



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III

6TH AND WALNUT STREETS  
PHILADELPHIA, PENNSYLVANIA 19106

AUG 15 1983

Dr. Rajender Auluck, P.E., Project Manager  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Dr. Auluck:

EPA has completed its review of the draft EIS for operation of the Limerick Generating Station, as required under Section 309 of the Clean Air Act. In general, the document is acceptable with certain exceptions enumerated in the attached technical comments. As a result of the review, the draft EIS is rated ER-2, which means that the environmental reservations are related to insufficient information. The attached sheet describes the rating system used by EPA and is enclosed for your information.

In late 1980 and early 1981, the EPA EIS review staff met with the DRBC and PaDER several times to clarify environmental issues related to the Neshaminy Creek Watershed Plan and Water Supply Plan. The issues discussed had been raised in a letter to DRBC, dated September 26, 1980, and supplemented in subsequent meetings. The issues included analysis of flows, population and water use projections, water conservation controls, and the relationship of the Philadelphia Electric Company needs (described in Docket No. 79-52-CP) as it relates to components of the NWRA watershed and water supply plans. These meetings resolved our technical concerns regarding the NWRA portion of the diversion proposal and resulted in our conclusion that the potential benefits to be derived from the diversion, as claimed in the various Dockets, far outweighed any potential adverse impacts. This is the position EPA took in a letter dated February 17, 1981 to Governor Tribbet of Delaware, who was then the U.S. Commissioner of DRBC.

The majority of the following comments are concerned with radiation and cooling water with regard to its sources and receiving streams. In some cases the radiation information is incompletely addressed while in other places it is presented in a way that is confusing to the reader. The major deficiencies regarding radiation are: a) treatment of EPA standards, b) a lack of information on postulated accidents, and c) a lack of information on decommissioning.

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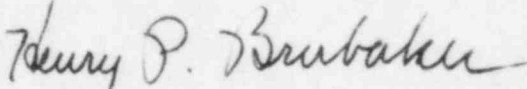
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With regard to the cooling water discussions, the document is inconsistent in its presentation of the water budget and the needs. Major deficiencies in the water area of concern are: a) cooling water budget inconsistencies, b) the range of cooling water needs for differing operating configurations, c) aquatic impacts of flow extremes in diversion and receiving streams that may occur over short time spans, and d) dilution for water quality improvement in the lower portion of the East Branch Perkiomen Creek. These are the two major areas addressed in the comments and are followed by some air pollution concerns and other minor points.

We appreciate the opportunity to review the document and your staff's cooperation. If any points require further discussion or clarification, please contact Mr. Robert Davis of the EIS Review Team. He can be reached on 215-597-4388.

Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Henry P. Brubaker".

Henry P. Brubaker  
Chief, Analysis and Services Section

Enclosure(s)

## Technical Comments

### Radiation Concerns:

A most important concern is the treatment of the EPA standards for the uranium fuel cycle given in 40 CFR 190. These standards are fleetingly addressed on pages 5-38 and 5-48, 49. The standards are incompletely described and are addressed only by the vague statement that "under normal operations the Limerick facility is capable of operating within these standards." This statement does not state whether or not the plant actually will operate within the standards, and more importantly only a part of the standard is referenced by the DEIS. Attached is a copy of 40 CFR 190 for your information. In a careful study of the DEIS, we have found that information is supplied on pages 5-64 and D9-D11 which may be compared to the EPA standard, but the information is not presented in an understandable format and there is some question as to whether the standard for release of krypton-85 will be met. The EPA standards should be directly and completely addressed in the EIS in tabular form so that projected releases may be directly compared to the standard. The standard is applicable only to normal operations.

In addition, there is a lack of information on postulated accidents and on the radwaste system. On pages 5-61 it is stated that NRC's review of the utility's probabilistic risk assessment has not yet been completed and "will be factored into the NRC staff's analysis . . . to fulfill the requirement of this section of the DES." The radwaste issues are to be addressed in Chapter 11 of the SER. Both of these issues are an integral part of the environmental impacts of the plant and should be considered as a part of the NEPA process. No final EIS should be issued before these issues are reviewed by EPA and supplemental comments provided to NRC.

As a final note on the radiological portion of this review, the impacts of decommissioning are only briefly mentioned in passing. At least a general order of magnitude of these impacts should be discussed, though specific numerical estimates of the impacts are probably not yet available.

### Hydrology and Cooling Water:

Information presented in the document regarding hydrology is in agreement with information available to the EPA technical staff. However, some serious questions have been raised over the cooling water sources and uses.

Questions are raised concerning withdrawal flows presented in Table 4.1 and Section 4.2.4. Page 4-10 indicates a maximum withdrawal rate of 95 MGD from the Delaware River. Of this, a maximum of 46 MGD will be diverted to Limerick. However, Table 4.1 shows a maximum flow of 37 MGD from the Delaware/Perkiomen. This apparent inconsistency should be explained.

Page 4-12 indicates a maximum withdrawal rate of 41.9 MGD from Perkiomen is expected. However, this does not match with the maximum flow of 46 MGD diverted to Limerick, as stated on page 4-10, nor does it match the flows in Table 4.1 for the Perkiomen. Again the apparent inconsistency should be explained.

These inconsistencies may be serious, with implications reaching from operation of the Point Pleasant diversions all the way to the range of possible effects upon the final receiving stream. These could impact the Bradshaw reservoir, the East Branch of the Perkiomen Creek, the Perkiomen Creek, the Schuylkill at the confluence with the Perkiomen, and downstream.

Section 4.2.4 should detail the current conditions of those streams to receive diversion water more thoroughly than is done. For example, virtually nothing is included regarding the conditions of the riparian habitat or the flood plain, and in chapter 5 no mention is made of the effects under extreme conditions, e.g., high flows of short duration. We agree that diverted water will result in negligible effects most of the time and furthermore will probably have beneficial effects ecologically. However, extremes should be thoroughly explained. In addition, very little is mentioned regarding the effects of the environmental ramifications of flows 4 to 25 times normal. You have included information that flows are below the highest flows and that they are well within the erosion limits, but disclosure should go beyond merely the water quality conditions. The answers are probably available and deserve inclusion, if only by reference.

In addition, no mention is made of the effects the Pennsylvania Public Utility Commission decision regarding unit two. If only one unit is ever operated, what are the implications for the cooling water budget both from the Point Pleasant diversion and the Schuylkill? Since this possibility has been disregarded, we have no way of estimating any aquatic impacts that may result from differing operational configurations. If only one unit is ever brought on-line, alternative sources of cooling water may be available. In this case, diversion of water into the East Branch of the Perkiomen may be unnecessary.



Part of the operational plans mentioned in the document are concerned with the use of releases from the yet to be constructed Merrill Creek facility. Admittedly, all the ramifications of this are unknown, but it seems apparent that releases from that facility will seldom be needed. However, if that facility is necessary for the successful operation of the LGS then what contingency has been planned in the event that the Merrill Creek facility is precluded? This as well as other impoundments appears to be crucial to future water quality in the Delaware.

Recent information indicates that DRBC is continuing to update the modeling of the Delaware, especially with regard to the salinity criteria. As we understand it, the latest salinity objective for the year 2000 is unachievable under current operational modes of existing and planned impoundments and diversions. Apparently a need exists to adjust the operational configuration of these projects to achieve the salinity objective. Aside from the fact that DRBC has a plethora of alternatives to consider and quite a few years to develop and examine them, still the demands by Limerick are certainly a part of the Point Pleasant diversion and certain to be a concern in the deliberations over the salinity issue. Therefore, the salinity issue and operation of the Limerick plant are related and the basin's overall water budget into the future may effect the operation of the Limerick plant. Sections 5.3 or 5.3.2.3 should include discussions regarding salinity and the EIS should include information on the impacts expected from the various operational configurations, both for the LGS as well as for the dams and diversions.

An apparent inconsistency exists in statements under Section 4.3.2.1 (p. 4-3) and 5.3.2.2 (p. 5-3). In the first case it is stated that no changes in the overall scheme for water use has occurred while on page 5-3 it is stated that several changes in the design have taken place. The reviewers assume that these changes have been made to accommodate water quality implications, however, no information is presented to tell why such changes were necessary and why such drastic efforts were needed for what appear to be incremental improvements. On the other hand, perhaps these design efforts have been made for larger improvements than are expressed. If this is so, then the document should discuss design changes discarded and why.

Another inconsistency exists regarding benefits to accrue from the Point Pleasant diversion. In Docket No. D-65-76CP (8), DRBC has eliminated dilution and augmentation as Point Pleasant diversion benefits for the Neshaminy, but the draft EIS claims such benefits for the East Branch Perkiomen. This appears to be inconsistent because it is a claim of convenience in spite of the fact that apparently dilution is the easiest means for improving the lower portion of the East Branch.

In Section 5.3.2.3, operation of the diversion and its environmental effects are discussed. It is understood that once the diversion of water to Limerick is begun the flows will be maintained so that extremes in fluctuation of water levels in the streams used for diversion will be avoided. However, no mention is made of how the diversion will be operated so that flash floods resulting from short duration/high intensity storms will not be exacerbated. There may be no cause for concern here, but some attention should be paid to the possibility, especially in light of the lack of riparian habitat along the streams of the area. In other words, much of the flood plain in the area has been changed so that it is now dedicated to agriculture or to activities other than flood way.

#### Air Concerns:

Under air impacts on page 5-24, the emissions are estimated to be "less than EPA de minimus levels" for certain pollutants. These de minimus levels are probably those used for PSD purposes. No information is given on the actual off-site ambient concentrations that will result. While the low emissions will most likely result in very small impacts, this does not justify the complete lack of any numerical data to backup this assertion. At a minimum, annual and maximum 24-hour emissions should be given. A simple model could then be run to estimate off-site concentrations. If these are truly as small, this will reinforce the conclusion that the impacts are too small to be significant.

Finally, on page 5-15, first paragraph, the last sentence states that "Actions to mitigate these potential impacts (from cooling tower chlorination) should be considered . . .". This statement constitutes a recommendation to the utility and is out of place in an EIS. It would be more appropriate to discuss what will be done, what are the alternatives and what mitigative actions will be implemented.

### Other Concerns:

The following are some minor points and are offered for your consideration and information.

1) On page 4-37 mention is made of the possibility of the presence of eels in the Delaware. This is very likely, especially in light of the fact that a small eel fishery exists in the Port Jervis area, far upstream of the diversion intake.

2) The document contains some very assured statements regarding the ultimate improvement in quality of the streams receiving diversion water. However, monitoring in conjunction with operation of the diversion should be carried out for all parameters contained in the draft EIS as well as for the fish community. A good start has been made, as described in Section 4, of the trophic levels in all the streams. This should be expanded and continued as the diversion is completed and placed into operation.

3) Section 5.3.2.3 describes the nonthermal water quality anticipated for the Bradshaw facility and the Delaware. A statement is made that the reservoir will act as both a sediment controlling facility as well as a phosphorous sink. However, no mention is made regarding the nonsettleable fraction which will pass through the reservoir and may negate any phosphorous control claimed as a benefit of the reservoir. Perhaps some reassessments are in order if the modelling for receiving stream water quality has not included this source of phosphorous. In addition, we failed to see any statements covering retention time in the Bradshaw facility. Information from other sources indicates that sediment control is not achieved with flows greater than 10% of total capacity flow through per day. However, this is an optimum figure that is adjusted on a case-by-case basis. In any event, the claims made by the NRC for sediment control using the Bradshaw facility should be substantiated statistically in the final EIS.

4) The next-to-last paragraph on page 5-25 states that "... induced shock will adversely affect biota along the Limerick Transmission corridor." Perhaps this is a typographical error because the remainder of the paragraph describes just the opposite. However, if this is not an error, then this section needs to be rewritten.

## SUBCHAPTER F—RADIATION PROTECTION PROGRAMS

## PART 190—ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR NUCLEAR POWER OPERATIONS

## Subpart A—General Provisions

Sec.

190.01 Applicability.

190.02 Definitions.

## Subpart B—Environmental Standards for the Uranium Fuel Cycle

- 190.10 Standards for normal operations.  
 190.11 Variances for unusual operations.  
 190.12 Effective date.

**AUTHORITY:** Atomic Energy Act of 1954, as amended; Reorganization Plan No. 3, of 1970.

**SOURCE:** 42 FR 2860, Jan. 13, 1977, unless otherwise noted.

## Subpart A—General Provisions

## § 190.01 Applicability.

The provisions of this part apply to radiation doses received by members of the public in the general environment and to radioactive materials introduced into the general environment as the result of operations which are part of a nuclear fuel cycle.

## § 190.02 Definitions.

(a) "Nuclear fuel cycle" means the operations defined to be associated with the production of electrical power for public use by any fuel cycle through utilization of nuclear energy.

(b) "Uranium fuel cycle" means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel, to the extent that these directly support the production of electrical power for public use utilizing nuclear energy, but excludes mining operations, operations at waste disposal sites, transportation of any radioactive material in support of these operations, and the reuse of recovered non-

uranium special nuclear and by-product materials from the cycle.

(c) "General environment" means the total terrestrial, atmospheric and aquatic environments outside sites upon which any operation which is part of a nuclear fuel cycle is conducted.

(d) "Site" means the area contained within the boundary of a location under the control of persons possessing or using radioactive material on which is conducted one or more operations covered by this part.

(e) "Radiation" means any or all of the following: Alpha, beta, gamma, or X-rays; neutrons; and high-energy electrons, protons, or other atomic particles; but not sound or radio waves, nor visible, infrared, or ultraviolet light.

(f) "Radioactive material" means any material which spontaneously emits radiation.

(g) "Curie" (Ci) means that quantity of radioactive material producing 37 billion nuclear transformations per second. (One millicurie (mCi)=0.001 Ci.)

(h) "Dose equivalent" means the product of absorbed dose and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its spatial distribution in the body. The unit of dose equivalent is the "rem." (One millirem (mrem)=0.001 rem.)

(i) "Organ" means any human organ exclusive of the dermis, the epidermis, or the cornea.

(j) "Gigawatt-year" refers to the quantity of electrical energy produced at the busbar of a generating station. A gigawatt is equal to one billion watts. A gigawatt-year is equivalent to the amount of energy output represented by an average electric power level of one gigawatt sustained for one year.

(k) "Member of the public" means any individual that can receive a radiation dose in the general environment, whether he may or may not also be exposed to radiation in an occupation associated with a nuclear fuel cycle. However, an individual is not consid-

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ered a member of the public during any period in which he is engaged in carrying out any operation which is part of a nuclear fuel cycle.

(l) "Regulatory agency" means the government agency responsible for issuing regulations governing the use of sources of radiation or radioactive materials or emissions therefrom and carrying out inspection and enforcement activities to assure compliance with such regulations.

## Subpart B—Environmental Standards for the Uranium Fuel Cycle

## § 190.10 Standards for normal operations.

Operations covered by this subpart shall be conducted in such a manner as to provide reasonable assurance that:

(a) The annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations.

(b) The total quantity of radioactive materials entering the general environment from the entire uranium fuel cycle, per gigawatt-year of electrical energy produced by the fuel cycle, contains less than 50,000 curies of krypton-85, 5 millicuries of iodine-129, and 0.5 millicuries combined of plutonium-239 and other alpha-emitting transuranic radionuclides with half-lives greater than one year.

## § 190.11 Variances for unusual operations.

The standards specified in § 190.10 may be exceeded if:

(a) The regulatory agency has granted a variance based upon its determination that a temporary and unusual operating condition exists and continued operation is in the public interest, and

(b) Information is promptly made a matter of public record delineating the nature of unusual operating conditions, the degree to which this operation is expected to result in levels in

excess of the standards, the basis of the variance, and the schedule for achieving conformance with the standards.

## § 190.12 Effective date.

(a) The standards in § 190.10(a) shall be effective December 1, 1979, except that for doses arising from operations associated with the milling of uranium ore the effective date shall be December 1, 1980.

(b) The standards in § 190.10(b) shall be effective December 1, 1979, except that the standards for krypton-85 and iodine-129 shall be effective January 1, 1983, for any such radioactive materials generated by the fission process after these dates.

## PART 192—ENVIRONMENTAL PROTECTION STANDARDS FOR URANIUM MILL TAILINGS

## Subpart A—[Reserved]

## Subpart B—Environmental Standards for Cleanup of Open Lands and Buildings Contaminated with Residual Radioactive Materials From Inactive Uranium Processing Sites

Sec.

192.10 Applicability.

192.11 Definitions.

192.12 Standards.

192.13 Effective date.

## Subpart C—Exceptions

192.20 Criteria for exceptions.

192.21 Remedial actions for exceptional circumstances.

Table A [Reserved]

Table B

**AUTHORITY:** Sec. 275, Atomic Energy Act of 1954, (42 U.S.C. 2022), as amended by the Uranium Mill Tailings Radiation Control Act of 1978, Pub. L. 95-604.

**SOURCE:** 45 FR 27367, Apr. 22, 1980, unless otherwise noted.



Environmental Impact of the Action

LO--Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the draft statement.

If a draft impact statement is assigned a Category 3, ordinarily no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.