low intake velocity of 0.37 fps for two openings or 0.75 fps for one intake opening (39,100 gpm, see ER-OL Section 3.4). The reach of the Susquehanna River where the plant is located contains acid mine drainage and is not as abundant with aquatic life as an estuary or non-polluted river.

#### DES Page 3-8

In accordance with NPDES Permit No. PA-0047325, the acceptable pH range is between six and nine. The appropriate low pH alarms and interlocks are included in the design to prevent accidental over-feeding of acid. Acid is used at the Susquehanna SES to prevent scale deposits that might form by the concentration of dissolved solids when water is evaporated and warmed. The acid addition is automatically controlled so that the natural buffer (acid absorbing) capacity of the water is not exceeded. See ER-OL Section 3.6.3 for additional information.

The NPDES Permit shows the final design which deletes the parking area hold-up pond. There are three low volume waste basins that are separately treated prior to being discharged. They are treated by retention, oil and grease removal and pH adjustment as required by this permit.

The estimate for the rate of accumulation of sediment in the tower basins is 2,700,000 lbs/year/tower. At this rate, the tower basins are not expected to need cleaning for several years after station start-up. Sediment from these basins will be disposed of on-site in one of the existing erosion control ponds which is not needed after construction. See ER-OL Section 3.7.2.



11. U.S. Department of Agriculture, Soil Conservation Service letter dated August 20, 1979

COMMENT: SEDIMENT AND EROSION CONTROL

Measures have been taken throughout the construction of the project to control erosion and sedimentation such that the waters of the Susquehanna would not be polluted. Surface water was diverted away from the project area by means of grading, open channels and culverts to sedimentation ponds, prior to discharge into the Susquehanna River.

Finally all areas disturbed by the project will be stabilized either by hard paving, gravel or controlled organic growth (grassed areas). Run-off is diverted away from the project area by proper grading, open channels and culverts. Rip-rap is placed at exit points to control the flow and minimize soil erosion.

COMMENT: PRIME AGRICULTURAL LAND

As stated in the Susquehanna SES ER-OL, the total area of the site is 1,075 acres. Tillable soil, located on the floodplain and upland areas, accounts for 300 acres. There are 175 acres of tillable soil located on the flood plain which have been classified by the U.S. Soil Conservation Service as land capability Class one. One hundred acres of the floodplain will remain in agricultural production. A total of 200 acres of tillable soil will be removed from agricultural production. In 1970, Luzerne County had 85,000 acres of land classified agricultural.

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