

***Appendix A-NRC NEPA Issues for License Renewal of Nuclear Power
Plants***

Exelon Generation Company, LLC (Exelon Generation) has prepared this environmental report for the renewal of Limerick Generating Station, Units 1 and 2 (LGS) operating licenses in accordance with the requirements of U.S. Nuclear Regulatory Commission (NRC) regulation 10 CFR 51.53. NRC included in the regulation a list of National Environmental Policy Act (NEPA) issues for license renewal of nuclear power plants. [Table A-1](#) lists these 92 issues and identifies the section in which Exelon Generation addressed each applicable issue in this environmental report. For organization and clarity, Exelon Generation has assigned a number to each issue and uses the issue numbers throughout the environmental report.

Table A-1 LGS Environmental Report Discussion of License Renewal NEPA Issues^a

Issue		Category	Section of this Environmental Report	GEIS Cross Reference ^b (Section/Page)
Surface Water Quality, Hydrology and Use (for all plants)				
1.	Impacts of refurbishment on surface water quality	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
2.	Impacts of refurbishment on surface water use	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
3.	Altered current patterns at intake and discharge structures	1	4.0	4.2.1.2.1/4-5
4.	Altered salinity gradients	1	NA	LGS does not discharge to saltwater.
5.	Altered thermal stratification of lakes	1	NA	LGS does not discharge to a lake.
6.	Temperature effects on sediment transport capacity	1	4.0	4.2.1.2.3/4-8
7.	Scouring caused by discharged cooling water	1	4.0	4.2.1.2.3/4-6
8.	Eutrophication	1	NA	LGS does not discharge to a lake or other slow-moving water body.
9.	Discharge of chlorine or other biocides	1	4.0	4.2.1.2.4/4-10
10.	Discharge of sanitary wastes and minor chemical spills	1	4.0	4.2.1.2.4/4-10
11.	Discharge of other metals in waste Water	1	4.0	4.2.1.2.4/4-10
12.	Water use conflicts (plants with once-through cooling systems)	1	NA	LGS design does not include the use of a once-through cooling system.
13.	Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	2	4.1	4.3.2.1/4-29
Aquatic Ecology (for all plants)				
14.	Refurbishment impacts to aquatic resources	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
15.	Accumulation of contaminants in sediments or biota	1	4.0	4.2.1.2.4/4-10
16.	Entrainment of phytoplankton and zooplankton	1	4.0	4.2.2.1.1/4-15
17.	Cold shock	1	4.0	4.2.2.1.5/4-18

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Issue		Category	Section of this Environmental Report	GEIS Cross Reference^b (Section/Page)
18.	Thermal plume barrier to migrating fish	1	4.0	4.2.2.1.6/4-19
19.	Distribution of aquatic organisms	1	4.0	4.2.2.1.6/4-19
20.	Premature emergence of aquatic Insects	1	4.0	4.2.2.1.7/4-20
21.	Gas supersaturation (gas bubble disease)	1	4.0	4.2.2.1.8/4-21
22.	Low dissolved oxygen in the Discharge	1	4.0	4.2.2.1.9/4-23
23.	Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	1	4.0	4.2.2.1.10/4-24
24.	Stimulation of nuisance organisms (e.g., shipworms)	1	4.0	4.2.2.1.11/4-25
Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)				
25.	Entrainment of fish and shellfish in early life stages for plants with once-through and cooling pond heat dissipation systems	2	4.2	LGS design does not include the use of once- through and cooling pond heat dissipation systems.
26.	Impingement of fish and shellfish for plants with once-through and cooling pond heat dissipation systems	2	4.3	LGS design does not include the use of once- through and cooling pond heat dissipation systems.
27.	Heat shock for plants with once through and cooling pond heat dissipation systems	2	4.4	LGS design does not include the use of once- through and cooling pond heat dissipation systems.
Aquatic Ecology (for plants with cooling-tower-based heat dissipation systems)				
28.	Entrainment of fish and shellfish in early life stages for plants with cooling-tower-based heat dissipation systems	1	4.0	4.3.3/4-33
29.	Impingement of fish and shellfish for plants with cooling-tower based heat dissipation systems	1	4.0	4.3.3/4-33
30.	Heat shock for plants with cooling-tower-based heat dissipation systems	1	4.0	4.3.3/4-33
Groundwater Use and Quality				
31.	Impacts of refurbishment on groundwater use and quality	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the

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				license renewal term.
32.	Groundwater use conflicts (potable and service water; plants that use < 100 gpm)	1	4.0	4.8.1.1-115
33.	Groundwater use conflicts (potable, service water, and dewatering; plants that use > 100 gpm)	2	4.5	LGS does not use groundwater >100 gpm (annual average).
34.	Groundwater use conflicts (plants using cooling towers withdrawing make-up water from a small river)	2	4.6	4.8.1.3/4-117
35.	Groundwater use conflicts (Ranney wells)	2	4.7	LGS design does not include the use of Ranney wells.
36.	Groundwater quality degradation (Ranney wells)	1	NA	LGS design does not include the use of Ranney wells.
37.	Groundwater quality degradation (saltwater intrusion)	1	NA	LGS plant site is not located at an ocean or estuary.
38.	Groundwater quality degradation (cooling ponds in salt marshes)	1	NA	LGS design does not include the use of cooling ponds in salt marshes.
39.	Groundwater quality degradation (cooling ponds at inland sites)	2	4.8	LGS design does not include the use of cooling ponds.
Terrestrial Resources				
40.	Refurbishment impacts to terrestrial resources	2	4.9	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
41.	Cooling tower impacts on crops and ornamental vegetation	1	4.0	4.3.4.1/3-44
42.	Cooling tower impacts on native plants	1	4.0	4.3.5.1/3-44
43.	Bird collisions with cooling towers	1	4.0	4.3.5.2/4-45
44.	Cooling pond impacts on terrestrial resources	1	NA	LGS design does not include the use of cooling ponds.
45.	Power line right-of-way management (cutting and herbicide application)	1	4.0	4.5.6.1/4-71
46.	Bird collisions with power lines	1	4.0	4.5.6.2/4-74
47.	Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	1	4.0	4.5.6.3/4-77
48.	Floodplains and wetlands on power line right-of-way	1	4.0	4.5.7.7/4-81

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Threatened or Endangered Species (for all plants)				
49.	Threatened or endangered species	2	4.10	<u>Refurbishment</u> Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term. <u>Renewal Term</u> 4.1/4-1
Air Quality				
50.	Air quality during refurbishment (non-attainment and maintenance areas)	2	4.11	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
51.	Air quality effects of transmission lines	1	4.0	4.5.2/4-62
Land Use				
52.	Onsite land use	1	4.0	3.2/3-1
53.	Power line right-of-way land use Impacts	1	4.0	4.5.3/4-62
Human Health				
54.	Radiation exposures to the public during refurbishment	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
55.	Occupational radiation exposures during refurbishment	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
56.	Microbiological organisms (occupational health)	1	4.0	4.3.6/4-48
57.	Microbiological organisms (public health) (plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	2	4.12	4.3.6/4-48
58.	Noise	1	4.0	4.3.7/4-49
59.	Electromagnetic fields, acute Effects	2	4.13	4.5.4.1/4-66
60.	Electromagnetic fields, chronic Effects	NA	4.0	4.5.4.2/4-67
61.	Radiation exposures to public (license renewal term)	1	4.0	4.6.2/4-87
62.	Occupational radiation exposures (license renewal term)	1	4.0	4.6.3/4-95

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	Issue	Category	Section of this Environmental Report	GEIS Cross Reference ^b (Section/Page)
Socioeconomics				
63.	Housing impacts	2	4.14	<u>Refurbishment</u> Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term. <u>Renewal Term</u> 4.7.1/4-101
64.	Public services: public safety, social services, and tourism and recreation	1	NA 4.0	<u>Refurbishment</u> Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term. <u>Renewal Term</u> 4.7.3/4-104 (public safety) 4.7.3.3/4-106 (public safety) 4.7.3.44-107 (social services) 4.7.3.6/4-107 (tourism and recreation)
65.	Public services: public utilities	2	4.15	<u>Refurbishment</u> Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term. <u>Renewal Term</u> 4.7.3/4-104
66.	Public services: education (refurbishment)	2	4.16	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
67.	Public services: education (license renewal term)	1	4.0	4.7.3.1/4-106
68.	Offsite land use (refurbishment)	2	4.17.1	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
69.	Offsite land use (license renewal term)	2	4.17.2	4.7.4/4-107
70.	Public services: transportation	2	4.18	<u>Refurbishment</u> Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term. <u>Renewal Term</u> 4.7.3.2/4-106
71.	Historic and archaeological Resources	2	4.19	<u>Refurbishment</u> Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term. <u>Renewal Term</u> 4.7.7/4-114

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72.	Aesthetic impacts (refurbishment)	1	NA	Exelon Generation has no plans for refurbishment activities at LGS during the license renewal term.
73.	Aesthetic impacts (license renewal term)	1	4.0	4.7.6/4-111
74.	Aesthetic impacts of transmission lines (license renewal term)	1	4.0	4.5.8/4-83
Postulated Accidents				
75.	Design basis accidents	1	4.0	5.3.2/5-11 (design basis) 5.5.1/5-114 (summary)
76.	Severe accidents (SAMA)	2	4.20	5.3.3/5-12 (probabilistic analysis) 5.3.3.2/5-19 (air dose) 5.3.3.3/5-49 (water) 5.3.3.4/5-65 (groundwater) 5.3.3.5/5-95 (economic) 5.4/5-106 (mitigation) 5.5.2/5-114 (summary)
Uranium Fuel Cycle and Waste Management				
77.	Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	1	4.0	6.2/6-8
78.	Offsite radiological impacts (collective effects)	1	4.0	Not in GEIS.
79.	Offsite radiological impacts (spent fuel and high-level waste disposal)	1	4.0	Not in GEIS.
80.	Nonradiological impacts of the uranium fuel cycle	1	4.0	6.2.2.6/6-20 (land use) 6.2.2.7/6-20 (water use) 6.2.2.8/6-21 (fossil fuel) 6.2.2.9/6-21 (chemical)
81.	Low-level waste storage and disposal	1	4.0	6.4.2/6-36 (low-level def) 6.4.3/6-37 (low-level volume) 6.4.4/6-48 (renewal effects)
82.	Mixed waste storage and disposal	1	4.0	6.4.5/6-63
83.	Onsite spent fuel	1	4.0	6.4.6/6-70

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84.	Nonradiological waste	1	4.0	6.5/6-86
85.	Transportation	1	4.0	6.3/6-31, as revised by Addendum 1, August 1999.
Decommissioning				
86.	Radiation doses (decommissioning)	1	4.0	7.3.1/7-15
87.	Waste management (decommissioning)	1	4.0	7.3.2/7-19 (impacts) 7.4/7-25 (conclusions)
88.	Air quality (decommissioning)	1	4.0	7.3.3/7-21 (air) 7.4/7-25 (conclusions)
89.	Water quality (decommissioning)	1	4.0	7.3.4/7-21 (water) 7.4/7-25 (conclusions)
90.	Ecological resources (decommissioning)	1	4.0	7.3.5/7-21 (ecological) 7.4/7-25 (conclusions)
91.	Socioeconomic impacts (decommissioning)	1	4.0	7.3.7/7-19 (socioeconomic) 7.4/7-24 (conclusions)
Environmental Justice				
92.	Environmental justice	NA	2.6.2	Not in GEIS.

a. Source: 10 CFR Part 51, Subpart A, Appendix B, Table B-1. (Issue numbers are added to facilitate discussion.)

b. Source: Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437). Title 40 of the Code of Federal Regulations. Pts. 1500-1508. 2010 ed.