

**RAS 12196**

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

**DOCKETED 09/06/06**

**SERVED 09/06/06**

Before Administrative Judges:

Dr. Paul B. Abramson, Chairman  
Dr. Anthony J. Baratta  
Dr. David L. Hetrick

In the Matter of

EXELON GENERATION COMPANY, LLC

(Early Site Permit for Clinton ESP Site)

Docket No. 52-007-ESP

ASLBP No. 04-821-01-ESP

September 6, 2006

ORDER

(Requesting Staff Responses to Attachment A Regarding Clinton ESP FEIS)

On July 20, 2006, the Final Environmental Impact Statement (FEIS) for a 10 C.F.R. Part 52 early site permit for the Exelon Generation Company, LLC (EGC) Clinton nuclear power station site in DeWitt County, Illinois was published as NUREG-1815 and a Notice of Availability of that FEIS was published in the Federal Register on August 4, 2006.<sup>1</sup>

As outlined in our August 2, 2006 Order,<sup>2</sup> in this mandatory hearing the Board is charged in part with addressing three broad NEPA-based questions, the resolution of which will depend materially upon the Board's assessment of the FEIS and the balance of the record supporting it. Having at this point completed our preliminary review of the FEIS, in furtherance of our review functions regarding the NEPA-related portions of the mandatory hearing, the Board propounds to the Staff the inquiries set forth in Attachment A hereto.

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<sup>1</sup> See 71 Fed. Reg. 44,280, 44,281 (Aug. 4, 2006).

<sup>2</sup> See Licensing Board Order (Addressing: (a) Commission Order dated 7/26/06; (b) requiring briefings in preparation for a public hearing; and (c) establishing a preliminary schedule) (Aug., 2, 2006) (unpublished).

In addition, the Board has observed that the FEIS deals much more thoroughly with issues related to the performance of reactor types other than the ABWR and the AP1000 in development of the PPE (see, e.g., sections 5.10.1 and 5.10.2 of the FEIS) than does the FSER. The Staff is directed, in addition to responding to the queries set out in Attachment A, to explain why the assessment of the impacts of reactors other than the ABWR and the AP1000 is dealt with differently in the FSER and the FEIS and how those differences affected the logic of the Staff conclusions in each circumstance where it is assessed.

The Staff shall file responses to the inquiries included in Attachment A not later than C.O.B. September 29, 2006.

IT IS SO ORDERED.

THE ATOMIC SAFETY  
AND LICENSING BOARD<sup>3</sup>

**/RA/**

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Dr. Paul B. Abramson, Chairman  
ADMINISTRATIVE JUDGE

**/RA/**

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Dr. Anthony J. Baratta  
ADMINISTRATIVE JUDGE

**/RA by Dr. Paul B. Abramson for/**

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Dr. David L. Hetrick  
ADMINISTRATIVE JUDGE

Rockville, Maryland  
September 6, 2006

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<sup>3</sup> Copies of this order were sent this date by Internet e-mail transmission to: (1) Counsel for EGC, and (2) Counsel for the NRC Staff.

**ATTACHMENT A**  
CLINTON ESP  
FEIS INQUIRIES

Page	Section	Inquiry
1-4	1.1.3	<p>The Staff states that it “relied on reasonable assumptions made by Exelon” and that those assumptions are “identified in each section and are documented in Appendixes J and K and this EIS.” The Staff then states “staff intends to confirm these assumptions at the CP or COL stage.” (See also Section 3.2.1 on p. 3-7). The Staff notes that it is required to “independently evaluate and be responsible for” information in the EIS.</p> <p>Appendix J is merely a list of parameters for the PPE and, since it was prepared by Applicant, and the Applicant bears the full risk at the COL stage of its bounding nature. What is the nature of the “verification” to be conducted by Staff at the COL stage beyond assuring that the actual plant design falls within those bounds?</p> <p>Appendix K, on the other hand, has three parts: K-1 seems to be actual Applicant commitments and/or statements to be verified; K-2 lists statements not directly considered by the Staff; and K-3 seems to also have matters that will need to be confirmed at the COL stage (although it is said to relate to activities of third parties). Explain what, if any, matters discussed in sections K-2 and K-3 are to be confirmed at the COL stage, and confirm the Board’s understanding that all items listed in K-1 are to be confirmed at the COL stage.</p>
2-15	2.3.1.2	<p>The Staff performed a comparison of atmospheric stability for the period between 1972 and 1977 and between 2000 and 2002. The Staff notes that there has been a shift in the distribution towards unstable conditions. The Staff then suggests that the shift may be due to the existence of the Clinton Lake. Did the Staff examine if there were any changes in regional stability that could explain the observations?</p>
2-18	2.3.3	<p>Fourth paragraph of section: Why is there no reference to the FSER for the atmospheric dispersion values?</p>
2-24	2.6.2.2	<p>Did Staff confirm Exelon’s report that 65% of total public groundwater supplies are pumped from the Mahomet Bedrock Valley aquifer? If not, why is this matter not mentioned in Appendix K?</p>
2-26	2.6.3.3	<p>The Staff states that Exelon proposed two new sampling locations regarding lake inflow and outflow temperature distributions. What is the Staff’s view of the sufficiency of this proposal and the locations proposed? If this is an open ended proposal, why is it not mentioned in Appendix K?</p>
2-35	2.7.2.1	<p>Third paragraph of section: Tenmile Creek is “west of the city of Clinton and approximately 8 km (5 mi) west of the site.” But the city of Clinton is 6 mi west of the site. Is there a typographic error in part of this?</p>

2-42	2.8.1	Staff mentions State of IL population projections are “not expected to be released until 2004 to 2006.” Were these projections released? If so, were they considered by Staff? If not, why is this not mentioned in Appendix K?
2-45	2.8.1.2	Did Staff verify Exelon’s population projection methods and results for tables 2-6 and 2-9? If not, why are these not part of what must be verified at the COL stage?
2-52	2.8.2.1	Middle of page: The term “Starker exchanges” should be defined for the reader.
3-2	3.2	Third paragraph of section: “The values used for the seven reactor designs are not necessarily the same values used in the safety evaluation.” Why not? Please clarify.
3-4	3.2	Table 3-1: Composing error in heading of table.
3-6	3.2	Footnote 1 states that the listings in Appendix K are not intended to be a complete list of the commitments described in the ER. Where is there a complete list of such commitments?
3-9	3.2.2.1	Second paragraph of section: The heat rejection of 4420 MW is for two AP-1000 reactors. The other plants in Table 3-1 would produce smaller heat loads. Please clarify how smaller heat loads would affect the discussion.
4-20	4.4.3	Final paragraph of section: “The conclusion of SMALL impacts by the NRC staff is predicated on certain assumptions made by the staff. These include . . . .” Why were all assumptions not listed?
4-33	4.5.3.5	The area around Clinton Lake is a popular summertime destination making rental property both expensive and scarce during that time. As a result, should the impact of construction on housing be listed as SMALL to LARGE depending on the time of year?
5-2	5.1.1	The Staff concludes the impacts of construction on land use would be SMALL yet states that additional mitigation would be warranted. Should the statement read “would not be warranted?”
5-4	5.2.2	Last sentence of section: Give details of this calculation.
5-6	5.3.2	Second paragraph of section (last sentence): Should the decrease in lake elevation correspond to a decrease in water releases? Please clarify.
5-8	5.3.2	The Staff states that during years where precipitation is below normal the impact of water use would be MODERATE and require coordination with IEPA. How will the Staff ensure this occurs?
5-9	5.4.1	Throughout the EIS the Staff notes that Exelon has not chosen a cooling tower design and did not provide sufficient information to evaluate various impacts, and instead, these impacts would be assessed at the CP or COL stage. How will the Staff ensure these are evaluated given the 20 year life of an ESP?

5-11	5.4.1.3	Second paragraph of section: More water consumption would seem to correspond to a decrease in water releases (see Question regarding p. 5-6). Please clarify.
5-13 5-46	5.4.1.5 5.8.4	Explain how the statements regarding EMF in these two sections are consistent.
5-22	5.4.2.2	The Staff notes that an Environmental Protection Plan as well as requirements for the disclosure, investigation, and analysis of nonroutine environmental impacts of operation would be expected to be part of an OL for a new nuclear unit and could be included as part of a COL. How will the Staff ensure these are included as part of a COL considering the 20 year life of an ESP?
5-35	5.5.3.2	The Staff appears to question the assumptions of Exelon regarding the impact on taxes associated with operation of a new nuclear unit and concludes there is no way of knowing if Exelon is correct. It would seem appropriate for the Staff to conduct a bounding analysis to determine if additional mitigation is warranted. Please comment on whether or not this is appropriate.
5-39	5.5.3.5	Exelon assumes that much of the workforce will come from the local area and as a result there will be minimal impact on housing. Did the Staff assess the Exelon assumption given the changing demographics in the local area? Also, if the assumption is not valid, it would seem that the impact would be LARGE rather than MODERATE as indicated by the Staff. Please provide additional explanation for the choice of MODERATE.
5-47	5.8.6	The chronic health effect of continued exposure to EMF's is given as unknown. Since all electrical generating facilities, no matter what location, would potentially have such an effect, why is this discussed in a site-specific EIS rather than in a GEIS?
5-51	5.9.2.2	First paragraph of section: Why are Tables 3.5-1 and 3.5-3 of the ER not reproduced here?
5-54 & 55	5.9.3.1	Tables 5-3 and 5-4 are not in complete agreement with each other. Please clarify.
5-59	5.9.5.3	The Staff states that it performed an independent assessment of the dose to biota. Please explain how this was done.
5-62	5.10	Second to last paragraph of section: Why are the quoted cancer induction rates not referenced?
5-62	5.10.1	First paragraph of section: Did the Staff verify the applicant's evaluation of DBA's?

5-63	5.10.1	<p>The Staff states that should Exelon choose to build and operate a reactor other than an ABWR or AP1000 Exelon would need to verify that the radiological consequences are bounded by those evaluated in the EIS. How is this documented by the Staff as part of the ESP approval? A similar statement appears later on (page 5-66) about gas cooled reactors in relation to chi/Q values, how does the Staff plan to track these needs?</p> <p>Finally, a similar situation exists in the SER yet statements such as those on pages 5-63, 5-66, 5-76, and 5-77 are not contained in the SER. Please explain why these are in the EIS and not in the SER.</p>
5-64	5.10.1	Explain the differences between Table 5-7 of this report and Table 2.3.4-1, page 2-46, of the FSER.
5-67	5.10.1	<p>The following sentence appears to be inconsistent with the preceding discussions:</p> <p>“Should an applicant for a CP or Col reference an LWR design, the applicant would need to demonstrate that chi/Q values . . . .”</p> <p>Please explain if this is inconsistent and why.</p>
5-69	5.10.2	Middle of page: Why does Table 5-13 include only risks from internally initiated events?
5-80	5.12	First paragraph of section: “The impact column [of Table 5-15] designates beneficial impacts as SMALL.” But the beneficial items on page 5-82 are either “SMALL to MODERATE” or “SMALL to LARGE.” Please clarify.
6-1	6.0	The Staff states that Exelon would have to perform a new evaluation of uranium fuel cycle impacts if a different design is proposed at the construction permit or COL stage, if a reactor other than a LWR is chosen. Is this condition tabulated elsewhere to ensure easy reference given the 20 year life of an ESP?
6-11	6.1.1.5	Please explain the origin of the technetium-99 during the gaseous diffusion enrichment.
6-16	6.1.2	Did Staff confirm the information set out in table 6-3? Since GT-MHR and PBMR type reactors provide higher thermal efficiencies than LWRs, does the Staff’s approach over-estimate the impacts?
6-18, 6-19	6.1.2.1, 6.1.2.2	Please show how the estimates for the amount of UO <sub>2</sub> , UF <sub>6</sub> and SWU needed were derived if gas-cooled reactor technologies are employed.
6-20	6.1.2.7	Did Staff confirm Exelon’s statements that gas-cooled technologies would generate less waste and produce less heavy metal radioactive waste than the reference LWR? If not, explain how Staff is “responsible” for this portion of the conclusions. Is this part of what the Staff refers to as “unresolved” in 6.1.2.8?

6-21	6.1.2.7	The Staff concludes that the impacts from low-level radioactive waste generated by decommissioning would likely be small but would need to be evaluated at the CP or COL stage. Was it possible to glean any information from the decommissioning of the Ft. St. Vrain reactor? If so what conclusion can be drawn in light of this experience?
6-24	6.2	In the second bullet, sixth line, should the word “Cash” be “cask?”
6-35	6.2.2.1	Last paragraph of section: “Dose estimates to the MEI from the transportation of unirradiated fuel, spent fuel, and waste under normal conditions are presented in Section 6.2.1.1.” But Section 6.2.1.1 is for unirradiated fuel only. Please clarify.
6-41	6.2.3	Last paragraph of section: Same question as posed by preceding question.
6-37	6.2.2.2	The Staff states that the impact of crud and activation products on spent fuel shipment would have to be evaluated at the CP or COL stage. Where is this need tabulated?
6-38, 6-39, 6-43	6.2.2.2, 6.2.2.3, 6.3	These sections state that for non-LWRs there are a number of unresolved issues related to fuel performance, shipping casks, and accident risks, and that these issues would have to be evaluated at CP or COL stage if such designs were referenced. Where is this need tabulated?
7-2	7.2	The Staff states the impact on air quality of construction would be SMALL. How did the Staff make this determination? Similar statements appear throughout the cumulative impact section. The Staff should explain the rationale for their assessment as it is not obvious to the reader. Note, in some cases, a simple cite to an earlier section would be sufficient.
7-6	7.5	The Staff states that entrainment data are not available for the CPS for recreational fish. Page 5-17 seems to imply otherwise. Please explain.
7-7	7.5	This section states that the impact of the intake structure could be MODERATE if best available technology is not used. Can the use of best available technology be a condition of the ESP?
7-12	7.10	Staff states that certain information was not available to resolve issues. Where are these issues documented? [they are not mentioned in Appendix K] If they are not listed anywhere, provide a list.
8-3	8.2	The Staff states that the State of Illinois is an appropriate region of interest in keeping with current deregulation policies. Please provide a cite for these policies.
8-9	8.2.2.1	Throughout this section, there are assessments made that appear inconsistent with those of the similar section discussing a nuclear plant. For example, why would construction impact on land use be MODERATE where as for a nuclear plant it is SMALL? Similar inconsistencies appear in other sections and are summarized in the table on page 8-12. Please explain.



8-17	8.2.3.1	The Staff states that current energy storage technologies are too expensive for wind power to serve as a large baseload generator but does not provide a basis for this statement. Please provide either the reason or a cite to the literature. Similar statements appear on the following pages concerning geothermal sites and the size of large wood-waste power plants. Again, please provide citations. <sup>4</sup>
8-19	8.2.3.4	Last paragraph of section: First line should read “4.0 to 4.5 kWhr/m <sup>2</sup> .” Also, why is the solar power more for flat-plate collectors than for concentrating systems?
8-21	8.2.3.8	Third paragraph of section: Change “\$4500 per kWh” to “\$4500 per kW” and “\$800 to \$1500 per kWh” to “\$800 to \$1500 per kW.”
8-21	8.2.3.8	Given that the ESP is valid for 20 years, the Staff conclusion that fuel cells are not economically competitive seems inconsistent with the DOE initiative to lower costs to the \$400 per kWh goal expressed in 2004. Please explain this apparent inconsistency.
8-22	8.2.3.10	First paragraph of section: “There are many possible combinations of alternatives.” However, only one combination is analyzed in this section. Why is this considered sufficient for the environmental analysis?
8-22	8.2.3.10	The discussion does not adequately explain table 8-3. The Staff should review the discussion to see if it can be amplified.
8-24	8.2.4	Table 8-4 seems inconsistent with some of the analysis for a new nuclear unit, as noted in an earlier comment regarding p. 8-9. Please explain.
8-74	8.5.4.5	The text in the first full paragraph of the page: “increase the congest the highway . . .” is garbled.
8-102	8.64	Middle of the page: Zion is not the only alternate site where existing plants would be replaced. Does the Staff’s conclusion adequately reflect this?

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<sup>4</sup> The Board recognizes that during an ESP licensing, the Commission does not require evaluation of alternatives (except for alternative sites); however, since the Staff has included the discussion in the FEIS the Board finds it necessary to ensure the statements are supported and founded in fact and logic.



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
EXELON GENERATION COMPANY, LLC	)	Docket No. 52-007-ESP
	)	
	)	
(Early Site Permit for Clinton ESP Site)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing LB ORDER (REQUESTING STAFF RESPONSES TO ATTACHMENT A REGARDING CLINTON ESP FEIS) have been served upon the following persons by deposit in the U.S. mail, first class, or through NRC internal distribution.

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Docket No. 52-007-ESP  
LB ORDER (REQUESTING STAFF RESPONSES TO ATTACHMENT  
A REGARDING CLINTON ESP FEIS)

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[Original signed by Evangeline S. Ngbea]

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Office of the Secretary of the Commission

Dated at Rockville, Maryland,  
this 6<sup>th</sup> day of September 2006