

the regulation to exclude consideration of new and significant information, in light of the overarching NEPA mandate to consider such information even when prior NEPA review has been completed. *E.g., Marsh v. Oregon Natural Res. Council*, 490 U.S. at 365. Rather, to reach a result that does not defy NEPA the Commission *must* conclude that the purpose of the regulation would not be served by applying it to reject NRDC's Contentions based on such information.

Accordingly, it would be contrary to the purpose of 10 C.F.R. § 51.53(c)(3)(ii)(L) to deny the following NRDC Contentions (for portions of 1E, as modified by the ASLB, and portions of 3E):

- a. Exelon has omitted from its ER a required analysis of new and significant information regarding potential new severe accident mitigation alternatives previously considered for other BWR Mark II Containment reactors (Contention 1E-1)**

30-38-PA

NRDC's Contention 1E, and supporting declaration, contends that the ER is deficient because it ignores new severe accident mitigation alternatives previously considered for other BWR Mark II Containment reactors. NRDC Cont. at 16-19; *see also* ASLB Op. at 40; NRDC Decl. ¶¶ 5-13. For the foregoing reasons it would not serve the purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) for this regulation to bar consideration of this basis for Contention 1E here. *See also* NRDC Counsel Decl. ¶ 1.

- b. Exelon's reliance on data from TMI in its analysis of the significance of new information regarding economic cost risk constitutes an inadequate analysis of new and significant information (1E-2).**

30-39-PA

NRDC's Contention 1E, and supporting declaration, also contends that the ER is deficient in relying on data from TMI in order to consider the significance of the new information concerning economic cost risks. NRDC Cont. at 18 (¶ 5); *see also* ASLB Op. at 40;

NRDC Decl. ¶¶ 17-24. For the foregoing reasons, it would not serve the purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) for this regulation to bar consideration of this basis for Contention 1E here either. *See also* NRDC Counsel Decl. ¶ 2.

c. A legally sufficient analysis of newly identified severe accident mitigation alternatives for Limerick must utilize modern techniques for assessing whether those alternatives are cost-beneficial, and Exelon’s ER erroneously concluded that new mitigation alternatives can be evaluated without use of those modern techniques (3E) 30-40-PA

As noted, the Commission invited NRDC to seek a waiver of 10 C.F.R.

§ 51.53(c)(3)(ii)(L) not only as to the two modified bases for Contention 1E that were admitted by the ASLB, but also as to Contention 3E. NRDC seeks a waiver as to one basis for Contention 3E not covered by Contention 1E – the adequacy of the ER vis-à-vis techniques used to assess whether SAMDA’s are cost-beneficial. NRDC Cont. at 22 (¶¶ 1, 3). In particular, this basis for Contention 3E contends that the 1989 SAMDA failed to use a probabilistic safety assessment severe accident consequences code system comparable to the MELCOR Accident Consequence Codes Systems (“MACCS”) 2. *Id.* This basis for Contention 3E seeks to require Exelon and NRC Staff to use the more accurate and reliable methods available *today* for assessing the consequences of a severe accident, including economic consequences, and assessing the costs and benefits of the additional mitigation alternatives that are appropriate for BWRs. *Id.* For the foregoing reasons, it would also not serve the purposes of 10 C.F.R. § 51.53(c)(3)(ii)(L) for this regulation to bar consideration of this basis for Contention 3E. *See also* NRDC Counsel Decl. ¶ 3.

* * *

2
6-27-13
Daly

I love "NRC staff BELIEVES are LIKELY to continue to exist...." wiggle wiggle wiggle. p. xi x line 13

I love: "The comments CONSIDERED to be within the scope of the environmental license renewal...." Judging the public and ignoring the public. Oh my. p. 1-3 line 6

23-11-LR

Where is the safety report? Can we see it + comment in public? p. 1-3 line 23

23-12-LR

Mitigation of adverse impacts means you still allow adverse impacts and try not to do worse things, but you might, p. 1-4 line 29

23-13-LR

MINIMIZE means it is still there but may be less. p. 2-1 line 36.

23-14-RW

Keep in mind The National Academy has said there is NO safe level of exposure to ionizing radiation. P. 2-1 line 35 + ff are about minimizing, controlling, meeting standards that allow exposure etc. ALARA is a laugh. Calculate p. 2-2 line 9 - not PREVENT, not measure BUT calculate - (how??) Objective is to LIMIT releases 2-2 line 13. NOT STOP BUT LIMIT.

23-15-RW

3

Daly
6-27-13

P. 2-2 line 23 REDUCE to ALARA
I mean really, this is all very silly but
VERY SCARY,

23-15-RW
Cont'd

Waste from Laundry p 2-2 line 38,
Does it stay in the sample tank forever?
What happens to it?

23-16-RW

2-5 Where is the Pump House shown on 2-17?

23-17-SW

P. 2-6 line 9 - A favorite line
"diluted with air"

23-18-RW

Its still there.

P. 2-6 line 18 Permanent Disposal
There is NO such thing as
disposal or Permanent - just moving it around.

Another favorite p 2-7 line 33
"... using Corporate procedures"
what are they?

23-19-RW

EXELON wants Upgrades,
Keep that in mind.
What is how may differ with UPDATES.
line 34 p. 2-8

23-20-RW

... does not EXPECT...
nicely vague

Daly

6-27-13

Point: LNG or LGS

LGS lulls the mind.

It does not say Nuclear

so one does not worry.

Great PR

Using LNG or LGS numbs the mind

P. 2-15 PECO has been told NOT to use
Biological or Chemical "Techniques"
on our land.

23-21-TE

P. 2-16 line 1) "clay lined" how do you
know it doesn't leak? (INSIGNIFICANT
INTERFACE - how do we know? NO info
given.

23-22-SW

2-17 Where is this? Very vague.

23-23-SW

P. 2-30 line 28 "... shaking WOULD LIKELY
result..." too vague and wishful.

23-24-GE

P. 2-30 line 30 "adequately conservative" vague
and pathetic considering all things Japanese.

23-25-GE

PA DEP should think again about RAM in
the river and their designation for fishes. P. 2-32 line 33.
This document should show RAM levels in water

23-26-GE

5

Daly

6-27-13

and fish if fishing is encouraged in rivers with
RAM.

23-26-GE
Cont'd

DILUTION is not a solution for Pollution

P. 2-45 line 11

Exelon has not conducted any sampling
or monitoring of aquatic biota in Possum

Hollow Run -

WHY NOT ?? almost criminal - has DEP??

Read the NPDES permit application, and weep.

23-27-AQ

Where are the Dredge spoils for the Vincent Dam
that ^{were} removed from the Schuylkill River

Several years ago? Were they tested for
RAM? Why is this information so hard to get?

NO foot notes. Where does info come
from?

LLW is one tick off HLW. Remember?

LLW can be very hot,

→

Page 2-24 line 35

CONRAIL rail line

23-28-LU

Page 2-24 line 33

"all activities on the LGS site are

under the control of Exelon"

EXACTLY what does that mean?

6
Daly
6-27-13

Is Conrail under the control of Exelon?
Please Be SPECIFIC.

Who would be liable for a train accident
on this part of the railroad?

→ NEW SINCE LNG started
Changes to Conrail
that very well might
IMPACT US ALL

23-28-LU
Cont'd

See attached Article about Paulsboro, NJ
and Conrail and liability.

When LNG began Conrail was owned by
one entity and since then has changed
hands.

I think it's a common carrier But it
may be that users contract between
themselves and Conrail or CSX or NS

All of this is IMPORTANT
mixed in with Exelon

stating on P 2-24 line 33 that
it controls ALL activities.

N R C MUST STOP The approval
of the GEIS
and ALL relicensing
UNTIL

The public is informed about the Railroad
and who is liable for what at this site.

Daly
6-27-13

P. 2-69 and commuting routes

NEW population growth

See attached news article

There has been major population growth and use of roads.

Just go on 422 at rush hour-

leave your NEC Desk and come try driving around. Many roads are already clogged.

23-29-SE

Because health can be adversely impacted by exposure to RAN there are costs to schools

to the health system

These are either NOT discussed or the discussion is inadequate.

23-30-SE

Taxes

Does Limonick Nuclear PP pay its fair share of taxes.

Probably NOT.

23-31-SE

There are NO Definitions. What does

"refurbishment"

mean

?

23-32-RF

8
Daly
6-27-13

P. 4-1 There is no NO mention
of issues related to No Rail line
(thru the site) which I view
AS VERY CRITICAL
for the public to understand
in detail.

23-33-LU

What is Exelon's relationship with the railroad(s)?

4-1 → tables refer to GEIS
SO citizens have a hard time
getting needed info

23-34-LU

4-21 HUMAN HEALTH

Did we know about Baby Teeth + Strontium 90
when the plant began?

Have we learned NOTHING about
RAM + cancer + other illnesses
in 40 years?

23-35-HH

Come on.

NRC relied on Exelon for info
on Health?

can you see cancer on a
site visit?

Did you ignore ACE re
Scoping?

What info, not paid for by Exelon or

9

Daly
6-27-13

Other corporate interests did NRC
evaluate for mis?? I see none or too few
in your bibliographies

23-35-HH
Cont'd

Page 4-22 line 27
normal operations
is operating "normal" ?
wiggle room

23-36-HH

all mis about radiological impacts of
so called Normal operations
(Define the term "normal").
must be prefaced with the National
Academy finding that there
is no safe level
of exposure to ionizing
radiation
The rest is fluff.

Back to xvii line 1
Rules - a revised rule is EXPECTED
to be published
Let's put this application aside
for about 15 years until the
rules are in and in effect and
the public knows what they say.

23-37-LR

10

Daly
6-27-13

Re page 4-41 4.12 Cumulative Impacts
I suggest that some one read this
out loud to NRC and then test
them to see if they can explain
it, what gibberish.

Marcellus shale page 4-47 line 28

Please note article attached
from Phila. Inq. 5-29-13.

23-38-AQ

NEW Since LNPP went on line

Please explain this

Page 4-48 line 12 (4.12.3.4 conclusion)

This is COMPLETELY ILLOGICAL
and dangerous.

NEW Since LNPP went on line

23-39-AQ

Stresses on the river

recently for 8 years agonized

over + Exelon won - river is

now augmented and ground water

in Schuylkill ^{COUNTY} ~~PA~~ + the river

are DEVOTED TO LNPP.

Yes - increasing urbanization

yes increasing demand for water

people have a right to clean water

depend on factors NRC staff can't quantify -

11
Daly
6-27-13

how can you write that + then make a conclusion?

23-39-AQ
Cont'd

IF NRC can't do it -
Do NOT grant the relicensing.
Decommission at ONCE.

Page 4-5 line 39

Spent Fuel Storage

23-40-HH

NEW since LNPP began

A defacto HLW Dump

What rules govern it? Limenck Township zoning?
and Building codes?

Who has liability?

Page 5-1 Postulated Accidents

leads to 5.3 SAMAs

I concur with NRC

23-41-PA

I add to this Railroad issues.

Liability + who has it

is a concern overall

Closure and Decommissioning should be clearly understood by the local population.
If the life is extended what will be left at the end and who is liable?

23-42-DC

So do a complete EIS for decommissioning.

12
Daly
6-27-13

What? p 7-1 line 27

There are NO site-specific
issue related to decommissioning.

The site will be the same whether or not

The plant operates?

23-43-DC

Of course there are issues and NRC
should spell them out.

Brownfields is the biggest public
scam there is, its about LIABILITY
and transferring it on to the public.

23-44-DC

The spent rods will be there. What happens to them?

Closure - what happens to radioactive
materials like cement, steel, water, soil,
etc. in closure?

What happens to the HLW pool?

How long is Exelon liable?

What gets dumped on others?

The alternative I chose is Closure Now.

23-45-OP

9-1 Conclusion

How can any sane person conclude
that nuclear energy is less impacting

than sun + wind should not be

working for the public.



MONTGOMERY COUNTY PLANNING COMMISSION

box 311 • norristown • pennsylvania • 19404-0311 • 610-278-3722
office location: suite 201 • one montgomery plaza • swede & airy streets • norristown pa
FAX 610-278-3941 • Website www.planning.montcopa.org

June 27, 2013

5/7/2013

78 FR 26663

13

RECEIVED

2013 JUL - 8 PM 2: 40

RULES AND DIRECTIVES BRANCH USNRC

Ms. Cindy Bladey
Chief, Rules, Announcements, and Directives Branch
Mail Stop: TWB-05-B01M
US Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Comments on the Draft Plant Specific Supplement 49 to NUREG-1437
Limerick Nuclear Generating Station
Division of License Renewal
NRC-2011-0166

Dear Ms. Bladey:

We have reviewed the draft plant specific Supplement 49 to the generic environmental impact statement for the license renewal regarding the Limerick Generating Station, Units 1 and 2. Our comments on the draft are listed below.

We expect the Nuclear Regulatory Commission to do a full review of both environmental and public safety issues pertaining to the Limerick Generating Station as discussed in the Environmental Impact Statement and we hope that any relicensing decision will also address specific issues pertaining to the plant based upon its conformity to the Montgomery County Comprehensive Plan and overall county development policies in the area surrounding it. Overall, we are particularly concerned about growth around the power plant, transportation and evacuation capacity, the Schuylkill River, and future education about the Limerick Generating Station.

Land Use Change and Growth around the Power Plant:

As the Environmental Impact Statement indicates, the population in the 50-mile radius of the plant was 6,819,505 in 1980 and is expected to reach 9,499,925 by 2030, a 39 percent increase in population. It is also noted that according to 2010 Census, there are 1,365,850 people residing within 20 miles of the Limerick Generating Facility. Limerick Township, where the plant is located, and nearby Upper Providence Township have been two of the most rapidly growing communities in the county. This growth occurring along the US Route 422 Expressway has dramatically changed the character of the area surrounding the Limerick Generating Station. In the past few years, the Philadelphia Premium Outlet Mall, a 600,000 square foot retail facility, and the adjoining Costco shopping center opened along US Route 422 about one mile north of the Limerick Generating Station property. The land adjoining those facilities is being considered for various types of retail and residential

31-1-SE

SUNSI Review Complete
Template = ADM - 013
E-RIDS= ADM-03
Add= L. Perkins (HP)

Ms. Cindy Bladey

-2-

June 27, 2013

uses. Other lands in Lower Pottsgrove Township near the Limerick Generating Station have also been proposed for similar types of uses.

While the county planning commission has tried to promote lower densities of growth in proximity to the Limerick Generating Station, the local communities and the marketplace favor this location for significant development due to its proximity to the US Route 422 interchange at Township Line/ Evergreen Road. The growth that has taken place in the area around the power plant, and in particular the growth taking place in the area immediately adjoining the plant and the primary access to it, as well as the projected growth in the future, could complicate evacuation plans and the movement of appropriate emergency response personnel to the plant in the event of a disaster. Certainly this access could be even more critical in the event of a natural disaster when other roads to the plant may be impassable. The Environmental Impact Statement needs to analyze this growth in the vicinity of the power plant to evaluate what impact it would have on plant operations and whether or not safe evacuation can take place from the newly developed areas within the extended licensing period.

31-1-SE
Cont'd

Transportation and Evacuation Capacity:

The growth in the whole US Route 422 Corridor has raised numerous proposals for expanding the vehicle capacity of the 422 Expressway. Congested traffic conditions are a way of life along the expressway and raise concern about future viability of the expressway and other local arterial roads as a safe evacuation routes for the region. The county transportation plan recognizes the need for various road improvements along the US 422 Corridor to address current and future traffic demands. The current county comprehensive plan recommends several measures to enhance transportation capacity in this portion of the county, though due to funding limitations in Pennsylvania, these projects are not likely to move forward at this time. Possible mitigation strategies to be considered in the license renewal could include the role of Exelon in funding the important road improvements needed in this area to ensure safe evacuation and access to the plant in any type of disaster.

31-2-OS

Schuylkill River:

The Limerick Plant will depend upon river water for a longer period of time as a result of the license renewal. During low flow periods, additional quantities of water are released into the river from the Wadesville Mine and Still Creek Reservoir in Schuylkill County to compensate for the water withdrawn at the plant through a docket approved by the Delaware River Basin Commission (DRBC). Since the relicensing action would extend the time period of this flow augmentation system, continued monitoring and analysis of the river is vital to ensure that the water quality of the river is not impaired by the total dissolved solids in the Wadesville water among other parameters. This is particularly important due to the role of the Schuylkill River, a state scenic river, which is an important regional water supply source and recreation area. If resumed use of the Delaware water diversion is anticipated, an evaluation of that system should be undertaken to ensure that the capacity is available in the conveyance system and that water quality objectives can be met for discharge into the East Branch of the Perkiomen Creek.

31-3-
SW

Community Outreach and Education:

The relicensing process has raised local questions about the Limerick Generating Station. It will become more of a permanent element of the community with extension

31-4-LR

Ms. Cindy Bladey

-3-

June 27, 2013

of the license as requested. Therefore, it is vital to have an effective and continuous education program about the generating station and the associated risks presented by its operation. Education can take the form of many types of activities that further engage local residents and keep them better informed about the plant and their role and responsibilities in the event of an emergency at the facility.

31-4-LR
Cont'd

If you have any questions, please contact me. Also, we offer our assistance in providing local information that may be helpful to the US Nuclear Regulatory Commission in their review of this license renewal application.

Sincerely,



Michael M. Stokes
Assistant Director

mstokes@montcopa.org
(610) 278-3729

c. Thomas Sullivan, Public Safety Department

EPA concluded this rating in part due to deficient information on the potential environmental impact associated with the onsite disposal of spent fuel subsequent to the decommission of Units 1 and 2. Section 6 of the draft generic EIS provides information on impacts associated with spent nuclear fuel both "Onsite and Offsite"; however it does not provide sufficient detail of potential environmental impacts of onsite storage subsequent to reactor decommission. EPA recommends that the Final EIS address this aspect of the project's future activities. 28-1-RW

EPA suggests that the Final GEIS include greater detail of the potential environmental impacts and the measures taken to address the increased population surrounding the facility from both the aspect of emergency notification/evacuation planning and from cumulative effects perspective. As you may be aware there has been substantial population growth around the area of the LGS. While Section 5 provides details on postulated accidents, and Section 4.12.8 includes a summary of cumulative impacts, it is unclear in both cases, how the increase growth has been factored into the analysis. 28-2-OS

As new science emerges on the topic of Climate Change, the facility should consider adaptations that might be appropriate for the future. Please address this issue in the Final EIS. 28-3-CC

Additionally, one of the leading causes of water quality impairment in Schuylkill River watershed is related to stormwater runoff. Over the last 20 years stormwater management practices have evolved from peak flow attenuation to low impact development. Please include any information on if or how the facility will upgrade its stormwater management practices over the re-licensing period. EPA recommends the facility consider upgrading its stormwater management practices to current standards. 28-4-SW

EPA appreciates the opportunity to comment on the DEIS and look forward with the continued to development of the Final Environmental Impact Statement. As we are planning to meet with representatives of the facility within the next few weeks, we would like to reserve the ability to provide further comment if needed. If you have any questions regarding our comments, please feel free to contact me at (215) 814-3322 or Kevin Magerr at (215) 814 5724.

Sincerely,



Barbara Rudnick, NEPA Team Leader
Office of Environmental Programs

June 24, 2013

**ALLIANCE FOR A CLEAN ENVIRONMENT (ACE)
Official Written Testimony On
NRC's DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS)
FOR LIMERICK NUCLEAR POWER PLANT
NUREG-1457, Supplement 49, Docket ID NRC-2011-0166**

MAJOR PROBLEM:

NRC PRODUCED A DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR LIMERICK NUCLEAR PLANT WITHOUT ACKNOWLEDGING DOCUMENTED HARMFUL ENVIRONMENTAL IMPACTS. NRC FAILED TO ACKNOWLEDGE LIMERICK NUCLEAR PLANT'S UNPRECEDENTED THREATS AND HARMS PRESENTED TO NRC IN ACE WRITTEN TESTIMONY 10-26-11.

CONSEQUENCES OF NRC'S INACCURATE CONCLUSIONS:

Limerick's DRAFT EIS Could Result In Increased Future Risks And Harms For Millions Of People In The Greater Philadelphia Region. Ignoring Evidence Of Harm Doesn't Eliminate The Reality Of Current Harms Or Future Threats.

NRC MUST SET THE RECORD STRAIGHT IN ITS FINAL EIS

NRC'S Mission Is To Protect Public Health And Safety Related To Limerick Nuclear Plant Operations. Minimally, That Requires NRC To Provide Full, Fair, And Accurate Disclosure Of All Of Limerick Nuclear Plant's Unprecedented Environmental Threats And Harms. The Health And Safety Of Millions Of People In The Greater Philadelphia Region Will Be Further Jeopardized By Negligent Conclusions In NRC'S DRAFT EIS For Limerick Nuclear Plant.

NRC Conclusions In Limerick Nuclear Plant's DRAFT EIS Are An Unethical Injustice To The Public, And Must Be Changed To Reflect The Documented Evidence Of Unprecedented Threats And Harms.

ON BEHALF OF THE HEALTH, SAFETY, AND FINANCIAL INTERESTS OF MILLIONS OF PEOPLE:

2-21-LR

- 1. ACE Is Requesting That NRC'S DRAFT EIS For Limerick Nuclear Plant Relicensing Be Changed To Accurately Reflect The Documented Evidence ACE Put On NRC'S Public Hearing Record For Limerick's EIS October 26, 2011.**
- 2. ACE Is Also Requesting That NRC'S Final EIS Reflect Additional Evidence Of Environmental Threats And Harms Included In This June 24, 2013 Written Testimony.**

Facts Show Limerick Nuclear Plant's Environmental Threats Are Clearly "Large", NOT "Small" As Inaccurately Claimed By NRC.

2-22-SW

- **Increases And Exemptions In Limerick Nuclear Plant's Air And Water Pollution Permits Should Be Sufficient For NRC To Conclude Limerick's Environmental Impacts Are "LARGE" NOT "SMALL", Especially When Limerick Couldn't Meet Its Original Permit Limits Or Safe Limits In Place To Protect Public Health, And Exelon Won't Pay For Filtration To Reduce health Threats.**

NRC Did NO Independent Monitoring Or Testing For Limerick's EIS. It Is Indefensible For NRC To Claim Limerick's Impacts Are "Small" When A Body Of Evidence Suggests Otherwise.

2-23-LR

NRC FAILED TO HAVE AN INDEPENDENT EXPERT ANALYZE THE ADDITIVE, CUMULATIVE, AND SYNERGISTIC HARMS TO THE ENVIRONMENT AND PUBLIC HEALTH OVER THE PAST 28 YEARS. THEREFORE, NRC CAN'T MAKE A RELIABLE, DEFENSIBLE PREDICTION ABOUT THE HARMS FROM LIMERICK UNTIL ITS LICENSES EXPIRE IN 2029, NOR UNTIL 2049, DURING ANOTHER 20 YEARS IF LIMERICK IS RELICENSED.

2-24-LR

- Prior to NRC's scoping process, ACE repeatedly urged NRC and other agencies to do a year of independent monitoring and testing for all of Limerick's broad range of radionuclides, as well as other toxics massively released into our air and water from Limerick. NRC never even responded to our requests.

2-25-OS

WELL DOCUMENTED EVIDENCE OF LIMERICK'S UNPRECEDENTED ENVIRONMENTAL THREATS AND HARMS REFUTE NRC'S INDUSTRY-BIASED UNRELIABLE, UNSUBSTANTIATED CONCLUSIONS THAT LIMERICK'S HARMS ARE "SMALL".

- NRC'S negligent conclusions protect Exelon's profits and NRC jobs, but fail to protect public health and safety.

2-26-LR

NRC's inaccurate conclusions in Limerick's DRAFT EIS are largely based on untrustworthy estimates, calculations, and "reviews" of monitoring and testing data from Exelon, the company with a clear vested interest in the outcome, that has shown it can't be trusted to provide full and accurate disclosure at Limerick or elsewhere.

- 10-26-11 ACE provided NRC with several specific examples of why Exelon can't be trusted to provide full, accurate, or timely disclosure of Limerick's monitoring, testing, calculating, estimating, or reporting.
 - Example of Exelon's Unreliable Monitoring:
 - ✓ A vital radiation monitor was inoperable for over an entire year.
 - Example of Exelon's Delayed Disclosure:
 - ✓ Exelon waited 23 days to inform the public about a huge radioactive spill into a vital public drinking water source for almost two million people.

2-27-OS

EVIDENCE SHOWS NRC FAILS TO TAKE MEANINGFUL ENFORCEMENT ACTION AGAINST EXELON'S NEGLIGENCE REGARDING THREATS TO PUBLIC HEALTH, REGARDLESS OF ENORMOUS OPPORTUNITY FOR HARMS TO THE ENVIRONMENT AND PUBLIC HEALTH.

2-28-DC

- 2-3-13 It was reported that Exelon provided NRC with inaccurate information about how much money will be available to decommission Exelon's power plants, potentially hiding a shortfall of "roughly \$1 Billion". This should show NRC why they can't trust any information provided by Exelon, especially in radiological monitoring reports.

ACE rejects NRC's inaccurate, absurd conclusions in its DRAFT EIS for Limerick Nuclear Plant.

- 10-26-11 ACE provided NRC with analyses that should have triggered investigations, not just consultations with agencies that allowed dangerous permit increases and exemptions in Limerick's pollution permits. NRC's conclusions show that NRC ignored and dismissed important documented evidence from several analyses related to Limerick's environment and health threats. These analyses were on:
 - Exelon's Radiological Monitoring Reports to NRC
 - Limerick's Title V air pollution permit renewal in 2009
 - Limerick's NPDES permit for pollution discharges into the Schuylkill River
 - Analyses of radioactive groundwater contamination

2-29-GW;AM

NRC CLEARLY DID NOT GIVE A FULL AND FAIR REVIEW NOR ADDRESS THE DOCUMENTED EVIDENCE OF ENVIRONMENTAL AND HEALTH HARMS AND THREATS SUBMITTED FROM ACE 10-26-11 ON BEHALF OF PUBLIC INTERESTS.

2-30-LR

- NRC ALSO REFUSED ACE'S REQUEST TO MEET TO DISCUSS OUR POLLUTION PERMIT ANALYSES, DESPITE THE FACT THAT NRC FAILED TO INDEPENDENTLY ANALYZE LIMERICK NUCLEAR PLANT'S POLLUTION PERMITS.

- Not one word appears in Limerick's EIS about the documented cancer crisis in communities near Limerick. Nor have the high infant and neonatal mortality issues been acknowledged or discussed. 2-31-HH
- Major evidence related to Limerick's air and water pollution permit issues goes unaddressed. 2-32-AM;SW
- High-level and low-level radioactive waste issues have not been adequately addressed. 2-33-RW

NRC REFUSING TO INCLUDE OR DISCUSS DOCUMENTED HEALTH HARMS AND ENORMOUS ENVIRONMENTAL THREATS SPEAKS VOLUMES ABOUT NRC'S INDUSTRY BIASES.

AVOIDING THE PUBLIC AND DISMISSING DOCUMENTED FACTS ABOUT LIMERICK'S POLLUTION THREATS WILL NOT REDUCE RISKS, BUT INSTEAD ALLOW THEM TO CONTINUE AND INCREASE.

- If NRC'S baseless inaccurate conclusions that Limerick's harms are "small" are not changed to deal with reality in Limerick's EIS, then the NRC officials who approved Limerick's DRAFT EIS must be held accountable for regulatory negligence.
- NRC's irresponsible conclusions will result in unacceptable consequences and injustices to millions of people in the Greater Philadelphia Region.

NRC MADE INACCURATE ILLOGICAL CONCLUSIONS THAT FAIL TO CONSIDER OR ACKNOWLEDGE EXTENSIVE DETAILS PROVIDED IN ACE'S 10-26-11 PUBLIC HEARING TESTIMONY. EVIDENCE SINCE 2011 ALSO REFUTES NRC'S FALSE CLAIMS THAT HARMS ARE, OR WILL BE, "SMALL".

AMONG THE MOST GLARING OMISSIONS IN NRC'S DRAFT EIS IS THE DOCUMENTED COMPELLING EVIDENCE ACE PROVIDED 10-26-11 ON THE LINKS BETWEEN OUR CANCER CRISIS AND LIMERICK'S ROUTINE AND ACCIDENTAL RADIATION RELEASES SINCE 1985.

- **WE SHOWED WHY LIMERICK'S RADIATION RELEASES ARE CLEARLY A MAJOR FACTOR IN CANCER RATES FAR HIGHER THAN THE NATIONAL, STATE, AND TRI-COUNTY AVERAGES, ESPECIALLY IN OUR CHILDREN.**
- **CANCER RATES ARE DOCUMENTED TO HAVE SKYROCKETED FAR ABOVE THE NATIONAL, STATE, AND TRI-COUNTY AVERAGES IN COMMUNITIES NEAR LIMERICK, AFTER LIMERICK STARTED OPERATING.** 2-34-HH
- **YET, OUR ALARMING CANCER RATES AND HIGH INFANT MORTALITY RATES ARE NOT EVEN MENTIONED IN NRC'S DRAFT EIS. THERE IS NOT ONE WORD ABOUT CANCER INCREASES IN COMMUNITIES NEAR LIMERICK AFTER LIMERICK STARTED OPERATING AND RELEASING RADIATION INTO OUR LIFE-SUPPORT SYSTEMS AND OUR BODIES.**
- **THIS OMISSION IS UNACCEPTABLE. THE EVIDENCE IS CLEAR. NRC'S FINAL DRAFT MUST BE CHANGED TO INCLUDE THE CANCER INCREASES. FOR NRC'S CONVENIENCE WE HAVE INCLUDED SOME OF THE DETAILS BELOW.**
- **ACE CALLS ON NRC TO REVIEW THE SUMMARY BELOW THEN REVISE ITS DRAFT EIS TO REFLECT THE REALITY ABOUT LIMERICK'S PAST, CURRENT, AND FUTURE ENVIRONMENTAL AND HEALTH HARMS, INCLUDING OUR ALARMING CANCER AND INFANT MORTALITY RATES.**

2. LIMERICK THREATENS A DRINKING WATER DISASTER, YET NRC IRRATIONALLY CLAIMS HARMS ARE “SMALL”

THE SCHUYLKILL RIVER IS THE VITAL DRINKING WATER RESOURCE FOR ALMOST TWO MILLION PEOPLE FROM POTTSTOWN TO PHILADELPHIA. LIMERICK NUCLEAR PLANT IS SLOWLY BUT SURELY DESTROYING THE SCHUYLKILL RIVER.

LIMERICK NUCLEAR PLANT OPERATIONS THREATEN A DRINKING WATER DISASTER FOR THE ALMOST TWO MILLION PEOPLE FROM POTTSTOWN TO PHILADELPHIA WHO DEPEND ON THE SCHUYLKILL RIVER FOR THEIR WATER SUPPLY.

LIMERICK NUCLEAR PLANT OPERATIONS ARE CAUSING UNPRECEDENTED THREATS AND HARMS TO THE SCHUYLKILL RIVER INCLUDING FROM:

- **Radioactive Discharges**
- **Toxic Discharges From Cooling Towers**
- **Heated Discharges**
- **Depletion Due To Cooling Towers Insatiable Water Use**
- **Toxic Mine Water Pumping To Operate Limerick**

2-35-SW

WATER RESOURCES ARE THREATENED ACROSS SIX COUNTIES

- **Water Resources Threatened Across Six PA Counties From Potential Limerick Meltdowns.**

10-26-11 ACE provided a vast body of evidence in written testimony to NRC to analyze and put on the record for Limerick's EIS. ACE included detailed analyses of Limerick Nuclear Plant's water pollution permits and Limerick's water use docket.

- ACE'S Detailed Analyses Of Limerick's Water Pollution Permits, Water Use Docket, AND Documents Obtained Through FOIA and PA Right-To-Know, As Well As Other Information Provided to NRC Should Have Led NRC To A Clear Understanding Of The Grave Threats and Harms To The Schuylkill River And The People Using The Water As A Result Of Limerick Nuclear Power Plant Operations.

WE WERE SHOCKED TO SEE THAT NRC'S DRAFT EIS CALLED THE UNPRECEDENTED HARMS AND THREATS THAT WE DOCUMENTED IN OUR TESTIMONY, “SMALL”. NRC'S DRAFT EIS FOR LIMERICK FAILED TO ACCURATELY REFLECT LIMERICK'S UNPRECEDENTED THREATS AND HARMS TO THIS VITAL DRINKING WATER RESOURCE FOR SO MANY PEOPLE.

- **IT IS INDEFENSIBLE FOR NRC'S DRAFT EIS TO CLAIM LIMERICK'S UNPRECEDENTED THREATS AND HARM TO THE SCHUYLKILL RIVER ARE “SMALL”. THE EVIDENCE SHOWS OTHERWISE!**

2-36-SW

Historic evidence proves it was clear even before Limerick Nuclear Plant was constructed, that the Schuylkill River was unable to sustain Limerick's insatiable water use and abuse.

2-36-SW
Cont'd

It is not clear that the river can continue to sustain the wide range of damages caused by Limerick operations even until Limerick's licenses expire in 2029. There is no guarantee there will be enough safe usable water for the almost two million people and other businesses that need the Schuylkill River for their water supply until 2029. If there is a meltdown requiring massive amounts of water, others will surely lose their water supply.

- **NRC'S DRAFT EIS MUST BE CHANGED TO REFLECT REALITY. FACTS SHOULD BE CLEAR, EVEN TO NRC THAT THE SCHUYLKILL RIVER CANNOT SUSTAIN LIMERICK'S USE AND ABUSE UNTIL 2049.**

NRC'S DRAFT EIS CONCLUSION THAT BASICALLY DISMISSES DOCUMENTED HARMS TO THE DRINKING WATER SOURCE FOR SO MANY PEOPLE IS CLEARLY NRC REGULATORY NEGLIGENCE AND MALPRACTICE!

- **NRC IS PREPARING AN ENVIRONMENTAL IMPACT STATEMENT FOR LIMERICK NUCLEAR PLANT WITHOUT ACKNOWLEDGING OR ANALYZING LIMERICK'S ACTUAL IMPACTS ON SCHUYLKILL RIVER WATER, ECOSYSTEMS, WILDLIFE AND PUBLIC HEALTH TO DATE.**

2-37-LR

- **IT IS IMPOSSIBLE FOR NRC TO ACCURATELY PREDICT WHAT WILL HAPPEN UNTIL 2049 WHEN NRC FAILED TO REVIEW AND ANALYZE LIMERICK'S WATER PERMITS AND DOCKETS, AND NRC REFUSED TO MEET WITH PUBLIC INTEREST CITIZENS WHO DID REVIEW AND ANALYZE LIMERICK'S WATER PERMITS AND DOCKETS FROM BEFORE LIMERICK WAS LICENSED THROUGH THE MOST RECENT PERMITS AND DOCKETS ISSUED 4-13.**

2-38-SW

- **FOR EIS DECISIONS NRC DID CONSULT WITH THE AGENCIES THAT JUST APPROVED NEGLIGENT, UNPROTECTIVE, SHAMEFUL WATER PERMITS WITH EXEMPTIONS AND LOOPHOLES THAT ALLOW LIMERICK TO CONTINUE TO:**
 - A. DRASTICALLY VIOLATE SAFE DRINKING WATER STANDARDS FOR THE KIND OF POLLUTION THAT TRANSPORTS LIMERICK'S RADIATION AND COOLING TOWER TOXICS INTO THE RIVER.
 - B. SERIOUSLY OVERHEAT THE RIVER
 - C. PUMP TOXIC UNFILTERED MINE WATER INTO THE RIVER FOR LIMERICK OPERATIONS

ACE Table Of Contents For Written Testimony to DRBC October 23, 2012 Below Provides An Overview Of Issues ACE Wanted To Discuss

With NRC Related To: Limerick Nuclear Plant 's - DRBC - DRAFT Docket No. D-1969-210 CP-13
Concerns Expressed In ACE's Written Public Hearing Testimony Submitted To DRBC About Not Having Enough Safe Usable Drinking Water In The Future Are Based On:

ACE's Reviews Of Limerick Nuclear Plant's:

1. 2011 NPDES Permit Renewal Request to DEP For Permit No. PA0051926
2. 2009 Radiological Report By Exelon To NRC
3. Exelon's Current Docket Requests to DRBC
4. PA Right to Know Information from PA DEP
5. Freedom of Information Act Documents from DRBC
6. Planned Upgrades Which Will Require More Water
7. Relicensing Which Would Extend Limerick's Unprecedented Harms and Threats

➤ **ACE IS STILL OFFERING TO MEET WITH NRC IN OUR OFFICE TO DISCUSS ANY OF THE VITAL WATER ISSUES ASSOCIATED WITH THIS NPDES PERMIT AND LIMERICK'S ENVIRONMENTAL AND PUBLIC HEALTH IMPACTS.**

In Summary:

- 10-26-11 ACE provided NRC with a substantial body of irrefutable evidence on how and why Limerick Nuclear Plant operations could result in an irreversible drinking water disaster. Limerick operations result in unprecedented threats to the Schuylkill River, a vital drinking water source for almost two million people from Pottstown to Philadelphia.
- Limerick poisons the river water with radiation, routinely and accidentally discharging radioactive wastewater containing a broad range of radionuclides, some with long half-lives.
- NRC previously tried to mischaracterize Limerick's discharges as just one radionuclide, Tritium, even though Exelon's Radiological Monitoring Records in NRC's own files prove the water, sediment, and fish all contain many radionuclides.

2-39-HH

Exelon's 2009 Radiological Monitoring Report For Limerick Shows:

- 6 of 7 Gross Beta Radionuclides Were Detected In Surface Water
- Beta Emitters Include: Iodine-131, Cesium-137, Strontium-90, Cobalt-60, Zinc-65
- Beta radionuclides can damage thyroid, liver, bone, muscles, ovaries, and cause cancer, birth defects, mutations, and miscarriages.

In WATER - 12 Different Radionuclides Were Reported

1.	Iodine I-131	1.2 Lives	8 Days
2.	Cesium Cs-134		30 Years
3.	Cesium Cs-137		30 Years
4.	Manganese Mn-54		314 Days
5.	Zinc Zn-65		250 Days
6.	Cobalt Co-58		70 Days
7.	Cobalt Co-60		70 Days
8.	Zirconium Zr-95		65 Days
9.	Iron Fe-59		46.6 Days
10.	Niobium Nb-95		35 Days
11.	Barium Ba-140		13 Days
12.	Lanthanum La-140		40 Hours

In FISH - 9 Different Radionuclides Were Reported

1.	Iodine I-131		8 Days
2.	Cesium Cs-134		30 Years
3.	Cesium Cs-137		30 Years
4.	Manganese Mn-54		314 Days
5.	Zinc Zn-65		250 Days
6.	Cobalt Co-58		70 Days
7.	Cobalt Co-60		70 Days
8.	Iron Fe - 59		456.6 Days
9.	Potassium K-40		1 Day

Note: The Hazardous Life of a Radioactive Isotope is Ten to Twenty Times its Half-Life

Reality: Synergistic, Additive, and Cumulative Harmful Impacts Are Obviously Significant

Problems: Many Radionuclides go Unreported and Unmonitored - Sampling Is Woefully Inadequate and Controlled by Exelon, a Company that Can't Be Trusted

- NRC does no testing. No independent agency ever did long-term monitoring for all the radionuclides associated with Limerick operations. But when the National Academy of Sciences says there is no safe level of exposure, the kinds and levels are not as important as the fact that almost two million people are always exposed to radiation in their water from Limerick.
- Water companies are not required to continuously monitor, test, or filter the water for all Limerick's radionuclides.
- The Consequences Of Additive, Cumulative, and Synergistic, Radioactive Discharges From Limerick Nuclear Plant Into The Schuylkill River Since 1985 Are Obviously Significant NRC Doesn't Test or

2-40-HH

2-41-SW

2-42-SW

Even Take Split Samples. Far More Radionuclides Could be In Water And Fish Than Reported.
NRC Simply Reviews Exelon's Unreliable Reports.

- Limerick Nuclear Plant Testing Reports Reveal Iodine-131 In Water and Fish. Limerick is Clearly A Major Source of Iodine-131 Found In Philadelphia Water At The Highest Levels Of Any Water Treatment Plant In The Nation, Out Of 66 Cities Tested. Philadelphia is only about 20 Miles Downstream from Limerick.

2-43-SW

- A dangerous mix of massive toxic corrosive chemicals is discharged into the Schuylkill River from Limerick's cooling towers. Huge amounts of toxic chemicals are added to Limerick's cooling towers every day. Limerick uses at the site every day 94,293 to 192,614 pounds of toxic chemicals. They don't just disappear, but instead end up in air and water pollution releases from the site. Limerick uses Sodium Hypochlorite CHLORINE at the site - 16,000 to 58,000 lbs Per DAY - Chlorine is continuously discharged into the Schuylkill River with no continuous testing to determine the extent of harm. In fact, Limerick has just been given a permit exemption for the pollution that transports Limerick's cooling tower chlorine and other toxics into the river, unmeasured and unfiltered.

2-44-SW

- Limerick's discharges are violating Safe Drinking Water Standards for Total Dissolved Solids (TDS) (up to five times the safe level). TDS transports Limerick's radiation and cooling tower toxics into the river.

2-45-SW

- ✓ To deal with continuous violations of Safe Standards, DEP EXEMPTED Limerick from a safe limit requirement, instead of requiring Exelon to filter the discharges.
- ✓ NRC is turning a blind eye to this enormous threat to public drinking water health risks and the eventual additional costs to water treatment systems and their customers.

- Limerick insatiable water use by its cooling towers threatens the water supply across six PA counties.

- Limerick Nuclear Plant has slowly but surely been depleting the Schuylkill River since it started operating in 1985. Limerick withdraws more than double the amount of water every day than is withdrawn for Pottstown, Phoenixville, and Norristown in total. Limerick only returns ¼ of that to the river. Even after supplementation, the Schuylkill River had record low flows by 1999.

2-46-SW

- To supplement the flow for Limerick operations, Exelon is pumping billions of gallons each year of toxic unfiltered mine water into the river. One toxic is permitted to be pumped into the river at 80 times higher than safe drinking water standards, even though it can cause permanent brain damage at the legal limit if showering in this water for 10 minutes each day for 10 years.

- A meltdown at Limerick could require so much water that Exelon could take everyone's water supplies without their permission, from Schuylkill County, the Delaware River, the Schuylkill River and all its tributaries, and the groundwater from the residents and businesses surrounding Limerick.

2-47-SW

- Limerick's continuous heated discharges up to 110 degrees are regularly overheating the river with a temperature limit of 87 degrees. This jeopardizes the river ecosystem. Temperature restrictions for the river were just eliminated as requested by Exelon.

2-48-SW

For A Detailed Review Of Some Of The Evidence ACE Provided To NRC 10-26-11

www.acereport.org Download #6

"Schuylkill River – Limerick Operations: Threaten A Drinking Water Disaster"

➤ **EVIDENCE IS UNDENIABLE: LIMERICK OPERATIONS UNQUESTIONABLY RESULT IN UNPRECEDENTED THREATS AND HARMS TO THE SCHUYLKILL RIVER, A VITAL DRINKING WATER SOURCE FOR ALMOST TWO MILLION PEOPLE FROM POTTSTOWN TO PHILADELPHIA.**

➤ **IT IS NOT CREDIBLE FOR NRC'S DRAFT EIS TO STATE SUCH ENORMOUS THREATS AND HARMS TO THE SCHUYLKILL RIVER ARE "SMALL" OR FOR NRC OFFICIALS TO CLAIM NRC IS NOT RESPONSIBLE TO ANALYZE THE ENVIRONMENTAL HARMS FROM LIMERICK'S WATER POLLUTION AND WATER USE PERMITS FOR LIMERICK'S ENVIRONMENTAL IMPACT STATEMENT.**

2-49-SW

- **NRC'S FINAL EIS MUST BE CHANGED TO REFLECT THE REALITY. NRC'S CONCLUSION MUST SAY HARMS TO A VITAL DRINKING WATER RESOURCE ARE "LARGE", NOT "SMALL" AND THAT NRC CANNOT GUARANTEE A SAFE, DRINKABLE WATER SUPPLY FOR ALMOST TWO MILLION RESIDENTS AND BUSINESSES FROM POTTSTOWN TO PHILADELPHIA DURING THE PERIOD OF REQUESTED EXTENDED OPERATION.**

- **THE LONGER LIMERICK OPERATES THE MORE RADIOACTIVE THE SCHUYLKILL RIVER WATER WILL BECOME AND THE MORE TOXIC THE RIVER WILL BECOME FROM LIMERICK'S MASSIVE COOLING TOWER TOXICS AND MASSIVE MINE WATER PUMPING. THE RIVER WILL BECOME MORE DEPLETED AND HEATED. THE MORE RISK THERE WILL BE FOR MELTDOWNS THAT CAN CAUSE TOTAL LOSS OF WATER RESOURCES FOR MILLIONS OF PEOPLE ACROSS SIX PA COUNTIES.**

2-50-SW

- **TO REDUCE FUTURE HEALTH THREATS TO MILLIONS OF PEOPLE, NRC SHOULD REQUIRE EXELON TO FILTER ITS RADIOACTIVE DISCHARGES, COOLING TOWER TOXICS, AND MINE WATER PUMPING AS A CONDITION OF RELICENSING.**

2-51-SW

3. RADIOACTIVE GROUNDWATER

LIMERICK'S RADIOACTIVE LEAKS AND SPILLS OVER DECADES CAUSED GROUNDWATER TO BECOME RADIOACTIVE.

- **Some of Limerick's radioactive leaks continued for long periods of time unabated.**

2-52-GW

- **NRC never required clean-up of groundwater or soil and vegetation around it.**

2-53-GW

- **There are countless opportunities for future leaks in the miles of buried, hard-to-inspect pipes under the Limerick site.**

2-54-OS

- **For 28 years some pipes have been transporting highly corrosive, heated, and radioactive water. Aging and deterioration can cause pipes to become brittle and leak.**

- **Earthquakes can break and disrupt pipes. There is an earthquake fault right under the site, with four others within 17 miles.**

2-55-GE

IN NRC'S DRAFT EIS FOR LIMERICK, NRC IRRESPONSIBLY CALLED LIMERICK'S GROUNDWATER CONTAMINATION "SMALL" AND MADE INACCURATE STATEMENTS.

2-56-GW

- **GIVEN THE LACK OF INDEPENDENT PROOF AND THE HUGE INCREASING RISK FOR RADIOACTIVE LEAKS IN THE MILES OF BURIED PIPES UNDER LIMERICK'S SITE, NRC'S CONCLUSION MUST BE CHANGED FROM "SMALL" TO "UNKNOWN".**

THERE IS CAUSE FOR CONCERN, PRECAUTION, AND PREVENTION!

- **AS A CONDITION OF RELICENSING, EXELON SHOULD BE REQUIRED TO CLEAN UP THE RADIOACTIVE GROUNDWATER AND SOIL THAT IS ALREADY CONTAMINATING THE SITE, TO TRY TO AVOID TRAVEL TO OFF-SITE RESIDENTIAL AND BUSINESS WELLS.**

2-57-GW

- 46 Domestic Withdrawal Wells**
- 2 Commercial Wells**
- 1 Institutional Well**
- 2 Industrial Wells**
- 1 Fire Water Well Is 500 Feet from cooling towers**

➤ **RADIOACTIVE GROUNDWATER AND DRINKING WATER THREATS WILL INCREASE AS LONG AS LIMERICK OPERATES**

BREAKDOWNS and LEAKS - There Are Countless Opportunities For Breakdowns and Leaks Under Limerick Nuclear Plant That Can Contaminate Groundwater.

1. Miles of aging buried pipes under Limerick are corroding and deteriorating.

- Limerick operated since 1985.
- Miles of Limerick's old buried pipelines transported highly radioactive and corrosive chemicals for decades. They become very vulnerable to leaks over time.
- Pipes and fittings corrode and become brittle over time, then leak.
- Leaks in the miles of underground buried pipes are hard to detect.
- Radioactive leaks in the miles of Limerick's aging buried pipes can go undetected and/or unaddressed and/or unreported for long periods of time, if not forever. Radiation can slowly spread in groundwater to off-site wells.

2-58-OS

2. Earthquakes can cause leaks by shaking and breaking Limerick's miles of underground pipes and vast numbers of fittings.

- Limerick is 3rd on the nation's earthquake risk list for nuclear plants.
- Two earthquake faults are extremely close to Limerick - 9 miles and 17 miles away.
- There is great cause for concern, considering the August 23, 2011 earthquake as far away as Virginia caused shaking with potential for damage to buried pipes at Limerick.

2-59-GE

RADIOACTIVE GROUNDWATER CONTAMINATION CAN SPREAD INTO OFF-SITE WELLS UNDETECTED NOW AND IN THE FUTURE

- Limerick is one of the 102 of 104 of our nation's nuclear reactors that contaminated groundwater with radiation.
- Groundwater is confirmed to be radioactive under Limerick's 600 acre site.
- Reliable monitoring to accurately determine the full extent of spreading radioactive groundwater contamination would be cost prohibitive. Radiation could poison well water for long periods of time.
- Limerick's radioactive contaminated groundwater could have been spreading long periods of time, in any direction, in this fractured bedrock aquifer. Radioactive groundwater contamination may have already moved off the Limerick site, undetected or unreported by Exelon.
- Radiation in Limerick's groundwater was never cleaned up. There is no plan to clean it up.
- New leaks and spills can happen without full disclosure.
- Exelon failed to fully disclose and address radioactive water contamination at some of its other nuclear plants.
- At one nuclear plant site in Illinois, Exelon failed to provide full and accurate disclosure for years, then finally supplied 600 residents with bottled water for years more until they were finally put on public water.
- The same thing could happen at Limerick, jeopardizing drinking water and public health.
- Once groundwater becomes radioactive it is difficult, if not impossible to clean up. Exelon never tried, either here or at its other nuclear plants.

2-60-GW

NRC's Irresponsible Policies Must Change, Starting At Limerick Nuclear Plant.

- **Exelon is asking NRC for Limerick license renewal, when in Illinois and New Jersey Exelon showed it can't be trusted to provide full and accurate timely disclosure of radioactive leaks under its nuclear plants.**

4. AIR POLLUTION - DRASTIC INCREASES IN DANGEROUS PM-10 WERE PERMITTED FOR LIMERICK'S COOLING TOWERS IN 2009, YET NRC'S DRAFT CONCLUDED ENVIRONMENTAL IMPACTS FROM LIMERICK'S AIR POLLUTION WERE "SMALL".

2-61-AM

THIS KIND OF AIR POLLUTION IS CONSIDERED MORE DEADLY THAN OZONE.

- **IT IS NOT CREDIBLE FOR NRC TO CLAIM THE IMPACTS FROM LIMERICK NUCLEAR PLANT'S AIR POLLUTION ARE "SMALL".**

LIMERICK'S DANGEROUS AIR POLLUTION HARMS HEALTH

- **LIMERICK IS CONSIDERED A MAJOR AIR POLLUTION SOURCE UNDER HEALTH-BASED STANDARDS OF THE CLEAN AIR ACT.**

Limerick Nuclear Power Plant emits so much dangerous air pollution (in addition to radiation) that it's considered a MAJOR AIR POLLUTION source under the Clean Air Act. The following facts have been compiled by ACE from Limerick Nuclear Plant's Title V Air Pollution Permit.

LIMERICK NUCLEAR PLANT'S AIR POLLUTION INCLUDES:

1. Radiation - from routine operations and accidental releases
2. Schuylkill River Toxics - from withdrawing 56.2 Million Gallons Per Day
3. Toxic Chemicals - from adding over 300 lbs per day to Cooling Towers
4. Greenhouse Gases, Combustion Chemicals & By-products - from Boilers, Etc.
5. Waste Fuel - from a Boiler

2-62-AM

AIR POLLUTANTS from Limerick Nuclear Plant Include:

- Radiation
 - PM10
 - VOCs
 - NOx
 - SO2
 - Arsenic
 - Cadmium
 - Chromium
 - Lead
 - PCBs
 - Halogens
- This dangerous SYNERGISTIC MIX continuously threatens the health of families in the region, especially children. ADDITIVE, CUMULATIVE HEALTH IMPACTS could be significant.

2-63-AM

32 SOURCES of Limerick Nuclear Plant's Air Pollution Include:

- 2 Cooling towers

- 3 Boilers
- 8 Generators
- 8 Diesel Oil Tanks
- 8 Day Tanks
- Degreasing Unit
- Emergency Spray Pond
- Various Waste Oil Sources

2-63-AM
Cont'd

➤ **There is NO FILTRATION FOR TOXICS from any of the sources.**

ACE's review of Limerick's air pollution permit revealed a shocking number of air pollution sources and pollutants, with no continuous monitoring or filtration on any of them. In fact, there are extraordinary permit loopholes.

Limerick's Permit Loopholes are Unprotective and Unacceptable. Almost anything goes.

- Radiation, the signature toxic at a nuclear plant, was excluded even though radiation emissions are regulated by EPA and reported by Exelon to NRC.
- Limerick Nuclear Plant Title V permit renewal lists 32 air pollution sources and a broad range of pollutants, but excludes radiation the signature toxic released from a nuclear plant.
- No air pollution control equipment is required on any of the many sources.
- Reported emissions are based on illusion, not reality. Annual reports are largely based on Exelon's own "calculations" and "estimates", not on actual emissions testing. There is no independent testing.
- Exelon can increase dangerous air pollution from the nuclear plant without going through any kind of review or approval process.
- There are all kinds of exemptions.
- Preapproved permit revisions are allowed under economic incentives.

Limerick Nuclear Plant's additive, cumulative, and synergistic harmful health impacts are unknown, but clearly significant. Children, elderly, and those already sick are most impacted.

Examples of Synergism:

- NOx + SO2 = acid rain which can jeopardize water, soil and food. When NOx and SO2 meet with steam (35 to 42 million gallons per day emitted from Limerick towers), sulfuric and nitric acids can be formed in the air causing major respiratory damage and other health harms when inhaled. Limerick's permit allows automatic (TONS per year) increases in both.
- NOx + VOCs with sunlight increases ozone, which kills thousands of people each year and sends many more for hospital emergency room visits.
- Ozone works synergistically with radiation to enhance the cancer causing effects of radiation.

Synergistic, Additive, and Cumulative Harmful Health Impacts From Limerick's Air Pollution Are Unknown, But Clearly Unprecedented,

2-64-HH

When They Include:

1. A Broad Range of Radionuclides
2. Massive Emissions of Many Dangerous Cooling Tower Toxics
3. Combustion Chemicals From Boilers and Generators
4. Waste Derived Liquid Fuel
5. And Various Other Sources of PM-10 Emissions

Families throughout the region are at risk from Limerick Nuclear Plant's radiation emissions and other toxic air pollutants. Consider the following:

- Philadelphia, only about 20 miles away, is in the predominant wind direction.
- Routine radiation releases go into our air, but are not measured in air or listed in Limerick's Title V permit.
- Limerick's cooling towers and other sources emit massive dangerous PM 10 emissions which are not accurately measured or filtered.
- The effluent stream from the river to the sky through the cooling towers includes all river toxics.
- Cooling tower emissions include toxics added to the towers.
- No toxics are filtered out from any of the 32 air pollution sources listed in Limerick Nuclear Plant's Title V Air Pollution Permit.

- Halogens
 > **NO FILTRATION IS REQUIRED FOR ANY TOXICS LISTED ABOVE**

Numerous Studies Show The Kinds Of Air Pollution Produced By Limerick's 32 Sources Contribute To A Broad Range of Disease and Disabilities.

- World Health Organization Estimated Air Pollution Would Cause About 8 Million Deaths Worldwide by 2020
- American Cancer Society
- Harvard School of Public Health
- John's Hopkins School of Public Health
- Cedars-Sinai Medical Center

Dr. Devra Davis reported that there are more than 1,000 studies from 20 countries all showing you can predict a certain death rate for asthma, heart disease, and lung disorders based on the amount of air pollution.

Cooling Towers Host Pathogens

Research Shows Health Threats From Cooling Towers Include Pathogens
Cooling Towers Spray Infectious Pathogens Into Our Air. These Pathogens Can Cause Disease in Humans, Even Legionella

- Section 4.9.3 on Microbiological Organisms of NRC'S DRAFT EIS States That Limerick Cooling Towers Release Microbiological Organisms, INCLUDING:
SALMONELLA, LEGIONELLA, AND PSEUDOMONAS AERUGINOSA, which can cause serious and sometimes fatal infections in immune compromised individuals.
 > **THESE TOXINS ARE DOCUMENTED TO BE HARMFUL TO HUMANS AND ANIMALS.**
- Exelon requested PA DEP to provide comments or confirm Exelon's conclusion about a low likelihood of risk from pathogens released from Limerick contribute to related health effects.
- PA DEP would not make any conclusions regarding the effect on public health. 2-65-HH
- NRC says optimal growing temperature is 99 degrees F, but Limerick's cooling tower waters are allowed to be up to 110 degrees.

NRC HAS CONCLUDED THAT IMPACTS ON PUBLIC HEALTH FROM THESE ORGANISMS WOULD BE "SMALL", BUT THERE NO PROOF OF THAT, WHETHER IN RELEASES TO AIR OR WATER.

- 44 MILLION GALLONS Of Cooling Tower Steam Are Released Into Our Air Every Day.
- 14.2 MILLION GALLONS Of Limerick's Wastewater Are Released Into The River Every Day.
- There Are NO Measurements By NRC Or Exelon For The Pathogens In The Air Or River Releases From Limerick's Cooling Towers.
- Limerick's Cooling Tower Waste Water Is Allowed To Be Heated Up To 110 Degrees.
 - > **NRC HAS NO ACCURATE IDEA OF HOW THESE PATHOGENS ARE IMPACTING THE POPULATION OVER TIME.**
 - > **NRC MUST CHANGE ITS CONCLUSION THAT IMPACTS WOULD BE "SMALL" TO IMPACTS ARE "UNKNOWN".**

COOLING TOWER DRIFT - DRIFT IS SPRAY DROPLETS – NOT VAPOR

- Drift Droplets Are Contaminated With Everything In The System
- Up to 44 Million Gallons of Toxic Filled Steam Are Emitted Into Our Air Every Day.
- There Is NO Filtration - Exposure Risks Are Unknown

- ✓ Immune System
 - ✓ Reproductive
 - ✓ Neurological
 - ✓ Skin and Sense Organ
- NO_x reacts with moisture and other compounds to form nitric acid and related particles.

VOCs + NO_x = Ground-Level OZONE

Acute, Short Term Effects include:

- ✓ Shortness of Breath
- ✓ Phlegm Build Up
- ✓ Coughing, Wheezing
- ✓ Watery Eyes, Runny Nose
- ✓ Sore Throat
- ✓ Head Colds
- ✓ Chest Colds
- ✓ Chest Pain

Repeated Exposure Can Result In:

- ✓ Permanent Lung Damage
- ✓ Respiratory Infection
- ✓ Lung Inflammation
- ✓ Aggravate Asthma

RADIATION INTERACTING WITH OZONE ENHANCES CANCER RISKS

From Mc Donnell, M.D. Health Effects Research Laboratory
EPA Testimony, April 9, 1987, to U.S. Senate

- **“OZONE WORKS SYNERGISTICALLY WITH RADIATION TO ENHANCE THE CANCER-CAUSING EFFECTS OF RADIATION.”**

2-66-HH

Radiation, the most potent carcinogen, is routinely released from Limerick Nuclear Plant. Radiation is the signature, most dangerous toxic released from nuclear plants. Radiation levels released cause more risk of cancer when breathed in with VOCs and NO_x.

January 2010, ACE presented agency and elected officials with an expose and list of recommendations and requests related to permitted PM-10 increases at Limerick Nuclear Plant.

Sources Used For ACE Air Pollution Comments:

- Limerick Title V Permit Renewal TVOP-46-00038 12-7-09
- EPA Air Pollution Data - Compiled At www.scorecard.org
- <http://epa.gov/air/particlepollution/>
- AP 3-19-10 Article in Mercury by Wayne Parry “Exelon Threatens to Shut Down N.J. Nuke Plant”
- Statistics and Facts in Hard Science Show: Air Pollution Kills and Cripples, Net Works 2001
- Cooling Towers May Host New Pathogens – Research by Sharon G. Berk and colleagues - ScienceDaily 8-28-06

All evidence of harm was ignored. Public health was abandoned. Agency regulators and elected officials ignored the increased threats to public health and increased financial health care costs, all to protect Exelon’s profits.

GIVEN THE HEALTH IMPACTS DOCUMENTED TO BE ASSOCIATED WITH THE KIND OF TOXIC AIR POLLUTION RELEASED FROM LIMERICK, ESPECIALLY FROM THE COOLING TOWERS, LIMERICK NUCLEAR PLANT IS AN OBVIOUS MAJOR FACTOR IN:

- **State Data Reported By EPA In 2003 SHOWING FAR HIGHER NUMBERS FOR:**
 - ✓ **Infant and Neonatal Mortality**
 - ✓ **Malignant Tumors**
 - ✓ **Cerebrovascular Disease**
 - ✓ **Respiratory Diseases**

ALL ARE FAR HIGHER NEAR LIMERICK NUCLEAR PLANT THAN THE STATE AVERAGE, AND FAR HIGHER THAN PHILADELPHIA OR READING.

ACE Summary Conclusions:

- Limerick Nuclear Power Plant Is A Major Air Pollution Source Under Health Based Standards Of The Clean Air Act and Is Clearly A Major Factor In The Health Crisis That Developed After Limerick Started to Operate in 1985.
- Yet, NRC Has Repeatedly Attempted To Ignore and/or Dismiss Limerick's Air Pollution Threats To Health and The Environment In Limerick's Updated Environmental Impact Statement (EIS).
- Fractured Agency Permitting Is NOT An Excuse To Dismiss Serious Environmental and Health Impacts From Limerick Nuclear Plant's Major Air Pollution For NRC's Updated EIS. Just Because PA DEP Issues Limerick Nuclear Plant's Air Pollution Permit Does Not Eliminate The Harms Our Region Faces From It.
- Without a year of independent air monitoring, testing, and reporting for all Limerick Nuclear Plant's radionuclides and other air pollutants, the community should reject any NRC conclusions in NRC's updated Environmental Impact Statement for Limerick Nuclear Plant as invalid.
- Unless additive, cumulative, and synergistic harmful health impacts from radiation releases and all other air pollutants from Limerick are accurately determined, including from recent permitted drastic increases, the Precautionary Principle should be followed and Limerick should be closed, NOT RELICENSED.
- As long as Limerick Nuclear Plant operates, dangerous air pollution will continue and even increase.
 - To protect public health and avoid unnecessary health care costs, Limerick should close now.
 - 20 more years of exposure to the massive toxic brew of air pollution from Limerick is unacceptable. Limerick must close now.

Documents and Other Information Are Available For Review By Appointment At The ACE Office In Pottstown (610) 326-2387

NRC IS RESPONSIBLE TO PROTECT PUBLIC HEALTH RELATED TO LIMERICK NUCLEAR PLANT.

- **THE EVIDENCE PROVES LIMERICK'S AIR POLLUTION IS A MAJOR THREAT TO PUBLIC HEALTH. AS A CONDITION OF RELICENSING, NRC MUST REQUIRE EXELON TO FILTER SCHUYLKILL RIVER WATER INTAKE, AND NOT ALLOW LIMERICK'S DANGEROUS AIR POLLUTION TO CONTINUE WITHOUT AT LEAST SOME SAFEGUARDS.**

RADIATION RELEASES TO AIR

- Limerick routinely releases a broad range of radionuclides into the air.
- Radioactive air particulates are not listed in Limerick's Title V Air Permit, even though all air pollutants and sources from a major air polluter are supposed to be listed.
- Actual data and/or harmful health impacts from Limerick's routine and accidental radioactive releases are unknown.

Radiation Testing and Reporting To NRC Are Deceptive

2-67-HH

- **Radiation Levels Reported By Exelon For Limerick's Releases To Air Do Not Reflect Risks To The Public From All Limerick's Radionuclides Released Into Our Air.**
- **JUST BECAUSE EXELON ISN'T REQUIRED TO REPORT ALL RADIONUCLIDES LIMERICK RELEASES INTO OUR AIR, DOESN'T MEAN THOSE RADIONUCLIDES DO NOT INCREASE OUR RISK.**

Radiation Levels identified by monitoring are only reported for Limerick by Exelon when they are above an arbitrary background level. Above background reporting is deceptive. Exelon can hide actual radiation releases from Limerick and actual risks.

Radiation Background Levels Are Arbitrary, Deceptive, and Clearly Not Protective:

- 80 to 100 Millirems Per Year - Natural background BEFORE Chernobyl
- 360 Millirems Per Year - AFTER Chernobyl
- 620 Millirems Per Year - AFTER Fukushima, Japan

The National Academy of Sciences Says There Is NO SAFE DOSE

March 16, 2011, After Japan's Nuclear Disaster, NRC Legally Sanctioned Increased Radiation Harm To Regions Like Ours, Routinely Exposed To Nuclear Plant Radiation Releases.

Other Deceptive Unprotective Tactics In Radiation Reporting

- Exelon, the company with a vested interest in the outcome that has shown it can't be trusted, controls all radiation monitoring, testing, and reporting.
- Exelon is allowed to 'CALCULATE' and "AVERAGE" results.
- The system fails to report on radiation spikes.

Examples From Exelon's 2007 Self-Monitoring Report to NRC

1. **Lower Limit Detection (LLD) – ABOVE BACKGROUND IS DECEPTIVE.**
Defined as smallest concentration of radioactive material in a sample that would yield a net LLD does not mean the actual level detected - Level detected could be far higher
2. **Positive Results Were "CALCULATED"** - Gamma Spectroscopy
Standard deviations represent variability of measured results for different samples rather than single analysis uncertainty.
3. **Net Activity – Calculated by subtracting background from sample.**
MDC was reported in all cases – but they can claim positive activity was not detected.

2-67-HH
Cont'd

Radioactive Air Particulates - Air particulate samples collected weekly in 2007.

- **GROSS BETA WAS DETECTED AT ALL LOCATIONS.**
Beta Emissions Can Include Strontium-90, Tritium, and Many Other Radionuclides
- **GAMMA WAS DETECTED IN ALL SAMPLES**
Be-7 Beryllium 7: UNstable (1/2 life 53 days) was detected in all samples

Beta Particles and Gamma Rays Penetrate the Human Body and Environment, Causing Biological, Chemical, and/or Physical Damage.

- **Cancer, Leukemia, Heart Failure, Neuromuscular Diseases and Many Other Health Effects Can Result From Long-Term Exposures.**
- **Harmful Health Impacts Can Take Many Years To Develop.**

Examples: Harmful Health Impacts To Specific Parts Of The Body

- | | | |
|---------------------|--------------|--------------------------------|
| • Thyroid / Ovaries | Iodine – 131 | Beta / Gamma Emitter |
| • Liver / Ovaries | Cobalt – 60 | Beta / Gamma Emitter |
| • Bone / Ovaries | Zinc – 65 | Beta / Gamma Emitter |
| • Muscles / Ovaries | Cesium – 137 | Beta / Gamma Emitter |
| • Bones / Teeth | Strontium-90 | Beta Emitter 29 year half-life |

- **Strontium 90 (SR-90) Attaches To Particulate Matter – Easily Travels With Air SR-90 Masquerades As Calcium – Absorbs Into Bones and Teeth.**
- **Some of the highest levels of Strontium-90 were found in the teeth of children around Limerick Nuclear Power Plant (Tooth Fairy Study)**
- All GAMMA Radiation Emitters Attack REPRODUCTIVE ORGANS**
- Prostate Cancer Increased in Montgomery County 132% Since Limerick Nuclear Power Plant Started (Mid 1980s to Mid 1990s)
 - Other related cancers also drastically increased above the national average since Limerick started operating.
- Radiation Can Cause Birth Defects, Mutations, and Miscarriages,**
- In 1st and / or Successive Generations After Exposure.
 - Infant death and childhood cancer reductions after nuclear plant closings in the United States – 2002 Study - Deaths among infants who had lived downwind and within 64 km of each plant dropped.
 - Infant and Neonatal Mortality In The Area Around Limerick Are Far Higher Than State Averages and Higher Than Philadelphia or Reading.
- Other radionuclides in testing were claimed by Exelon to be less than the MDC**
- **BUT Minimum Detectable Concentration (MDC) Is Only An ESTIMATE and Only Reported IF Above Background**

2-67-HH
Cont'd

Limerick Nuclear Plant's Air Pollution Summary:

- **10-26-11 ACE provided NRC with documented details for Limerick's EIS public hearing comments. Our analysis of Limerick's Title V air pollution permit and other documentation show why Limerick's air pollution is a "major" threat to our region.**
- **NRC ignored this evidence in Limerick's DRAFT EIS conclusions or NRC could not have concluded Limerick's air pollution impacts are "small". NO unbiased person could analyze the evidence and the reality and still come to that conclusion!**

Major Points:

To avoid air pollution permit violations, in 2009, Limerick requested and received a 6-fold INCREASE in its Title V Air Pollution Permit limit for dangerous cooling tower air pollution that is considered more deadly than ozone by the American Lung Association.

- **Exelon's request for huge PM-10 permit increases to avoid air pollution permit violations alone makes our case.**

Limerick's cooling towers release 44 million gallons of steam into the air every day containing massive PM-10, which transports into our air Limerick's radioactive air particulates, toxic and corrosive chemicals added to Limerick's cooling towers by Exelon, toxics from the Schuylkill River including heavy metals, and pathogens from inside the cooling towers.

➤ **THAT CAN'T BE TRUE!**

NRC is responsible for all the health harm from Limerick Nuclear Plant operations. Major pollution permitted in Limerick's air and water pollution permits clearly present enormous threats to public health. **THAT MAKES IT NRC'S RESPONSIBILITY.**

- It is indefensible for NRC to make inaccurate, unsubstantiated conclusions in Limerick's Environmental Impact Statement, if NRC has no intention of actually analyzing health and environmental consequences of Limerick's air and water pollution permits.
- It is indefensible for NRC to avoid doing the detailed analyses of the consequences of Limerick's dangerous pollution permits simply by consulting with the agencies that allowed drastic increases in those permits and allowed dangerous exemptions and loopholes because Limerick can't meet their original permit limits or standards in place to protect public health.
- It is inexplicable and unacceptable that NRC refused to have their Environmental Review Team for Limerick's EIS meet with ACE officers that did do comprehensive independent reviews and analyses of Limerick's air and water pollution permits.

- **NRC failed to respond to ACE comments on Limerick's unprecedented air and water pollution threats from our 10-26-11 testimony, separately, or in Limerick's DRAFT EIS as NRC claimed.**
- **NRC claimed they used ACE comments to inform their review to develop the DRAFT EIS. THAT CAN'T BE TRUE or NRC COULD NOT HAVE CONCLUDED HARMS ARE "SMALL".**

Ms. Perkins June 10, 2013 e-mail to ACE states that "NRC uses public scoping comments to inform their review and develop the DSEIS. NRC responds to all public scoping comments by issuing a scoping summary report in the DSEIS." That is not true.

- If NRC had given full and fair review to ACE comments, NRC could not conclude Limerick's health impacts were "small".
 - ACE provided NRC with documented PA Cancer Registry and CDC data showing that after Limerick started operating in 1985, that cancer in communities near Limerick skyrocketed far higher than the national average, especially in children. ACE also provided NRC with researched links between elevated cancer rates and Limerick Nuclear Plant's routine radiation releases.
 - ACE provided NRC with a 2003 EPA report based on state data showing highly elevated infant and neonatal mortality rates, malignant tumors, cerebrovascular disease, and lower respiratory disease, all far higher than the state average and even higher than Philadelphia and Reading.
 - ACE provided NRC with lists of toxics that can cause the health harms above. Those toxics have been continuously released into our air and water from Limerick since Limerick started operating in 1985.
 - NRC did NO INDEPENDENT TESTING to prove Limerick's massive air pollution and water contamination or its routine radiation releases were not the major factor in the highly elevated illnesses and other health harms in communities near Limerick.
 - Our cancer crisis, with numbers far higher than the national average after Limerick started operating, suggests those impacts should not be considered "small".

2-68-HH

NRC'S REGULATORY NEGLIGENCE AND MALPRACTICE IN PREPARING LIMERICK'S DRAFT EIS CAN JEOPARDIZE THE FUTURE OF THE ENTIRE GREATER PHILADELPHIA REGION.

- **ON BEHALF OF PUBLIC HEALTH, ACE ABSOLUTELY REJECTS NRC'S INACCURATE, ILLOGICAL, AND NEGLIGENT CONCLUSIONS IN ITS DRAFT EIS FOR LIMERICK NUCLEAR PLANT.**
- **CONCLUSIONS MUST BE CHANGED TO REFLECT DOCUMENTED EVIDENCE IN THIS 6-24-13 ACE TESTIMONY.**

**COMPARISONS OF ENVIRONMENTAL IMPACTS OF ALTERNATIVES
NRC'S CONCLUSIONS ARE LUDICROUS AND INDEFENSIBLE
IN NRC'S DRAFT EIS FOR LIMERICK NUCLEAR PLANT**

NRC LOOKS FOOLISH MAKING THE INDEFENSIBLE STATEMENT THAT SOLAR POWER HAS THE SAME ENVIRONMENTAL IMPACTS AS NUCLEAR POWER!

IT IS INEXPLICABLE THAT NRC FAILED TO CONSIDER SOLAR POWER AS A COMMON SENSE ALTERNATIVE IN LIMERICK'S EIS.

- NRC failed to consider solar power as an alternative, despite ACE's 10-26-11 extensive EIS testimony documenting why solar power is a viable alternative to Limerick Nuclear Plant.
- NRC excluding solar power as an alternative is more evidence that NRC failed to seriously consider or acknowledge ACE's 10-26-11 public hearing comments.
- ACE identified large and small business installations, government building installations, schools, and residential solar installations already in the region of Limerick Nuclear Plant, including the Cuthberts' personal solar power with battery backup.
- ACE provided a list of news articles proving solar power had become cost competitive with nuclear power and that large back-up power installations were already available to use solar as baseload power.
- Since 2011, considerable additional evidence has become available showing that solar power is even more feasible from both a technical and economic standpoint.

LIMERICK'S FINAL EIS MUST BE CHANGED TO REFLECT THE REALITY OF SOLAR POWER AS A REASONABLE, FEASIBLE ALTERNATIVE.

NRC's Draft EIS for Limerick Nuclear Plant presented several conclusions that were simply not supported by scientific fact. Numerous assumptions appear to have been combined with predetermined, pro-nuclear conclusions. Many of the conclusions rise to the level of colossal incompetence, if not regulatory malpractice.

Several specific examples were included in oral and written testimony presented by Dr. Lewis Cuthbert at the NRC public meeting/hearing on May 23, 2013. One of the most ludicrous conclusions and assertions was that the impacts from continued nuclear operations at Limerick would result in the same impacts as from all other alternatives, all being "small". This unsupportable conclusion must be changed in the Final EIS to accurately reflect the far greater threats, risks, and impacts from nuclear operations.

2-69-AL

The substantial written testimony submitted by ACE October 26, 2011 focused on solar power as a preferred and viable alternative for our region, rather than a renewed license for Limerick. Since that time, solar technology has increased, costs have declined dramatically, and installations in the region have proliferated at an ever-increasing pace.

Inexplicably, in its Draft EIS for Limerick, NRC totally dismissed solar power as a viable alternative, despite the considerable body of evidence to the contrary provided by ACE in 2011. Since that time, an even more compelling body of evidence has emerged supporting the viability of solar power as an alternative energy source.

The most recent compelling article on the viability of solar power appeared 3-25-13, "*NRG Skirts Utilities Taking Solar Panels to U.S. Rooftop*" by Christopher Martin, and Naureen S. Malik.

This Article Confirms The Cost Effectiveness and Viability of Solar Panels Alternatives.
This article supports our conclusion that we don't need Limerick Nuclear Power Plant.

- Utilities are aware that generating power at customer sites is leading to them losing their customers and disrupting their businesses. Solar power is being installed on vast numbers of rooftops, both residential and commercial.
- Costs for solar panels keep coming down. Installation costs keep coming down. Solar is being combined with battery technology and power management systems.
- Some utilities recognize their business is becoming far less important, eventually being used just for back-up.
- NRG Energy, the biggest power provider to U.S. utilities is providing electricity directly to consumers.
- Energy companies are challenging traditional utilities, by providing rooftop solar panels to power individual buildings.
- At least a dozen U.S. companies provide rooftop panels at no upfront cost to customers, who typically make fixed reduced monthly payments for the output under decades-long contracts, known as solar leases or power-purchase agreements.
- By-passing its utility clients, NRC is installing solar panels on rooftops of homes and businesses and in the future will offer natural gas-fired generators to customers to kick in when the sun goes down.
- NRG is running mini-generation systems that run a single building. This endeavor strikes at the core business of utilities.
- Companies such as Sunrun and Sungevity offer services at home-improvement stores.
- CEO of NRG, David Crane said, "*Consumers are realizing they don't need the power industry at all. That is ultimately where big parts of the country go*".
- Individual home-owners may soon be able to tie a machine to their natural gas line and tie that with solar on the roof, then totally disconnect the line from the transmission-distribution company.
- Independent power producers may be evaluating the merits of distributed generation, building many small systems at customer sites instead of a few large ones.

2-69-AL
Cont'd

When viewed in conjunction with wind power, the need for and cost effectiveness of continued electric from Limerick is no longer a logical option. A glut of low priced natural gas is also contributing to cheaper power prices.

In addition to typical rooftop PV solar panels, new technology has dramatically reduced the footprint of installations. Homes, small businesses, governmental agencies, and large corporations have moved to solar power in increasing numbers. Rooftop leasing and thinner, lighter panels have redefined the cost and space constraints that NRC referenced in its flawed Draft EIS. Today, any home or business in our region can consider viable solar power with no up-front costs to the owner.

NRC's Final EIS for Limerick Nuclear Plant must be changed to include all of this evidence, and accurately reflect the reality of solar power as a currently available and safer alternative to Limerick's electric. NRC is encouraged to review and consider additional information that has emerged since 2011, and amend the Final EIS for Limerick accordingly.

Additional Information About Solar And Wind Power Viability

- Karl Grossman observed, "Today a host of safe, clean, renewable energy technologies are more than ready. Combined, importantly, with energy efficiency, they render nuclear power as unnecessary." (3/29/11)

THERE IS A CLEAR AND UNDENIABLE TREMENDOUS IMBALANCE BETWEEN THE IMPACTS OF LICENSE RENEWAL AND THE IMPACTS OF ALTERNATIVES.

➤ **TO PROTECT THE ENVIRONMENT AND PUBLIC HEALTH, NRC NEEDS TO STOP LYING ABOUT LIMERICK NUCLEAR PLANT'S DIRTY, DANGEROUS, AND COSTLY ELECTRIC IN ITS FINAL EIS FOR LIMERICK.**

In the Draft EIS for Limerick Nuclear Plant NRC has shamelessly failed to acknowledge the truth about nuclear power. It is not safe, clean, or cheap. There are far safer, cleaner, less dangerous, and cheaper ways to generate electricity. In the region around Limerick solar power and natural gas can easily replace Limerick's electric long before Limerick's license expires. Other renewable-sustainable energies like wind are also viable options.

ACE DID OUR OWN COMPARISON OF SOLAR, WIND, AND NUCLEAR BELOW: NRC FAILED TO INCLUDE THESE COMPARISONS IN LIMERICK'S EIS.

1. Costs of solar and wind (relatively quick to install) will continue to plummet, while costs for nuclear power will *continue to rise. Independent estimates suggest, adding in hidden costs to taxpayers and ratepayers, nuclear plants produce the most costly form of energy.*
2. Clean, safe energies like solar and wind, along with energy efficiency, are estimated to provide more jobs per dollar spent than nuclear power.
3. Producing solar and wind energies closer to where they are needed, provides more energy security, removing the necessity for huge grids that can be attacked by terrorists.
4. The Department of Energy 2006 report stated *solar power and wind power could provide far more energy than our nation needs - That solar alone could provide 55 times our entire nation's energy needs.*
5. Costly security is not needed for solar or wind energy installations.
 - Terrorists are not interested in attacking solar or wind installations.
 - Attacks at solar or wind energy installations would not result in astronomical costs or cause long-term devastation.
 - *Nuclear plants can be turned into nuclear bombs, resulting in tens of thousands of deaths and hundreds of billions of dollars in damages from spreading radioactive contamination across vast areas which create dead zones for centuries.*
6. Human error or mechanical failure of solar and wind technologies won't result in devastation like they can at nuclear plants.
7. Solar and wind would clearly be a far safer and less costly investment for taxpayers and ratepayers.
8. Solar and wind don't create dangerous high-level radioactive waste storage problems, with costs to taxpayers beyond meaningful calculation.
 - Reprocessing is not the solution to high-level radioactive waste problems. Evidence shows reprocessing makes waste problems worse. Reprocessing is costly, ill-conceived, dangerous and environmentally damaging. Vitrification is also costly and has not been proven safe.
9. Nuclear plants are not emissions-free.
 - *Solar and wind energies don't routinely release radiation in to our air and water that is harmful to health. Radiation exposure can alter DNA, cause cancer, and shorten life-expectancy.*
 - Limerick Nuclear Plant Title V air pollution permit proves it is a major polluter under the Clean Air Act. There are 32 air pollution sources on site releasing a broad range of air pollutants, including greenhouse gases.
 - From uranium mining to waste storage, nuclear power emits greenhouse gases.
10. Solar and wind energies don't present unprecedented threats and harms to the public water supplies such as those from Limerick Nuclear Plant.
11. Solar and wind are more dependable in heat and drought when you need power most. Nuclear reactors require enormous quantities of water to operate. If water sources diminish significantly or become too hot, due to droughts and heat waves (expected to increase under global warming), reactors cannot operate safely.

2-70-AL

NRC SAYS IT DECIDED TO EXERCISE ITS NEPA AUTHORITY TO REJECT LICENSE RENEWAL APPLICATIONS ONLY IN CASES WHERE THERE IS SUCH AN IMBALANCE BETWEEN THE IMPACTS OF LICENSE RENEWAL AND THE IMPACTS OF THE ALTERNATIVE THAT IT WOULD BE UNREASONABLE TO ALLOW FURTHER CONSIDERATION OF LICENSE RENEWAL.

➤ **ACE BELIEVES THE INFORMATION WE PROVIDED ABOVE CLEARLY SHOWS IT WOULD BE UNREASONABLE TO ALLOW FURTHER CONSIDERATION OF LIMERICK NUCLEAR PLANT LICENSE RENEWAL.**

ACE COMMENTS TO NRC 6-24-13 – ON LIMERICK NUCLEAR PLANT'S DRAFT EIS

SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA)

NRC COMMENTS AND CONCLUSIONS IN THIS SECTION ARE PROFOUNDLY ALARMING.

NRC devalued every person, all their possessions, and life-support systems in the Greater Philadelphia Region to save Exelon the cost of implementing the most protective safety planning and measures.

NRC's cost-benefit analysis concludes the cost for risk reduction to the population and its life-support systems is not worth the cost to Exelon for severe accident mitigation design alternatives.

SAMA assesses environmental, economic, and other consequences. It's about human health, economic, and environmental impacts of a nuclear plant. Limerick's SAMA is decades out-of-date.

➤ **STILL, NRC WANTS TO EXEMPT LIMERICK**

Exelon and NRC want to exempt Limerick, as one of three nuclear plants that never again have to consider an updated Severe Accident Mitigation Analysis in connection with new and significant environmental information under NEPA in relicensing.

2-71-PA

➤ **This is a grotesque dereliction of responsibility.**

The National Resource Defense Council (NRDC) Filed A Legal Appeal and won in the 3rd Circuit Court of Appeals in Philadelphia, Against Exelon's Attempt To Circumvent A Safety Analysis Requirement for Limerick Nuclear Plant's Outdated, Unacceptable Accident Mitigation Analysis

- The judge agreed with NRDC's conclusion that ignoring the population growth around Limerick is unacceptable if an emergency evacuation at Limerick becomes necessary.
- Common sense planning is needed stating that what was acceptable in 1989 is not good enough now and in the future.
- Limerick's Severe Accident Mitigation analysis was last completed in 1989, relying on the census for 1980 population.

2-72-PA

Even after Fukushima, involving boiling water reactors similar to Limerick's, and drastically increased populations that would clearly be impacted by a Fukushima-type disaster at Limerick, NRC illogically joined Exelon in an appeal against a federal court decision, in order to avoid an updated safety analysis for Limerick. The federal court decision stated that Limerick can't be exempted.

➤ **In this appeal NRC didn't even pretend to be a neutral arbitrator. This is totally shameful and unacceptable.**

Limerick is the 2nd most densely populated nuclear plant in the nation. Still, NRC is refusing to consider increased population and health risks associated with a Limerick Nuclear Plant accident/meltdown.

- Due to Limerick's location, the potential impact of a severe accident would be far greater than at most other U.S. nuclear plants (NRDC research).
- Over 8 million people live within 50 miles of Limerick, the radius NRC told Americans to evacuate in Japan during the Fukushima accident.
- 1.4 million people are now living downwind in the Philadelphia-Wilmington-Newark metropolitan area.

2-73-PA

2-73-PA
Cont'd

- In 1980 Limerick already had double the population density within 30 miles than could evacuate safely (NRC standard). Now the population density is four times higher.

**EVACUATION AND EMERGENCY PLANS
ARE INADEQUATE AND FATALLY FLAWED.**

**NRC INEXPLICABLY PARED DOWN EMERGENCY PLANNING AFTER
FUKUSHIMA. NRC'S ACTIONS ARE INDEFENSIBLE. AFTER FUKUSHIMA,
NRC MADE IT WORSE, NOT BETTER**

2-74-OS

NRC weakened regulations and requirements, including for emergencies and evacuation.

- NRC overhauled community emergency planning for the first time in more than three decades, however NRC pared down emergency rules and evacuation plans, further jeopardizing the public. NRC's new rules after Fukushima make no sense.
- Many emergency responders view NRC's new rules as downright bizarre.
 - 1) NRC Allowed Emergency Drills To Be Run Without Practicing for Radiation
 - 2) NRC Requires FEWER Exercises for Major Radiation Accidents
 - 3) NRC Recommends FEWER People Evacuate Right Away
- Instead Of Attempting To Minimize Chaos And Reduce Radiation Exposure Through Better Emergency Planning and Drills For A Radioactive Accident / Meltdown:
 - 1) NRC Deceived The Public and Weakened Emergency Rules
 - 2) NRC Denied Radiation Risks and Harms
 - 3) Despite Evidence from Fukushima, NRC Failed To Expand Emergency Zones
 - 4) NRC Has Denied Repeated Requests To Expand Evacuation Zones to 50 Miles, and Ingestion Pathway Zones to 100 Miles. This Would Better Protect Public Health, Safety, and Financial Interests For Vast Numbers Of People

**NRC IS ABDICATING ITS RESPONSIBILITY TO ENSURE PUBLIC
HEALTH AND SAFETY IN THE GREATER PHILADELPHIA REGION,
RELATED TO EMERGENCY PLANNING AND EVACUATION**

**NRC'S RESPONSE TO THE IMPOSSIBILITY OF SAFE EVACUATION FROM LIMERICK
NUCLEAR PLANT IS TO IGNORE REALITY, REFUSE TO DISCUSS THE FATALLY
FLAWED EVACUATION PLAN, AND SHIRK ITS RESPONSIBILITY.**

NRC is making decisions that could lead to a Limerick radiation accident/meltdown, while at the same time NRC is shirking its responsibility for radiation contamination released off Limerick's site when a major radiation release or meltdown occurs.

4-16-13, ACE received a response to our repeated requests to meet with NRC's Review Team to discuss the findings from our analysis of Exelon's 12-12 Plume Exposure Time Estimate. This response from Joseph D. Anderson, Chief Operating Reactor Licensing and Outreach Branch, Division of Preparedness and Response was both shocking and negligent.

- Anderson's e-mail to ACE revealed that NRC has no intention of reviewing or evaluating Exelon's 12/12 updated Evacuation Time Estimate (ETE) for Limerick's Radioactive Plume Exposure, even though NRC required it to be produced.

NRC's Earlier Estimated Meltdown Consequences

REFUTE

NRC's New Attempts To Deny Harm From Meltdowns

1974 Reactor Safety Study Published by NRC - Referred To As The Rasmussen Report

- **45,000 Radiation Sickness Cases** (Requiring Hospitalization)
- **3,300 Deaths** (From Acute Radiation Sickness)
- **45,000 Fatal Cancers** (over 50 years)
- **250,000 Non-Fatal Cancers** (over 50 years)
- **190 Children Born With Birth Defects Per Year**

Note: **Non-Insurable Property Damage Was Estimated At \$14 Billion**

NRC's Estimated Consequences For An Accident (CRAC REPORT) For Limerick Nuclear Power Plant - Reported To Congress In 1982

74,000 Early Fatalities
610,000 Early Injuries
34,000 Cancer Deaths

Census Records From 1980 to 2010 Show That These Numbers Would Be Drastically Higher Today.

Our Population Increase Demands Updated, More Realistic Planning

Census Shows - From 1980 to 2010 (2000 and 2010 Census Data)

Numbers For Fatalities, Injuries, and Deaths Above Would Be Drastically Higher Today Due To A: **FOUR-FOLD INCREASE IN POPULATION DENSITY SINCE 1980**

LIMERICK'S 10-MILE EPZ Is The 2ND MOST DENSELY POPULATED In The U.S.

1. INFORMATION ABOVE RENDERS NRC'S CLAIMS IN LIMERICK'S DRAFT EIS - SAMA PAGE 5-3 - MISLEADING, AND INDEFENSIBLE

2-75-PA

It appears NRC will say anything to fool the public to save Exelon money.

- *"Risks of early fatality from potential accidents at the site are small in comparison with risks of early fatality from other human activities in a comparably sized population."*
- *"The accident risk will not add significantly to population exposure and cancer risks."*
- *"Accident risks from Limerick are expected to be a small fraction of risks the general public incurs from other sources." THIS IS ABSURD!*
- *"Best estimates show risks of ...reactor accidents at Limerick are within the range of risks from other nuclear plants." - THIS IS A MEANINGLESS COMPARISON.*

Shame on NRC! This agency has lost all credibility!

- **A Limerick Accident/Meltdown Could Cause A Catastrophe That Could Render The Entire Greater Philadelphia Region A Dead Zone For Generations.**
- **A Limerick Accident/Meltdown Is About High-Levels Of Radiation Exposure That We Can't See, Taste, Smell, Or Feel, But That Cause Radiation Sickness, Cancer, Death, And Impacts Into Future Generations.**

Exelon should not be using decades-old 1989 information to determine health and economic impacts

It is inexcusable for NRC to allow Exelon to use decades old comparisons for anything, especially population. NRC is letting Exelon get away with declaring its review of new and significant information compared to 1989, claiming Exelon did not uncover any cost beneficial plant improvements or SAMAs that would substantially decrease risk of a severe accident. That doesn't even make sense considering NRC's own post-Fukushima recommendations. Cost beneficial to whom? Certainly NOT public interests!

- Exelon's evaluations and claims are based strictly on their costs. That leads to decisions ignoring unacceptable risks to the public.
- NRC's job is to ensure public safety, not protect Exelon's profits.
- NRC is supposed to protect the public's interests. NRC has failed to consider and compare impacts and costs to the public for Exelon not being required to spend the money for the safest accident mitigation.

Costs to the public for an accident/meltdown at Limerick Nuclear Plant could be astronomical, in terms of suffering, health care costs, and financial costs.

- Off-site economic costs for multiple radiation accidents/meltdowns in Limerick's reactors and/or fuel pools, in the densely populated Greater Philadelphia region surrounding Limerick Nuclear Plant have not been accurately assessed by anyone.
- Millions of people would need temporary housing and/or permanent relocation. In today's economy and political dysfunction, the millions of people in the Greater Philadelphia Region who could lose everything would get no help.
- Costs for dealing with a Limerick disaster are estimated to be a trillion dollars, with taxpayers paying all but \$12 billion.
- In addition to complete loss of property, possessions, businesses, and jobs, the short and long term health-care costs would be staggering. There would not even be enough treatment centers or hospitals to deal with the numbers of people who could end up with acute radiation poisoning or worse. In Japan, people, including children, were turned away because they were too radioactive.

2-76-PA

- **NRC never bothered to address any of the public interest issues above in Limerick's DRAFT EIS. NRC is only considering costs to Exelon and Exelon's profits, NOT costs to the public for a Limerick accident/meltdown because NRC failed to require the safest accident mitigation strategies. That is profoundly negligent!**

IF NRC CONSIDERED DRASTIC INCREASES IN POPULATION, RELATED TO THE COSTS FOR LOSSES, NRC SHOULD COME TO THE CONCLUSION THAT IT IS JUST TOO RISKY TO CONTINUE TO OPERATE LIMERICK NUCLEAR PLANT.

- **In NRC's FINAL LIMERICK EIS, THE PUBLIC'S OFF-SITE COSTS FOR A LIMERICK RADIATION ACCIDENT/MELTDOWN MUST BE ACCURATELY ESTIMATED BY AN INDEPENDENT ECONOMIC EXPERT WHO UNDERSTANDS WHAT TOTAL RADIOACTIVE CONTAMINATION WOULD DO TO THE ENVIRONMENT AND THE POPULATION.**

- **2010 census data for 50 miles (not 10) must be used and fully considered by a completely independent expert. The public's costs and interests must be the priority of NRC, not Exelon profits.**
- **EXELON'S COSTS FOR ALL THE SAFEST MITIGATION ACTIONS WOULD CLEARLY PALE BY COMPARISON TO THE COSTS FOR FAILING TO PREVENT A LIMERICK ACCIDENT/MELTDOWN, ESPECIALLY CONSIDERING THE DRASTIC INCREASE IN THE DENSITY OF POPULATION AROUND LIMERICK NUCLEAR PLANT.**

A BODY OF EVIDENCE BELOW SHOWS THAT NRC IS MAKING DECISIONS THAT FAIL IN NRC'S MISSION TO PROTECT THE PUBLIC!

- **Dangerous delays and the opportunity for Exelon to avoid costs for important safety measures at Limerick Nuclear Plant have been allowed by NRC.**
- **When NRC knows about problems, whether with fire protection, increased seismic risk, or corrosion and thinning in fuel pool liners, allowing Exelon to choose to delay or avoid mitigation and safeguards for years or forever, amounts to regulatory negligence and even malpractice.**
- **NRC's Decisions and Irresponsible Conclusions in Limerick's DRAFT EIS are Contributing to Unnecessary Risk for Disastrous Radiation Accidents/Meltdowns and Their Inevitable Catastrophic Impacts.**

POST-FUKUSHIMA NEGLIGENCE AT LIMERICK
NRC IS ALLOWING DANGEROUS DELAYS FOR IMPORTANT SAFEGUARDS
RECOMMENDED BY NRC'S OWN POST-FUKUSHIMA TASK FORCE.

NRC allowed Exelon to DELAY important post-Fukushima safeguards recommended by their own staff, even though Limerick is considered a high-risk nuclear plant with GE Mark II boiling water reactors similar to those at Fukushima.

NRC Is Ignoring Its Own Orders, Based On Fukushima Task Force Recommendations Issued July, 2011, MARCH, 2012 - NRC officially issued three orders to U.S. nuclear power plants:

1. Plants must develop and implement measures to keep spent fuel rods cool after an extreme natural disaster.
2. Sturdier venting systems are required to help prevent pressure-induced explosions.
3. They must have a reliable read of water levels in spent fuel containers.

MARCH 13, 2012 NRC Issued Order to Modify Licensees Requirements for Mitigation Strategies for Beyond-Design-Basis External Events NRC 3-12-12 Letter (E-mail notice 3-13-12).

NRC's Order Requires a 3-phase Approach For Mitigating Beyond-Design-Basis External Events.

1. Initial phase - Requires use of installed equipment and resources to maintain or restore core cooling, containment, and SFP cooling.
2. Transition phase - Requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site.
3. Final phase - Requires obtaining sufficient offsite resources to sustain those functions INDEFINITELY.
 - It is not clear any of these orders have been, or will be, required by NRC to be completed prior to relicensing of Limerick Nuclear Plant. It is important to remember that Fukushima was relicensed just a short time prior to the catastrophe. What was clear was the collusion between the owner and the regulator.
 - It is not clear any safety measure will be completed before 2017, six years after the Fukushima disaster.
 - NRC failed to provide answers to specific questions about several of these issues even after repeated requests by ACE.

2-77-OS

- **Given Exelon's track record of avoiding costs for precaution, Limerick should not be relicensed, at least until AFTER all the post-Fukushima recommendations are fully completed and operational to protect public interests.**

LIMERICK'S HIGH-LEVEL RADIOACTIVE WASTES

NRC'S DRAFT EIS HAS FAILED TO ADEQUATELY ADDRESS THE SITE SPECIFIC ENVIRONMENTAL IMPACTS OF THE MASSIVE AMOUNTS OF HIGH-LEVEL RADIOACTIVE WASTES CURRENTLY STORED IN FUEL POOLS AND CASKS ON THE LIMERICK SITE, AND THE IMPACTS OF THE FUTURE PRODUCTION OF LIMERICK'S HIGH-LEVEL RADIOACTIVE WASTES DURING LIMERICK'S RELICENSING PERIOD.

What could possibly have more of an impact on the future environment of the entire Greater Philadelphia Region than storing more and more of the most deadly materials on earth in fuel pools (like Fukushima's) and above ground casks that can eventually leak?

- **Devastating Long-Term Environmental Impacts Can Result From Storing Or Transporting Limerick's High-Level Radioactive Wastes.**
- **NRC's DRAFT EIS Fails To Adequately Address Specific Environmental Impacts of The Massive Amounts Of High-Level Radioactive Wastes Currently In Limerick's Fuel Pools and Casks.**
- **A New Review Of Limerick's Spent Fuel Storage Is Imperative BEFORE Limerick's EIS DRAFT Is Finalized. There Are Many Unanswered Questions With Serious Implications For Devastating Environmental Consequences For Generations, If Not Forever.**

What could have more impact on the future environment of the entire Greater Philadelphia Region than storing massive amounts of the most deadly materials on earth, in corroding and thinning fuel pools, originally made with substandard cement, and extremely vulnerable to meltdowns from earthquakes and terrorist strikes with planes and missiles (like Fukushima's, high above reactors with no containment)?

- NRC's decision to allow Exelon to avoid an assessment of environmental impacts from all the deadly high-level radioactive wastes stored on the Limerick site until after the EIS is approved for relicensing, is really about protecting Exelon's interests, not public interests.
- There is NO NEED to rush Limerick's relicensing, when its original license doesn't expire for over a decade, another 11 years.
- Given the extreme dangers and destruction faced by the entire Greater Philadelphia from Limerick's high-level radioactive waste storage at Limerick, NRC would be negligent to ignore the unprecedented threats to the environment and population in Limerick's Environmental Impact Statement.

2-78-RW

Although re-licensing of Limerick was pushed back 2 years by the June 8, 2012 court decision requiring NRC to re-think the environmental impact of storing radioactive wastes (spent-fuel) at nuclear plants, Neil Sheehan from NRC made the inexplicable statement in an e-mail to the Mercury that NRC's new rules about spent fuel storage, ordered by a court decision to be released September 2014, are not likely to affect Limerick's Environment Impact Statement.

- **"There is no expectation that Exelon would have to conduct a new review of spent fuel storage at Limerick."** (Mercury - March 8, 2013)
- **"Limerick nuke plant relicensing unlikely to be affected by new spent fuel rules"** (Mercury - March 13, 2013)

CONTRADICTION:

Neil Sheehan's March 2013 statements are contradictory to NRC's December 2012 statements, which revealed the court said NRC should have considered potential environmental effects of leaks and fires involving spent fuel pools.

(Mercury - December 29, 2012 "Limerick nuke plant re-licensing delayed by courts")

NRC wrote, "The Appeals Court ruled that in evaluating risks from on-site storage of spent fuel, "NRC should have considered the potential environmental effects in the event a permanent repository for disposing is never built and found other deficiencies with the agency's consideration of leaks and fires involving spent fuel pools".

- NRC indicated an intention to respond with a new analysis to be "completed within 24 months", including for Limerick.
- NRC intended to "develop an environmental impact statement and a revised waste confidence decision and rule on the temporary storage of spent nuclear fuel."
- On Sept. 6, 2012, the NRC announced it would not fight the June 8, 2012 ruling by the U.S. District Court of Appeals, finding that NRC could not ignore the possibility that the federal government may never build a national repository for America's spent nuclear fuel.

Important facts also in the 12-29-12 article:

- In 2006, Exelon's Limerick plant already reached its design capacity and beyond, forcing "dry storage" canisters to be built on-site. Ground was broken in 2007 for a dry cask storage system now storing the plant's older, colder spent fuel.
- All the fuel ever used at Limerick since it began operating remains on site to this day. It will remain radioactive for thousands of years.
- Spent fuel storage should have brought about a two-year relicensing delay by NRC.
- Until the recent challenge in court, NRC took the negligent position that spent fuel was so safe, it was not to be considered in re-licensing, **but a court decision overturned NRC's irrational conclusion.**
- NRDC petitioned the Atomic Licensing and Safety Board, arguing, among other things, that the reactors should not be re-licensed without a new, site-specific environmental impact review.

NRC STATEMENT IN LIMERICK'S APRIL 2013 DRAFT EIS

"If the results of the Waste Confidence Decision EIS identify information that requires a supplement to the EIS, the NRC staff will perform any appropriate additional NEPA review for those issues before NRC makes a final licensing decision." (6-3)

➤ THAT MAKES NO SENSE AND IS UNACCEPTABLE FOR TWO REASONS

A. THERE IS NO NEED TO RUSH TO COMPLETE LIMERICK'S FINAL EIS BEFORE 2014, WHEN NRC'S COURT-ORDERED STUDY IS COMPLETED. LIMERICK'S FIRST LICENSE DOES NOT EXPIRE UNTIL 2024, A DECADE AWAY.

It is unacceptable for NRC to finalize Limerick Nuclear Plant's EIS prior to finalization of NRC's Court-Ordered Waste Confidence Rules, which will not occur until 2014. The U.S. Court of Appeals for the D.C. Circuit found that an Environmental Impact Statement needed to add additional discussions concerning the impacts of failing to secure permanent disposal of spent nuclear fuel, and concerning the impacts of certain aspects of fuel pool leaks and fires.

2-79-RW

B. THERE ARE MAJOR UNADDRESSED AND UNANSWERED SPECIFIC CONCERNS ABOUT CURRENT STORAGE OF LIMERICK'S HIGH-LEVEL RADIOACTIVE WASTES, ESPECIALLY THE WASTE CURRENTLY STORED IN LIMERICK'S FUEL POOLS.

NO FINAL LIMERICK EIS SHOULD BE COMPLETED UNTIL AFTER NRC'S WASTE CONFIDENCE RULING HAS BEEN FINALIZED AND ALL LIMERICK SPECIFIC HIGH-LEVEL RADIOACTIVE WASTE ISSUES HAVE BEEN COMPLETELY ANSWERED AND ADDRESSED.

- **IT WOULD BE PREMATURE AND ABSOLUTELY INAPPROPRIATE TO ISSUE LIMERICK'S FINAL EIS WITHOUT INCLUDING THE RULING FROM THE COURT-ORDERED WASTE STUDY, AND WITHOUT ANSWERING IMPORTANT QUESTIONS AND CONCERNS.**

2-79-RW
Cont'd

- **3-21-13 ACE presented a written request to NRC for responses to specific Limerick high-level radioactive waste issues.**
- **NRC failed to respond to the concerns and questions presented 3-21-13. 5-16-13 Mel Gray responded to other issues for which we asked questions, but totally ignored the high-level radioactive waste issues.**

LIMERICK'S FUEL POOLS

Spent Fuel Pools - A Catastrophe Waiting To Happen

- Limerick's Fuel Pools are OVERLOADED with massive amounts of high-level radioactive waste rods. Wastes held in pools exceed design expectations.
- Large volumes of Limerick's highly radioactive wastes produced since Limerick started operating in 1985 are stored in Limerick fuel pools.
- Fuel pool liners are corroding and thinning faster than expected.
- Pools are filled with radioactive fluids that are threatening to boil away, introducing radiation into the air.
- They are vulnerable to a 9/11 type terrorist attack with a plane or missile. That kind of attack could lead to an unstoppable radioactive fire which could impact people hundreds of miles away, according to an NRC study (2000).
- Pools are outside the reinforced containment structures for the reactors.
- With so much deadly radioactive wastes in the pools, an attack on Limerick's fuel pools could result in an unstoppable radioactive fire, with potentially worse consequences than Chernobyl.

2-80-RW

Below Is A Summary of Major Issues and Concerns To Be Addressed:

1. **Corrosion and Thinning Documented in Limerick's Fuel Pool Liners at Rates up to 10 times Faster than Anticipated.**
2. **High-Level Radioactive Wastes Stored in Limerick's Fuel Pools Beyond Design Capacity.**
3. **Limerick Previous Accepting Waste From Other Nuclear Plants – Permit Changed in 2012 Without A Hearing**
4. **Structural Deficiencies in the Concrete of Limerick's Fuel Pools**
5. **Limerick's Fuel Pools Are Similar to Those That Exploded at Fukushima – High Above reactors With NO Containment.**
6. **Inadequate Alternative Back-Up Power**
7. **Fuel Pool Instrumentation**
8. **Spent Fuel Pools Are At High Risk For Meltdowns From Loss of Cooling Water Due To:**
 - Earthquakes, Cracking, Aging, Brittle, Deteriorating, Substandard Cement
 - Leakage and Evaporation
 - Explosion Inside or Outside Pool Building
 - Terrorist Acts With Planes Or Missiles – Fuel Pools Are Not Protected Against Air Strikes or Missiles
 - ✓ Aircraft Impact
 - ✓ Siphoning
 - ✓ Pumping
 - ✓ Accidental or Deliberate Drop of Fuel In Transfer

See: Spent Fuel Pools Pose A Danger - Associated Press - March 17, 2011

As Long As Limerick Continues To Operate, More Of This Dangerous and Deadly Waste Will Be Produced.

- Limerick is a de-facto high-level radioactive waste dump, storing massive amounts of all the deadly high-level radioactive wastes produced at Limerick since it started operating in 1985.
- Large volumes, if not all, of this dangerous waste will likely remain on the Limerick site long past Limerick's proposed relicensing period in 2049.
- EPA has a million-year health standard for storage of high-level radioactive waste.

In Conclusion:

THERE IS NO SAFE SOLUTION FOR LIMERICK'S HIGH-LEVEL RADIOACTIVE WASTES.

➤ **Facts About Limerick's Dangerous Deadly High-Level Radioactive Wastes Show The Only Logical Solution Is To Stop Making It.**

- **LIMERICK SHOULD BE CLOSED AS SOON AS POSSIBLE, NOT RELICENSED. EACH YEAR LIMERICK OPERATES MANY TONS MORE OF LIMERICK'S DEADLY HIGH-LEVEL RADIOACTIVE WASTES WILL BE PRODUCED. THREATS WILL OBVIOUSLY INCREASE IF LIMERICK IS RELICENSED.**
- **LIMERICK'S RADIOACTIVE WASTES ALREADY PRODUCED NEED TO BE STORED ON SITE SAFER.**
- **NRC CANNOT JUSTIFY IGNORING LIMERICK SPECIFIC ENVIRONMENTAL IMPACTS FROM LIMERICK'S MASSIVE AMOUNTS OF HIGH-LEVEL RADIOACTIVE WASTES.**
- **NRC'S FINAL EIS FOR LIMERICK NUCLEAR PLANT SHOULD NOT BE COMPLETED UNTIL AFTER NRC'S COURT-ORDERED HIGH-LEVEL RADIOACTIVE WASTE STUDY IS COMPLETED IN 2014 AND THE RESULTING ACTIONS ARE APPLIED TO LIMERICK.**
- **THE OUTCOME OF NRC'S COURT-ORDERED HIGH-LEVEL RADIOACTIVE WASTE STUDY MUST BE INCORPORATED INTO LIMERICK'S FINAL EIS, REGARDLESS OF THE LENGTH OF TIME REQUIRED.**
- **THERE IS NO NEED TO RUSH TO COMPLETE LIMERICK'S EIS FOR RELICENSING, WHEN LIMERICK'S FIRST LICENSE DOES NOT EXPIRE FOR OVER A DECADE.**

2-81-RW

For more information see www.acereport.org
Download #9 "High-Level Radioactive Wastes: A Ticking Time Bomb"

LIMERICK'S LOW-LEVEL RADIOACTIVE WASTES

LOW-LEVEL DOES NOT MEAN LOW RISK.

LIMERICK NUCLEAR PLANT'S "SO-CALLED" LOW-LEVEL RADIOACTIVE WASTES CAN TAKE AS LONG AS 500 YEARS TO FADE TO NATURAL BACKGROUND LEVELS.

NRC FAILS TO TRACK VOLUME OF LOW-LEVEL RADIOACTIVE WASTES PRODUCED AT LIMERICK EACH YEAR. IN MARCH 2013 AN NRC OFFICIAL TOLD ACE THAT TRACKING THE VOLUME OF LIMERICK'S LOW-LEVEL RADIOACTIVE WASTE ISN'T IMPORTANT. WE DISAGREE!

- **IF NRC DOESN'T KNOW HOW MUCH IS PRODUCED, NRC CAN'T CONFIRM WHAT HAS HAPPENED WITH ALL OF THE MASSIVE LOW-LEVEL RADIOACTIVE WASTES PRODUCED AT LIMERICK NUCLEAR PLANT.**
- **PROBLEM: EXELON COULD STILL BE BURNING SOME OF LIMERICK'S LOW-LEVEL RADIOACTIVE WASTES IN LIMERICK'S BOILER "A" WITHOUT NRC'S KNOWLEDGE.**

2-82-RW

NRC HAS NO ACCURATE IDEA HOW MUCH LOW-LEVEL RADIOACTIVE WASTE IS PRODUCED AT LIMERICK EACH YEAR OR WHERE IT IS GOING.

- **WE HAVE NO CONFIDENCE NRC HAS ANY IDEA WHAT EXELON IS DOING WITH ALL OF LIMERICK'S MASSIVE LOW-LEVEL RADIOACTIVE WASTES.**
- **NRC'S STATEMENTS AND NEWS REPORTS DON'T MATCH LOW-LEVEL RAD-WASTE DESTINATIONS REPORTED BY EXELON ON NRC'S WEBSITE (SIMPLY AS NUMBERS OF TRAIN OR TRUCK SHIPMENTS).**
- **JANUARY 2010, EXELON GOT PERMISSION TO SHIP LIMERICK'S LLRW TO PEACH BOTTOM. MARCH 2013 NRC TOLD US LIMERICK'S LLRW WAS SHIPPED TO PEACH BOTTOM. YET, NO SHIPMENTS WENT TO PEACH BOTTOM AT ALL IN 2010, 2011, OR 2012, ACCORDING TO NRC'S WEBSITE.**

PROBLEM: NRC HAS BEEN DECEIVING US ABOUT INCINERATION OF LOW-LEVEL RADIOACTIVE WASTES AT LIMERICK NUCLEAR PLANT.

- **SINCE 2009, NRC HAS BEEN DENYING THAT LIMERICK EVER BURNED LOW-LEVEL RADIOACTIVE WASTES.**
- **MARCH 2013 AN NRC OFFICIAL FINALLY ADMITTED WHAT WE SUSPECTED FROM REVIEWING LIMERICK'S AIR POLLUTION PERMIT IN 2009 - THAT EXELON BURNED LOW-LEVEL RADIOACTIVE WASTES AT LIMERICK.**

INCINERATING ANY OF LIMERICK'S LOW-LEVEL RADIOACTIVE WASTES IS NOT AN ACCEPTABLE OPTION, ESPECIALLY IN THIS HEAVILY POPULATED REGION WHERE THERE IS ALREADY A HEALTH CRISIS.

- **BURNING RADIOACTIVE WASTES DOES NOT DESTROY THE RADIONUCLIDES, BUT INSTEAD DISPERSES THEM IN SUCH A WAY THAT THEY ARE MORE EASILY INHALED, INCREASING THREATS TO HEALTH FROM THE INTERNAL RADIATION EXPOSURE, THE MOST DANGEROUS EXPOSURE.**
- **POTENTIAL HARMS FROM BURNING LIMERICK'S LOW-LEVEL RADIOACTIVE WASTES MUST BE INCLUDED IN LIMERICK'S FINAL EIS FOR RELICENSING.**

EXELON IS CLAIMING THEY WON'T CONTINUE TO BURN LIMERICK'S LOW-LEVEL RADIOACTIVE WASTES, BUT:

- **EXELON'S TRACK RECORD SHOWS WHY WE CAN'T BELIEVE OR TRUST EXELON**
- **NRC HAS NO SYSTEM IN PLACE TO ACCURATELY CONFIRM WHAT IS BEING DONE WITH ALL LIMERICK LOW-LEVEL RADIOACTIVE WASTE.**

NRC HAS NO LONG-RANGE PLAN FOR WHAT WILL BE DONE WITH ALL LIMERICK'S MASSIVE LOW-LEVEL RADIOACTIVE WASTES UNTIL LIMERICK'S CURRENT LICENSE IN 2029.

- **NRC CANNOT JUSTIFY RELICENSING LIMERICK FOR 20 YEARS BEYOND 2029 WHEN THERE IS NO SAFE PLACE TO STORE ALL THE LOW-LEVEL RADIOACTIVE WASTE THAT WILL BE PRODUCED.**
- **THERE IS NO ROOM AT LIMERICK TO STORE THE LLRW THAT MUST BE KEPT AWAY FROM PEOPLE FOR UP TO 500 YEARS,**
- **PEACH BOTTOM CANNOT CONTINUE TO TAKE LIMERICK'S WASTES FOR DECADES. NRC SAID THERE IS NO PLAN TO TAKE LIMERICK'S WASTES TO PEACH BOTTOM FOR MORE THAN ONE YEAR AT A TIME.**
- **THE NATION IS RUNNING OUT OF ROOM TO STORE LOW-LEVEL RADIOACTIVE WASTES AT THE FEW SITES DESIGNATED IN OUR NATION TO STORE IT.**

2-83-RW

RECYCLING CANNOT BE AN OPTION

EXPOSING PEOPLE TO RECYCLED RADIOACTIVE WASTES IN THEIR PRODUCTS SUCH AS BELT BUCKLES, DISHES, AND BABY CARRIAGES INCREASES HEALTH THREATS AND COSTS. IT IS SHAMEFUL AND NEGLIGENT.

RECYCLING RADIOACTIVE WASTES CAN BE COSTLY TO BUSINESSES. FOR EXAMPLE, THE BED, BATH, AND BEYOND RECALL ON RADIOACTIVE TISSUE HOLDERS.

BURNING LIMERICK'S LOW-LEVEL RADIOACTIVE WASTE CANNOT BE AN OPTION.

We are extremely concerned that Exelon may try to burn Limerick's low-level radioactive waste in an incinerator or even in its boilers at some time in the future.

This would be tragic negligence on the part of Exelon and NRC. Visit our website for details www.acereport.org, summaries:

- #2 - Cancer - Skyrocketing Increases: Links to Limerick
- #5 - Limerick's Major Air Pollution: A Serious Health Threat
- #10 - Low-Level Radioactive Wastes: Not Low Risk

Background:

When Limerick Nuclear Power Plant applied for its Title V major air pollution license renewal, ACE questioned whether Limerick was incinerating low-level radioactive wastes. Due to our past investigations and opposition to incinerators in our community, we recognized that some of the air pollutants listed in Limerick's air pollution permit were the same as those from an incinerator. Burning does not make radiation disappear. Inhaling radionuclides is one of the worst routes of exposure.

Section D Source Level Requirements #005 – Operating permit terms and conditions (a) "The permittee, may, in auxiliary boiler "A", fire ... Specific Waste Derived Liquid Fuel (WDLF)." The air toxics listed below from the WDLF are similar to those from incineration. The permit stated that WDLF Shall Meet Following Contaminant Limits Prior to mixing and Shall Not Exceed Limits After mixing:

(PRIOR to mixing with virgin No. 2 oil) (AFTER mixing or out the stack?)

• Arsenic	10 ppm	Arsenic	5 ppm
-----------	--------	---------	-------

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
1.	2-6	12 to 13	2.1.2.2	Clarify the sentence that reads "Discharge of these gases are planned, monitored, controlled, and discharged through the south stack" by changing it to read as follows (see LGS ER page 3-18, 3rd para.): "Discharge of these gases are <i>are is discharged through the north stack, except those from the reactor enclosures, which are</i> discharged through the south stack." 32-1-RW
2.	2-6	14 to 15	2.1.2.2	Clarify the sentence that reads "The standby gas treatment system (SGTS) and the reactor enclosure recirculation system (RERS) are used to reduce radioactive levels before being discharged into the environment" by changing it to read as follows (see LGS ER page 3-18, 4th para.): "The standby gas treatment system (SGTS) and the reactor enclosure recirculation system (RERS) are used to reduce radioactive <i>radioactivity</i> levels before being discharged into the environment <i>in gases from the reactor enclosures before they are discharged into the environment.</i> " 32-2-RW
3.	2-6	17 to 18	2.1.2.3	Clarify the sentence that reads "The solid waste management system collects, processes, and packages solid radioactive waste for storage and offsite shipment and permanent disposal" by changing it to read as follows (see LGS ER page 3-19 and 3-20): "The solid waste management system collects, processes, and packages solid radioactive wastes for <i>temporary onsite storage, as well as shipment and permanent offsite disposal</i> and offsite shipment and permanent disposal. " 32-3-RW
4.	2-6	23 to 24	2.1.2.3	Because (1) not all dry wastes are sent to Duratek for processing and (2) Duratek does not provide final disposal services, clarify the sentence that reads "Compressible and non-compressible wastes are packaged and temporarily stored until they are sent to Duratek in Tennessee for processing or final disposal" by changing it to read as follows (see LGS ER page 3-20): "Compressible and non-compressible wastes are packaged and temporarily stored until they are sent <i>offsite to Duratek in Tennessee</i> for processing or final disposal." 32-4-RW
5.	2-6	26 to 29	2.1.2.3	Clarify the sentence that reads "Wastes from the reactor water cleanup (RWCU) system floor drains, equipment drains, and fuel pool system usually exceed the criteria for LLRW or low specific activity material and are packaged in containers and stored in the high level storage area (HLSA), which is located in the Radwaste Enclosure" by changing it to read as follows (see LGS ER page 3-20): " <i>However, wet</i> wastes from the reactor" 32-5-RW

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
				water cleanup (RWCU) system floor drains, equipment drains, and fuel pool system usually exceed the criteria for <i>both Class A LLRW and</i> low specific activity material. and <i>Therefore, if they cannot be reused, they</i> are packaged in containers and stored in the high level storage area (HLSA), which is located in the Radwaste Enclosure." 32-5-RW Cont'd
6.	2-16	34 to 35	2.1.6.1	The sentence in lines 34 to 35 on page 2-16 reads as follows: "The screens have 0.25-in. (0.64-cm) mesh openings designed to limit water approaching the screens to a velocity of 0.75 fps (0.23 m/s)." As Exelon explained in its March 27, 2012 response to the NRC's Request for Additional Information, item E1-7, the information in this sentence was based on initial design information provided during the LGS construction permit stage (in Section 3.4.3 of the LGS ER-CP) and subsequently reflected in the LGS FES-CP and ASLB Initial Decision of June 14, 1974. However, changes made to the initial Schuylkill Pumphouse design resulted in a decrease from 0.75 fps to 0.61 fps in design velocity for the as-built screens. This decrease is acknowledged in Section 4.2.4 of the LGS FES-OL, as well as in the DRBC Docket No. D-1969-210 CP-13 (p. 3, Sec. A.2.b), which was approved on May 8, 2013. Accordingly, Exelon requests that the sentence in lines 34 to 35 on page 2-16 be revised to read as follows: "The screens have 0.25-in. (0.64-cm) mesh openings designed to limit water approaching the screens to a velocity of 0.75 fps (0.23 m/s) <i>0.61 fps (0.19 m/s)</i> ." 32-6-SW
7.	2-6	41	2.1.2.3	Replace the last two sentences of the paragraph that begins in line 41 on page 2-6 as follows: " Class B/C LLRW stored at LGS or packaged in the future will be sent to PBAPS to be stored at the LLRW storage Purpose and Need for Action facility at that site. The storage capacity for LGS Class B/C 1 wastes at PBAPS is expected to be sufficient through the extended operating license for both LGS units. Class B/C LLRW stored at LGS or packaged in the future may be sent to PBAPS to be stored at the LLRW storage facility at that site. The storage capacity for LGS Class B/C wastes at PBAPS is expected to be sufficient through the extended operating license for both LGS units. However, storage of LGS Class B/C wastes at PBAPS should be unnecessary during the term of a contract, which was executed in February 2013, for treatment and disposal of such wastes at a licensed off-site facility in Texas. " 32-7-RW

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
8.	2-7	7 to 9	2.1.2.4	Clarify the words "however, if it were necessary to treat and dispose of LLMW during the license renewal period, Exelon would store it on site, in compliance with the 1976 Resource Conservation and Recovery Act (RCRA) storage and treatment conditional exemption" as follows: "however, if it were necessary to treat and dispose of LLMW <i>were generated during the license renewal period</i> during the license renewal period, Exelon would store it on site, in compliance with the 1976 Resource Conservation and Recovery Act (RCRA) storage and treatment conditional exemption." 32-8-RW
9.	2-7	13 to 17	2.1.2.4	Consider deleting the paragraph in lines 13 to 17 on page 2-7 because it repeats information provided in the preceding paragraph. In addition, although Exelon has previously shipped LLMW for treatment and disposal by the facilities named in the paragraph, future contractual arrangements may be different. 32-9-RW
10.	2-8	20 to 21	2.1.3.1	Under Pennsylvania regulations there are 4 types of universal waste management facilities: large quantity handlers of universal waste (LQHUWs), small quantity handlers of universal waste (SQHUWs), universal waste transporters, and destination facilities. As stated in section 3.1.4.2, p. 3-25, of the LGS License Renewal Environmental Report, LGS is classified as a Small Quantity Handler of universal wastes (less than 5,000 kg accumulated at any time). Accordingly, the sentence in lines 20 to 21 on p. 2-8 of the draft SEIS, should be corrected to read as follows: "LGS is considered a Large Quantity Generator <i>Small Quantity Handler</i> of universal wastes (<i>less than 5,000 kg accumulated at any time</i>) (greater than 2,200 lb [1,000 kg] per month)" 32-10-RW
11.	2-23	2 to 3	2.1.7.1	Beginning after the words "and held a hearing on August 28, 2012" on line 3, insert the following sentence: " <i>On May 8, 2013, the DRBC unanimously approved the docket for water withdrawals by and discharges from the LGS.</i> " 32-11-SW The approved DRBC Docket No. D-1969-210 CP-13 is available on the DRBC Web site at the following URL: http://www.state.nj.us/drbc/library/documents/dockets/050713/1969-210CP-13.pdf
12.	2-23	30 to 31	2.1.7.2	Because the DRBC docket for LGS has been approved, revise the sentence in lines 30 to 31 on p. 2-23 as follows: " The draft docket issued by the DRBC (see Section 2.1.7.1) proposes groundwater production limits for LGS. <i>The approved DRBC docket for LGS (see Section 2.1.7.1) restricts groundwater withdrawals from each LGS well and from the total system,</i> " 32-12-GW

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
				<i>except during fire emergencies and other plant emergencies."</i> 32-12-GW Cont'd
13.	2-33	45 to 47	2.2.4.2	In lines 45 to 47 on page 2-33, the LGS DSEIS indicates that Exelon has not received any Notices of Violation, nonconformance notifications, or related infractions associated with the site's NPDES permits or related to other water quality matters within the past 5 years, based on a letter from Exelon to NRC responding to an NRC request for additional information, dated February 28, 2012. Please note that the Pennsylvania Department of Environmental Protection (PADEP) issued a Notice of Violation (NOV) to LGS dated 03/06/2012. The NOV addressed external corrosion and pitting observed by PADEP on the outer shells of the Unit 1 and 2 Sulfuric Acid Aboveground Storage Tanks (DEP Tank Nos. 001A and 002A) during inspections that were performed in December 2011. LGS completed the required corrective actions, had the tanks re-inspected, and submitted a letter to the PADEP on 03/27/2012 documenting the corrective actions. At this time, there are no open actions with respect to the NOV, and no other NOV's have been received in the past 5 years. 32-13-SW
14.	2-37	11 to 13	2.2.6	During the water supply demonstration project (see LGS License Renewal Application Environmental Report, p. 3-8, Section 3.1.2.1), the DRBC removed temperature as a restriction on water withdrawal from the Schuylkill River, and the DRBC docket issued on May 8, 2013 did not reinstate any temperature restriction. Accordingly, Exelon requests that the sentence in lines 11 to 13 on page 2-37 be revised as follows: "When temperature and flow conditions in the Schuylkill River do not meet DRBC criteria for water use, LGS secondarily relies on water from Perkiomen Creek." 32-14-AQ
15.	2-40	31	2.2.6.1	During the water supply demonstration project (see LGS License Renewal Application Environmental Report, p. 3-8, Section 3.1.2.1), the DRBC removed temperature as a restriction on water withdrawal from the Schuylkill River, and the DRBC docket issued on May 8, 2013 did not reinstate any temperature restriction. Accordingly, Exelon requests that the sentence in lines 11 to 13 on page 2-37 be revised as follows: "As described in Section 2.1.6, LGS withdraws water from Perkiomen Creek, rather than the Schuylkill River, if the flow and temperature conditions in the Schuylkill River do not meet DRBC criteria for water use." 32-15-AQ

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
16.	2-62	6 to 21	2.2.8.3	On February 18, 2013, a bald eagle was observed and photographed hunting waterfowl in the LGS spray pond. This observation will be reported in the Limerick Corporate Lands for Learning application to be submitted to the Wildlife Habitat Council in late June 2013. 32-16-TE
17.	2-71	8 to 10	2.2.9.5	Clarify the sentence in lines 8 to 10 on page 2-71 by revising it as follows: "As the ROI has a population greater than or equal to 190 persons per square mile within 80.4 km (50 miles), this translates to a Category 4, <i>"in close proximity" population density based on the GEIS measure of proximity</i> (greater than or equal to 190 persons per square mile within 50 miles)." 32-17-SE
18.	2-83	35 to 37	2.2.10.2	Because rehabilitation and mothballing activities at the Fricks Lock Historic District have been completed, revise the sentence in lines 35 to 37 on page 2-83 as follows: "The rehabilitation and mothballing activities are specified to meet the Secretary of Interior's Standards for Rehabilitation and construction activity, <i>which began is expected to begin in 2012, was completed in May 2013.</i> " 32-18-HA
19.	4-4	20 to 22	4.4	The sentence in lines 20 to 22 on p. 4-4 indicates that NRC staff did not consider use of water from the Wadesville Mine Pool and the Still Creek Reservoir in its impact level determination because the final DRBC docket had not been approved and use of these waters remained a demonstration project. Exelon recommends modifying the sentence based on DRBC's approval of Docket No. D-1969-210 CP-13 on May 8, 2013. The approved docket, which authorizes the Wadesville Mine Pool and Still Creek Reservoir as augmentation water sources for the Schuylkill River, is available on the DRBC Web site at the following URL: http://www.state.nj.us/drbc/library/documents/dockets/050713/1969-210CP-13.pdf 32-19-SW
20.	4-4	28 to 30	4.4	Because the DRBC made the demonstration project permanent by approving Docket No. D-1969-210 CP-13 on May 8, 2013, consider revising the sentence in lines 28 to 30 on page 4-4 as follows: "This trend toward an increasing reliance on augmented flows in the Schuylkill River would be expected to increase during the license renewal term should the demonstration project continue or be made permanent by DRBC, as requested by Exelon. " 32-20-SW
21.	4-23	14 to 16	4.9.2	Because the type of dosimeter used to measure environmental radiation doses may be changed from time to time, revise the sentence in lines 14 to 16 on page 4-23 as follows: "The ambient gamma radiation pathway measures direct exposure" 32-21-HH

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with **bolded italics** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment	
				from environmental radiation doses using thermoluminescent dosimeters, <i>which are typically thermoluminescent dosimeters.</i>	32-21-HH Cont'd
22.	4-29 to 4-31	NA	4.10.2 to 4.10.5	In sections 4.10.2 to 4.10.5, which discuss the impacts of LGS license renewal on housing, public utilities, offsite land use, and transportation, the DSEIS does not reach conclusions on the level of impacts (i.e., SMALL, MODERATE, etc.). Instead each section concludes that "there would be no ... impacts during the license renewal term beyond those already experienced." Exelon suggests that NRC consider providing impact level determinations in these sections using the standard levels of SMALL, MODERATE, and LARGE adopted in the GEIS.	32-22-SE
23.	4-30	33 to 37	4.10.4.2	Because payments to Chester County taxing entities are very small, consider revising the sentences in lines 33 to 37 on page 4-30 as follows: "As discussed in Chapter 2, Exelon pays <i>the majority of its annual</i> property taxes for LGS to the following entities in Montgomery County and Chester Counties: Limerick Township,; Spring-Ford Area School District, Lower Pottsgrove Township, Pottsgrove School District, Chester County, East Coventry Township, and Owen J. Roberts School District. Exelon also makes tax payments to taxing authorities in <i>Chester County and</i> Bucks County, but the amounts are relatively minor."	32-23-SE
24.	4-48	17	4.12.3.4	NRC's determination of SMALL to MODERATE cumulative impacts on aquatic resources is based on the combination of past flow alterations, increased suburban residential/commercial development, existing power/industrial/municipal NPDES dischargers, Marcellus shale/energy development activities, and climate change. Exelon requests that this conclusion be further clarified by adding the following sentence at the end of the paragraph in line 17 on page 4-48: " <i>However, the most significant contributory effects would come from activities in the region that are unrelated to continued LGS operation.</i> "	32-24-AQ
25.	4-50	15 to 22	4.12.4	NRC's determination of MODERATE cumulative impacts on terrestrial resources is based on neighboring energy-producing facilities, habitat fragmentation from increased suburban development, agricultural runoff, nearby parks and recreation areas, and climate change, with no contribution for the minimal terrestrial impacts from continued LGS operation. Considering that ,of the neighboring energy-producing facilities, one closed 2 units in 2011 (Cromby), another closed 1 unit in 2012 (Eddystone), and one was withdrawn (Linfield Energy Center),	32-25-TE

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
				Exelon suggests that SMALL to MODERATE may be a more appropriate cumulative impact level, similar to aquatic resources. 32-25-TE Cont'd
26.	4-53	Socio-economics	Table 4-10	Exelon suggests that NRC consider providing an impact level determination in Table 4-10 for "Socioeconomics" using the standard levels of SMALL, MODERATE, and LARGE adopted in the GEIS. 32-26-SE
27.	6-5	13 to 16	6.2.1.2	The LGS DSEIS states that the various studies reviewed show that "the relatively low order of magnitude of GHG [greenhouse gas] emissions from nuclear power, when compared to fossil-fueled alternatives (especially natural gas), <i>could potentially disappear if available uranium ore grades drop sufficiently . . .</i> " (Emphasis added.) This statement is speculative, based on worst-case assumptions, and a review of the information presented in the draft LGS DSEIS reveals it to be incorrect. None of the studies cited in Table 6-3 (page 6-7) shows that the difference in GHG emissions between nuclear and natural gas would "disappear," even under the worst-case speculative conditions of declining ore grades and best-case future improvements in natural gas technology. See, e.g., POST (2006) (showing GHG emissions nearly an order of magnitude lower for nuclear even under these assumptions). For this reason, Exelon suggests reevaluation of the accuracy of the conclusions in the draft LGS DSEIS regarding future relative magnitudes of GHG emissions from nuclear power plants compared to natural gas power plants. 32-27-GHG
28.	6-9	40	6.2.2	On page 6-9, the draft LGS DSEIS states in line 40 that "[f]ew studies predict that nuclear fuel cycle emissions will exceed those of fossil fuels within a timeframe that includes the LGS periods of extended operation." However, <u>none</u> , rather than "few," of the studies cited in the draft LGS DSEIS appear to support this thesis. Therefore, Exelon suggests that the quoted sentence be deleted and replaced with the following sentence: " <i>Nearly all studies predict that nuclear fuel cycle emissions will remain an order of magnitude or more below those of all types of fossil fuels during the LGS periods of extended operation.</i> " 32-28-GHG
29.	8-9	22 to 23	8.1.2	Because LGS does not use groundwater for service water makeup, revise the sentence in lines 22 to 23 on page 8-9 as follows: "This includes the use of groundwater for service water makeup <i>backup supply of fire emergency water</i> and potable 32-29-GW

Exelon Comments on the Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station, Units 1 and 2

Where suggested changes are provided, they are highlighted with ***bolded italics*** for inserted text and strikethroughs for deleted text.

Item #	Page #	Line #	Section #	Comment
				and sanitary uses.”
30.	8-14	32 to 33	8.1.10	The description of a NGCC plant in lines 32 to 33 on page 8-14 is credited to “Exelon 2011.” However, section 8.9 lists no reference document to which this short form citation is assigned. Furthermore, since the draft LGS DSEIS excludes the existing LGS site as the host for replacement generating facilities (see page 8-3, lines 22 to 27), Exelon questions the assumption that an alternative NGCC plant would have two cooling towers that exceed 500 ft in height, which implies natural draft hyperbolic towers. Accordingly, Exelon suggests that the accuracy of the description on page 8-14 of onsite features at an alternative NGCC plant should be verified. 32-30-SE
31.	8-21	12 to 13	8.2.2	Because LGS does not use groundwater for service water makeup, revise the sentence in lines 12 to 13 on page 8-21 as follows: “This includes the use of groundwater for service water makeup <i>backup supply of fire emergency water</i> and potable and sanitary uses.” 32-31-GW
32.	8-30	42	8.3.2	Because LGS does not use groundwater for service water makeup, revise the sentence in lines 41 to 42 on page 8-30 as follows: “This includes the use of groundwater for service water makeup <i>backup supply of fire emergency water</i> and potable and sanitary uses.” 32-32-GW

APPENDIX B
NATIONAL ENVIRONMENTAL POLICY ACT ISSUES FOR LICENSE
RENEWAL OF NUCLEAR POWER PLANTS

NATIONAL ENVIRONMENTAL POLICY ACT ISSUES FOR LICENSE RENEWAL OF NUCLEAR POWER PLANTS

According to the National Environmental Policy Act of 1969, as amended (NEPA), all agencies of the Federal Government are required to develop a detailed statement on the environmental impact of their proposed major Federal actions significantly affecting the quality of the human environment. NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants (referred to as the GEIS), documents the results of the U.S. Nuclear Regulatory Commission (NRC) staff's (staff's) systematic approach to evaluating the environmental impacts of renewing the licenses of individual nuclear power plants. The GEIS was originally published in 1996 and Addendum 1 to the GEIS, which only addresses transportation issues, was published in 1999. Of the 92 total environmental issues that the staff identified in the 1996 GEIS, the staff determined that 69 are generic to all plants (Category 1), while 21 issues must be discussed on a site-specific basis (Category 2). Two other issues, environmental justice and the chronic effects of electromagnetic fields, are uncategorized and must be evaluated on a site-specific basis.

Table B-1 in this appendix lists all 92 environmental issues, including the possible environmental significance (SMALL, MODERATE, LARGE, or uncategorized) as appropriate. This table is provided in Chapter 9 of the 1996 GEIS. .

On June 20, 2013, the NRC published a final rule (78 FR 37282) revising its environmental protection regulation, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions." Specifically, the final rule updates the potential environmental impacts associated with the renewal of an operating license for a nuclear power reactor for an additional 20 years. A revised GEIS, which updates the 1996 GEIS, provides the technical basis for the final rule. The revised GEIS specifically supports the revised list of NEPA issues and associated environmental impact findings for license renewal contained in Table B-1 in Appendix B to Subpart A of the revised 10 CFR Part 51. The revised GEIS and final rule reflect lessons learned and knowledge gained during previous license renewal environmental reviews. In addition, public comments received on the draft revised GEIS and rule and during previous license renewal environmental reviews were reexamined to validate existing environmental issues and identify new ones.

This SEIS, which discusses the environmental impacts associated with the proposed Federal action of renewing the operating licenses for the Limerick Generating Station, Units 1 and 2 (LGS), is reviewed against the criteria from the 1996 GEIS. However, under NEPA, the NRC must now consider and analyze, in its license renewal SEISs, the potential impacts described by the final rule's new Category 2 issues, and to the extent there is any new and significant information, the potential significant impacts described by the final rule's new Category 1 issues. Therefore, the new issues identified, or re-categorized, in the 2013 GEIS are also included in this SEIS. The new Category 1 issues identified in the 2013 GEIS which are discussed and evaluated in Chapter 4 of this SEIS are geology and soils, exposure of terrestrial organisms to radionuclides, exposure of aquatic organisms to radionuclides, human health impact from chemicals, and physical occupational hazards. The new Category 2 issues that are addressed in Chapter 4 of this SEIS are radionuclides released to groundwater, effects on terrestrial resources (non-cooling system impacts), minority and low-income populations (i.e., environmental justice), and cumulative impacts.

Table B–1. Generic Summary of Findings on NEPA Issues for License Renewal of Power Plants

Issue	Type of Issue	Findings
Surface Water Quality, Hydrology, and Use (for all plants)		
Impacts of refurbishment on surface water quality	Generic	SMALL. Impacts are expected to be negligible during refurbishment because best management practices are expected to be employed to control soil erosion and spills.
Impacts of refurbishment on surface water use	Generic	SMALL. Water use during refurbishment will not increase appreciably or will be reduced during plant outage.
Altered current patterns at intake and discharge structures	Generic	SMALL. Altered current patterns have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered salinity gradients	Generic	SMALL. Salinity gradients have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered thermal stratification of lakes	Generic	SMALL. Generally, lake stratification has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Temperature effects on sediment transport capacity	Generic	SMALL. These effects have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Scouring caused by discharged cooling water	Generic	SMALL. Scouring has not been found to be a problem at most operating nuclear power plants and has caused only localized effects at a few plants. It is not expected to be a problem during the license renewal term.
Eutrophication	Generic	SMALL. Eutrophication has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Discharge of chlorine or other biocides	Generic	SMALL. Effects are not a concern among regulatory and resource agencies, and are not expected to be a problem during the license renewal term.
Discharge of sanitary wastes and minor chemical spills	Generic	SMALL. Effects are readily controlled through National Pollutant Discharge Elimination System (NPDES) permit and periodic modifications, if needed, and are not expected to be a problem during the license renewal term.
Discharge of other metals in waste water	Generic	SMALL. These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants. They are not expected to be a problem during the license renewal term.
Water use conflicts (plants with once-through cooling systems)	Generic	SMALL. These conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems.
Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	Site-specific	SMALL OR MODERATE. The issue has been a concern at nuclear power plants with cooling ponds and at plants with cooling towers. Impacts on in-stream and riparian communities near these plants could be of moderate significance in some situations. See § 51.53(c)(3)(ii)(A).

Issue	Type of Issue	Findings
Aquatic Ecology (for all plants)		
Refurbishment	Generic	SMALL. During plant shutdown and refurbishment there will be negligible effects on aquatic biota because of a reduction of entrainment and impingement of organisms or a reduced release of chemicals.
Accumulation of contaminants in sediments or biota	Generic	SMALL. Accumulation of contaminants has been a concern at a few nuclear power plants but has been satisfactorily mitigated by replacing copper alloy condenser tubes with those of another metal. It is not expected to be a problem during the license renewal term.
Entrainment of phytoplankton and zooplankton	Generic	SMALL. Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Cold shock	Generic	SMALL. Cold shock has been satisfactorily mitigated at operating nuclear plants with once-through cooling systems, has not endangered fish populations, or been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds, and is not expected to be a problem during the license renewal term.
Thermal plume barrier to migrating fish	Generic	SMALL. Thermal plumes have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Distribution of aquatic organisms	Generic	SMALL. Thermal discharge may have localized effects but is not expected to affect the larger geographical distribution of aquatic organisms.
Premature emergence of aquatic insects	Generic	SMALL. Premature emergence has been found to be a localized effect at some operating nuclear power plants but has not been a problem and is not expected to be a problem during the license renewal term.
Gas supersaturation (gas bubble disease)	Generic	SMALL. Gas supersaturation was a concern at a small number of operating nuclear power plants with once-through cooling systems but has been satisfactorily mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Low dissolved oxygen in the discharge	Generic	SMALL. Low dissolved oxygen has been a concern at one nuclear power plant with a once-through cooling system but has been effectively mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	Generic	SMALL. These types of losses have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

Appendix B

Issue	Type of Issue	Findings
Aquatic Ecology (for all plants) (continued)		
Stimulation of nuisance organisms (e.g., shipworms)	Generic	SMALL. Stimulation of nuisance organisms has been satisfactorily mitigated at the single nuclear power plant with a once-through cooling system where previously it was a problem. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	Site-specific	SMALL, MODERATE, OR LARGE. The impacts of entrainment are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. Further, ongoing efforts in the vicinity of these plants to restore fish populations may increase the numbers of fish susceptible to intake effects during the license renewal period, such that entrainment studies conducted in support of the original license may no longer be valid. See § 51.53(c)(3)(ii)(B).
Impingement of fish and shellfish	Site-specific	SMALL, MODERATE, OR LARGE. The impacts of impingement are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. See § 51.53(c)(3)(ii)(B).
Heat shock	Site-specific	SMALL, MODERATE, OR LARGE. Because of continuing concerns about heat shock and the possible need to modify thermal discharges in response to changing environmental conditions, the impacts may be of moderate or large significance at some plants. See § 51.53(c)(3)(ii)(B).
Aquatic Ecology (for plants with cooling-tower-based heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	Generic	SMALL. Entrainment of fish has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Impingement of fish and shellfish	Generic	SMALL. The impingement has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Heat shock	Generic	SMALL. Heat shock has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.

Issue	Type of Issue	Findings
Groundwater Use and Quality		
Impacts of refurbishment on groundwater use and quality	Generic	SMALL. Extensive dewatering during the original construction on some sites will not be repeated during refurbishment on any sites. Any plant wastes produced during refurbishment will be handled in the same manner as in current operating practices and are not expected to be a problem during the license renewal term.
Groundwater use conflicts (potable and service water; plants that use <100 gallons per minute [gpm])	Generic	SMALL. Plants using less than 100 gpm are not expected to cause any groundwater use conflicts.
Groundwater use conflicts (potable and service water, and dewatering; plants that use >100 gpm)	Site-specific	SMALL, MODERATE, OR LARGE. Plants that use more than 100 gpm may cause groundwater use conflicts with nearby groundwater users. See § 51.53(c)(3)(ii)(C).
Groundwater use conflicts (plants using cooling towers withdrawing makeup water from a small river)	Site-specific	SMALL, MODERATE, OR LARGE. Water use conflicts may result from surface water withdrawals from small water bodies during low flow conditions which may affect aquifer recharge, especially if other groundwater or upstream surface water users come on line before the time of license renewal. See § 51.53(c)(3)(ii)(A).
Groundwater use conflicts (Ranney wells)	Site-specific	SMALL, MODERATE, OR LARGE. Ranney wells can result in potential groundwater depression beyond the site boundary. Impacts of large groundwater withdrawal for cooling tower makeup at nuclear power plants using Ranney wells must be evaluated at the time of application for license renewal. See § 51.53(c)(3)(ii)(C).
Groundwater quality degradation (Ranney wells)	Generic	SMALL. Groundwater quality at river sites may be degraded by induced infiltration of poor-quality river water into an aquifer that supplies large quantities of reactor cooling water. However, the lower quality infiltrating water would not preclude the current uses of groundwater and is not expected to be a problem during the license renewal term.
Groundwater quality degradation (saltwater intrusion)	Generic	SMALL. Nuclear power plants do not contribute significantly to saltwater intrusion.
Groundwater quality degradation (cooling ponds in salt marshes)	Generic	SMALL. Sites with closed-cycle cooling ponds may degrade groundwater quality. Because water in salt marshes is brackish, this is not a concern for plants located in salt marshes.
Groundwater quality degradation (cooling ponds at inland sites)	Site-specific	SMALL, MODERATE, OR LARGE. Sites with closed-cycle cooling ponds may degrade groundwater quality. For plants located inland, the quality of the groundwater in the vicinity of the ponds must be shown to be adequate to allow continuation of current uses. See § 51.53(c)(3)(ii)(D).

Appendix B

Issue	Type of Issue	Findings
Terrestrial Resources		
Refurbishment impacts	Site-specific	SMALL, MODERATE, OR LARGE. Refurbishment impacts are insignificant if no loss of important plant and animal habitat occurs. However, it cannot be known whether important plant and animal communities may be affected until the specific proposal is presented with the license renewal application. See § 51.53(c)(3)(ii)(E).
Cooling tower impacts on crops and ornamental vegetation	Generic	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling tower impacts on native plants	Generic	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Bird collisions with cooling towers	Generic	SMALL. These collisions have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling pond impacts on terrestrial resources	Generic	SMALL. Impacts of cooling ponds on terrestrial ecological resources are considered to be of small significance at all sites.
Power line right-of-way management (cutting and herbicide application)	Generic	SMALL. The impacts of right-of-way maintenance on wildlife are expected to be of small significance at all sites.
Bird collision with power lines	Generic	SMALL. Impacts are expected to be of small significance at all sites.
Impacts of electromagnetic fields on flora and fauna	Generic	SMALL. No significant impacts of electromagnetic fields on terrestrial flora and fauna have been identified. Such effects are not expected to be a problem during the license renewal term.
Floodplains and wetland on power line right-of-way	Generic	SMALL. Periodic vegetation control is necessary in forested wetlands underneath power lines and can be achieved with minimal damage to the wetland. No significant impact is expected at any nuclear power plant during the license renewal term.
Threatened or Endangered Species (for all plants)		
Threatened or endangered species	Site-specific	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are not expected to adversely affect threatened or endangered species. However, consultation with appropriate agencies would be needed at the time of license renewal to determine whether threatened or endangered species are present and whether they would be adversely affected. See § 51.53(c)(3)(ii)(E).

Issue	Type of Issue	Findings
Air Quality		
Air quality during refurbishment (nonattainment and maintenance areas)	Site-specific	SMALL, MODERATE, OR LARGE. Air quality impacts from plant refurbishment associated with license renewal are expected to be small. However, vehicle exhaust emissions could be cause for concern at locations in or near nonattainment or maintenance areas. The significance of the potential impact cannot be determined without considering the compliance status of each site and the numbers of workers expected to be employed during the outage. See § 51.53(c)(3)(ii)(F).
Air quality effects of transmission lines	Generic	SMALL. Production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.
Land Use		
Onsite land use	Generic	SMALL. Projected onsite land use changes required during refurbishment and the renewal period would be a small fraction of any nuclear power plant site and would involve land that is controlled by the applicant.
Power line right-of-way	Generic	SMALL. Ongoing use of power line rights-of-way would continue with no change in restrictions. The effects of these restrictions are of small significance.

Appendix B

Issue	Type of Issue	Findings
Human Health		
Radiation exposures to the public during refurbishment	Generic	SMALL. During refurbishment, the gaseous effluents would result in doses that are similar to those from current operation. Applicable regulatory dose limits to the public are not expected to be exceeded.
Occupational radiation exposures during refurbishment	Generic	SMALL. Occupational doses from refurbishment are expected to be within the range of annual average collective doses experienced for pressurized-water reactors and boiling-water reactors. Occupational mortality risk from all causes, including radiation, is in the mid-range for industrial settings.
Microbiological organisms (occupational health)	Generic	SMALL. Occupational health impacts are expected to be controlled by the continued application of accepted industrial hygiene practices to minimize worker exposures.
Microbiological organisms (public health)(plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	Site-specific	SMALL, MODERATE, OR LARGE. These organisms are not expected to be a problem at most operating plants, except possibly at plants using cooling ponds, lakes, or canals that discharge to small rivers. Without site-specific data, it is not possible to predict the effects generically. See § 51.53(c)(3)(ii)(G).
Noise	Generic	SMALL. Noise has not been found to be a problem at operating plants and is not expected to be a problem at any plant during the license renewal term.
Electromagnetic fields – acute effects (electric shock)	Site-specific	SMALL, MODERATE, OR LARGE. Electric shock resulting from direct access to energized conductors or from induced charges in metallic structures has not been found to be a problem at most operating plants and generally is not expected to be a problem during the license renewal term. However, site-specific review is required to determine the significance of the electric shock potential at the site. See § 51.53(c)(3)(ii)(H).
Electromagnetic fields – chronic effects	Uncategorized	UNCERTAIN. Biological and physical studies of 60-Hz electromagnetic fields have not found consistent evidence linking harmful effects with field exposures. However, research is continuing in this area and a consensus scientific view has not been reached.
Radiation exposures to public (license renewal term)	Generic	SMALL. Radiation doses to the public will continue at current levels associated with normal operations.
Occupational radiation exposures (license renewal term)	Generic	SMALL. Projected maximum occupational doses during the license renewal term are within the range of doses experienced during normal operations and normal maintenance outages, and would be well below regulatory limits.

Issue	Type of Issue	Findings
Socioeconomics		
Housing impacts	Site-specific	SMALL, MODERATE, OR LARGE. Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures, that limit housing development, are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development. See § 51.53(c)(3)(ii)(I).
Public services: public safety, social services, and tourism and recreation	Generic	SMALL. Impacts to public safety, social services, and tourism and recreation are expected to be of small significance at all sites.
Public services: public utilities	Site-specific	SMALL OR MODERATE. An increased problem with water shortages at some sites may lead to impacts of moderate significance on public water supply availability. See § 51.53(c)(3)(ii)(I).
Public services: education (refurbishment)	Site-specific	SMALL, MODERATE, OR LARGE. Most sites would experience impacts of small significance but larger impacts are possible depending on site- and project-specific factors. See § 51.53(c)(3)(ii)(I).
Public services: education (license renewal term)	Generic	SMALL. Only impacts of small significance are expected
Offsite land use (refurbishment)	Site-specific	SMALL OR MODERATE. Impacts may be of moderate significance at plants in low population areas. See § 51.53(c)(3)(ii)(I).
Offsite land use (license renewal term)	Site-specific	SMALL, MODERATE, OR LARGE. Significant changes in land use may be associated with population and tax revenue changes resulting from license renewal. See § 51.53(c)(3)(ii)(I).
Public services: transportation	Site-specific	SMALL, MODERATE, OR LARGE. Transportation impacts (level of service) of highway traffic generated during plant refurbishment and during the term of the renewed license are generally expected to be of small significance. However, the increase in traffic associated with the additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites. See § 51.53(c)(3)(ii)(J).
Historic and archaeological resources	Site-specific	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are expected to have no more than small adverse impacts on historic and archaeological resources. However, the National Historic Preservation Act requires the Federal agency to consult with the State Historic Preservation Officer to determine whether there are properties present that require protection. See § 51.53(c)(3)(ii)(K).
Aesthetic impacts (refurbishment)	Generic	SMALL. No significant impacts are expected during refurbishment.

Appendix B

Issue	Type of Issue	Findings
Socioeconomics (continued)		
Aesthetic impacts (license renewal term)	Generic	SMALL. No significant impacts are expected during the license renewal term.
Aesthetic impacts of transmission lines (license renewal term)	Generic	SMALL. No significant impacts are expected during the license renewal term.
Postulated Accidents		
Design-basis accidents	Generic	SMALL. The NRC staff has concluded that the environmental impacts of design-basis accidents are of small significance for all plants.
Severe accidents	Site-specific	SMALL. The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. See § 51.53(c)(3)(ii)(L).

Issue	Type of Issue	Findings
Uranium Fuel Cycle and Waste Management		
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	Generic	SMALL. Offsite impacts of the uranium fuel cycle have been considered by the Commission in Table S-3 of this part. Based on information in the GEIS, impacts on individuals from radioactive gaseous and liquid releases, including radon-222 and technetium-99, are small.
Offsite radiological impacts (collective effects)	Generic	<p>The 100-year environmental dose commitment to the U.S. population from the fuel cycle, high level waste and spent fuel disposal is calculated to be about 14,800 person rem, or 12 cancer fatalities, for each additional 20-year power reactor operating term. Much of this, especially the contribution of radon releases from mines and tailing piles, consists of tiny doses summed over large populations.</p> <p>This same dose calculation can theoretically be extended to include many tiny doses over additional thousands of years, as well as doses outside the United States. The result of such a calculation would be thousands of cancer fatalities from the fuel cycle, but this result assumes that even tiny doses have some statistical adverse health effects which will not ever be mitigated (for example no cancer cure in the next thousand years), and that these doses projected over thousands of years are meaningful. However, these assumptions are questionable. In particular, science cannot rule out the possibility that there will be no cancer fatalities from these tiny doses. For perspective, the doses are very small fractions of regulatory limits, and even smaller fractions of natural background exposure to the same populations.</p> <p>Nevertheless, despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgment in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the collective effects of the fuel cycle, this issue is considered Category 1 (Generic).</p>

Appendix B

Issue	Type of Issue	Findings
Uranium Fuel Cycle and Waste Management (continued)		
Offsite radiological impacts (spent fuel and high-level waste disposal)	Generic	<p>For the high-level waste and spent fuel disposal component of the fuel cycle, there are no current regulatory limits for offsite releases of radionuclides for the current candidate repository site. However, if it is assumed that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence Decision, 10 CFR 51.23, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 milliroentgen equivalent man (millirem) per year or less. However, while the Commission has reasonable confidence that these assumptions will prove correct, there is considerable uncertainty since the limits are yet to be developed, no repository application has been completed or reviewed, and uncertainty is inherent in the models used to evaluate possible pathways to the human environment. The NAS report indicated that 100 millirem per year should be considered as a starting point for limits for individual doses, but notes that some measure of consensus exists among national and international bodies that the limits should be a fraction of the 100 millirem per year. The lifetime individual risk from 100 millirem annual dose limit is about 3×10^{-3}.</p> <p>Estimating cumulative doses to populations over thousands of years is more problematic. The likelihood and consequences of events that could seriously compromise the integrity of a deep geologic repository were evaluated by the Department of Energy in the "Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste," October 1980. The evaluation estimated the 70-year whole-body dose commitment to the maximum individual and to the regional population resulting from several modes of breaching a reference repository in the year of closure, after 1,000 years, after 100,000 years, and after 100,000,000 years. Subsequently, the NRC and other Federal agencies have expended considerable effort to develop models for the design and for the licensing of a high-level waste repository, especially for the candidate repository at Yucca Mountain. More meaningful estimates of doses to the population may be possible in the future as more is understood about the performance of the proposed Yucca Mountain repository. Such estimates would involve great uncertainty, especially with respect to cumulative population doses over thousands of years. The standard proposed by the NAS is a limit on maximum individual dose. The relationship of potential new regulatory requirements, based on the NAS report, and cumulative population impacts has not been determined, although the report articulates the view that protection of individuals will adequately protect the population for a repository at Yucca Mountain. However, the Environmental Protection Agency's (EPA) generic repository standards in</p>

Issue	Type of Issue	Findings
Uranium Fuel Cycle and Waste Management (<i>continued</i>)		
<p>Offsite radiological impacts (spent fuel and high level waste disposal)</p> <p><i>[continued from previous page]</i></p>	Generic	<p>40 CFR Part 191 generally provide an indication of the order of magnitude of cumulative risk to the population that could result from the licensing of a Yucca Mountain repository, assuming the ultimate standards will be within the range of standards now under consideration. The standards in 40 CFR Part 191 protect the population by imposing “containment requirements” that limit the cumulative amount of radioactive material released over 10,000 years. The cumulative release limits are based on the EPA’s population impact goal of 1,000 premature cancer deaths worldwide for a 100,000 metric ton (MTHM) repository.</p> <p>Nevertheless, despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgment in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated.</p> <p>Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel and high-level waste disposal, this issue is considered Category 1 (Generic).</p>
Nonradiological impacts of the uranium fuel cycle	Generic	SMALL. The nonradiological impacts of the uranium fuel cycle resulting from the renewal of an operating license for any plant are found to be small.
Low-level waste storage and disposal	Generic	<p>SMALL. The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts to the environment will remain small during the term of a renewed license. The maximum additional onsite land that may be required for low-level waste storage during the term of a renewed license and associated impacts will be small.</p> <p>Nonradiological impacts on air and water will be negligible. The radiological and nonradiological environmental impacts of long-term disposal of low-level waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient low-level waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.</p>

Appendix B

Issue	Type of Issue	Findings
Uranium Fuel Cycle and Waste Management (<i>continued</i>)		
Mixed waste storage and disposal	Generic	SMALL. The comprehensive regulatory controls and the facilities and procedures that are in place ensure proper handling and storage, as well as negligible doses and exposure to toxic materials for the public and the environment at all plants. License renewal will not increase the small, continuing risk to human health and the environment posed by mixed waste at all plants. The radiological and nonradiological environmental impacts of long-term disposal of mixed waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient mixed waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.
Onsite spent fuel	Generic	SMALL. The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants if a permanent repository or monitored retrievable storage is not available.
Nonradiological waste	Generic	SMALL. No changes to generating systems are anticipated for license renewal. Facilities and procedures are in place to ensure continued proper handling and disposal at all plants.
Transportation	Generic	SMALL. The impacts of transporting spent fuel enriched up to 5 percent uranium-235 with average burnup for the peak rod to current levels approved by the NRC up to 62,000 megawatt days per metric ton uranium (MWd/MTU) and the cumulative impacts of transporting high-level waste to a single repository, such as Yucca Mountain, Nevada are found to be consistent with the impact values contained in 10 CFR 51.52(c), Summary Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor." If fuel enrichment or burnup conditions are not met, the applicant must submit an assessment of the implications for the environmental impact values reported in § 51.52.

Issue	Type of Issue	Findings
Decommissioning		
Radiation doses	Generic	SMALL. Doses to the public will be well below applicable regulatory standards regardless of which decommissioning method is used. Occupational doses would increase no more than 1 man-rem caused by the buildup of long-lived radionuclides during the license renewal term.
Waste management	Generic	SMALL. Decommissioning at the end of a 20-year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected.
Air quality	Generic	SMALL. Air quality impacts of decommissioning are expected to be negligible either at the end of the current operating term or at the end of the license renewal term.
Water quality	Generic	SMALL. The potential for significant water quality impacts from erosion or spills is no greater whether decommissioning occurs after a 20-year license renewal period or after the original 40-year operation period, and measures are readily available to avoid such impacts.
Ecological resources	Generic	SMALL. Decommissioning after either the initial operating period or after a 20-year license renewal period is not expected to have any direct ecological impacts.
Socioeconomic impacts	Generic	SMALL. Decommissioning would have some short-term socioeconomic impacts. The impacts would not be increased by delaying decommissioning until the end of a 20-year license renewal period, but they might be decreased by population and economic growth.
Environmental Justice		
Environmental justice	Uncategorized	NONE. The need for and the content of an analysis of environmental justice will be addressed in plant-specific reviews.

Source: Table B-1 in Appendix B to Subpart A of 10 CFR Part 51 (61 FR 28467, June 5, 1996)

APPENDIX C
APPLICABLE REGULATIONS, LAWS, AND AGREEMENTS

APPLICABLE REGULATIONS, LAWS, AND AGREEMENTS

The Atomic Energy Act of 1954, as amended (42 USC § 2011 et seq.), authorizes the U.S. Nuclear Regulatory Commission (NRC) to enter into agreement with any state to assume regulatory authority for certain activities (see 42 USC § 2021). For example, through the Agreement State Program, Pennsylvania assumed regulatory responsibility over certain byproduct, source, and quantities of special nuclear materials not sufficient to form a critical mass. The Bureau of Radiation Protection, Pennsylvania Department of Environmental Protection, administers the Pennsylvania State Agreement Program.

In addition to carrying out some Federal programs, state legislatures develop their own laws. State statutes supplement, as well as implement, Federal laws for protection of air, water quality, and groundwater. State legislation may address solid waste management programs, locally rare and endangered species, and historic and cultural resources.

The Federal Water Pollution Control Act (commonly referred to as the Clean Water Act (CWA)) (33 USC § 1251 et seq.) allows for primary enforcement and administration through state agencies, given that the state program is at least as stringent as the Federal program. The state program must conform to the CWA and to the delegation of authority for the Federal National Pollutant Discharge Elimination System (NPDES) program from the U.S. Environmental Protection Agency (EPA) to the state. The primary mechanism to control water pollution is the requirement for direct dischargers to obtain an NPDES permit, or in the case of states where the authority has been delegated from the EPA, a State Pollutant Discharge Elimination System permit, under the CWA. In Pennsylvania, the Pennsylvania Department of Environmental Protection issues and enforces NPDES permits.

One important difference between Federal regulations and certain state regulations is the definition of waters that the state regulates. Certain state regulations may include underground waters, whereas the CWA only regulates surface waters. The Delaware River Basin Commission regulates the Groundwater Protection Area in Southeastern Pennsylvania.

C.1 Federal and State Environmental Requirements

Limerick Generating Station, Units 1 and 2 (LGS) is subject to Federal and state requirements for its environmental program.

Table C–1 lists the principle Federal and state environmental regulations and laws applicable to the review of the environmental resources that could be affected by this project that may affect license renewal applications for nuclear power plants. See Table C–2 of this supplemental environmental impact statement for LGS's compliance status with these requirements.

Table C–1. Federal and State Environmental Requirements

Law/regulation	Requirements
Current operating license and license renewal	
Atomic Energy Act (42 U.S.C. § 2011 et seq.)	This Act is the fundamental U.S. law on both the civilian and the military uses of nuclear materials. On the civilian side, it provides for both the development and the regulation of the uses of nuclear materials and facilities in the United States. The Act requires that civilian uses of nuclear materials and facilities be licensed, and it empowers the NRC to establish by rule or order, and to enforce, such standards to govern these uses as “the Commission may deem necessary or desirable in order to protect health and safety and minimize danger to life or property.”
10 CFR Part 51, Title 10 Code of Federal Regulations (10 CFR) Part 51, Energy	“Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.” This part contains environmental protection regulations applicable to the NRC’s domestic licensing and related regulatory functions.
10 CFR Part 54	“Requirements for Renewal of Operating Licenses for Nuclear Power Plants.” This part focuses on managing adverse effects of aging rather than noting all aging mechanisms. The rule is intended to ensure that important systems, structures, and components will maintain their intended function during the period of extended operation.
10 CFR Part 50	“Domestic Licensing of Production and Utilization Facilities.” Regulations that the NRC issues under the Atomic Energy Act of 1954, as amended (68 Stat. 919), and Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242), provide for the licensing of production and utilization facilities. This part also gives notice to all persons who knowingly supply—to any licensee, applicant, contractor, or subcontractor—components, equipment, materials, or other goods or services that relate to a licensee’s or applicant’s activities subject to this part, that they may be individually subject to NRC enforcement action for violation of § 50.5.
Air quality protection	
Clean Air Act (CAA) (42 USC § 7401 et seq.)	The Clean Air Act (CAA) is a comprehensive Federal law that regulates air emissions. Among other things, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. EPA has promulgated NAAQS for six criteria pollutants: sulfur dioxide, nitrogen dioxide, carbon monoxide (CO), ozone, lead, and particulate matter. All areas of the United States must maintain ambient levels of these pollutants below the ceilings established by the NAAQS.
Pennsylvania Air Pollution Control Act (P.L. 2119)	The Pennsylvania Air Pollution Control Act establishes procedures for the protection of health and public safety during emergency conditions, creating a stationary air contamination source permit system and providing additional remedies for abating air pollution.

Law/regulation	Requirements
Land use resources protection	
Coastal Zone Management Act of 1972 (16 USC § 1451 et seq.), as amended	The Coastal Zone Management Act (CZMA) was established to preserve, protect, develop and where possible, restore or enhance, the resources of the Nation's coastal zone. It also encourages and assists the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values as well as the needs for compatible economic development.
Water resources protection	
Federal Water Pollution Control Act (commonly referred to as the Clean Water Act (CWA)) (33 USC § 1251 et seq.) and the NPDES (40 CFR 122)	The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
Wild and Scenic River Act (16 USC § 1271 et seq.)	The Wild and Scenic River Act created the National Wild and Scenic Rivers System, which was established to protect the environmental values of free flowing streams from degradation by affecting activities, including water resources projects.
Safe Drinking Water Act (42 USC § 300f et seq.)	The Safe Drinking Water Act (SDWA) is the principal Federal law that ensures safe drinking water for the public. Under the SDWA, EPA is required to set standards for drinking water quality and oversees all states, localities, and water suppliers that implement these standards.
Pennsylvania Code, Title 25, <i>Environmental Protection</i> , Part I, Department of Environmental Protection, Chapter 92a, National Pollutant Discharge Elimination System Permitting, Monitoring, and Compliance (25 Pa Code 92a).	The regulatory provisions contained in this Pennsylvania code implement the NPDES Program by the Pennsylvania Department of Environmental Protection under the Federal Act.
Pennsylvania Code, Title 25, <i>Environmental Protection</i> , Part 1, Department of Environmental Protection Chapter 93, Water Quality Standards (25 Pa Code 93)	This code sets forth water quality standards for surface waters in the State of Pennsylvania, including wetlands. These standards are based upon water uses that are to be protected and will be considered by the Pennsylvania Department of Environmental Protection in implementing its authority under the Clean Streams Law and other statutes that authorize protection of surface water quality.
Pennsylvania Code, Title 25, <i>Environmental Protection</i> , Part V, Delaware River Basin Commission, Chapter 901, General Provisions (20 Pa Code 901)	This code incorporates by reference among other things Parts 401, "Rules of Practice and Procedures," "Basin Regulations; Water Code and Administrative Manual Part III Water Quality Regulations," and 430, "Ground Water Protection Area: Pennsylvania," of 18 CFR containing regulations on conservation of power and water resources.

Appendix C

Law/regulation	Requirements
Water resources protection (continued)	
<p>Pennsylvania's Clean Streams Law (35 P.S. Section 691.1 et seq.)</p>	<p>The Clean Streams Law provides additional remedies for abating pollution of waters; regulates discharges of sewage and industrial wastes; regulates the operation of mines; and regulates the impact of mining upon water quality, supply, and quantity. The law places responsibilities on landowners and land occupiers, and maintains primary jurisdiction over surface coal mining in Pennsylvania.</p>
<p>Pennsylvania Safe Drinking Water Act (P.L. 206, No. 43 and 25 PA Code 109)</p>	<p>The Pennsylvania Safe Drinking Water Act protects the public health and safety by assuring that public water systems provide a safe and adequate supply of water for human consumption by establishing drinking water quality standards, permit requirements, and design and construction standards.</p>
Waste management and pollution prevention	
<p>Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq.)</p>	<p>RCRA gives EPA authority to control hazardous waste. Before a material can be classified as a hazardous waste, it first must be a solid waste as defined under the Resource Conservation and Recovery Act (RCRA). Hazardous waste is classified under Subtitle C of the RCRA. Parts 261, "Identification and Listing of Hazardous Waste," and 262, "Standards Applicable to Generators of Hazardous Waste," of 40 CFR contain all applicable generators of hazardous waste regulations.</p>
<p>Pollution Prevention Act (42 USC § 13101 et seq.)</p>	<p>The Pollution Prevention Act formally established a national policy to prevent or reduce pollution at its source whenever feasible. The Act supplies funds for state and local pollution prevention programs through a grant program to promote the use of pollution prevention techniques by business.</p>

Law/regulation	Requirements
Protected species	
Endangered Species Act of 1973 (ESA) (16 USC § 1531 et seq.)	The Endangered Species Act (ESA) forbids any government agency, corporation, or citizen from taking (e.g., harming or killing) endangered animals without an Endangered Species Permit. The ESA also requires Federal agencies to consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service if any Federal action may adversely affect any listed species or designated critical habitat.
Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 USC § 1801 et seq.)	The Magnuson–Stevens Fishery Conservation and Management Act (MSA) includes requirements for Federal agencies to consider the impact of Federal actions on essential fish habitat and to consult with the National Marine Fisheries Service if any activities may adversely affect essential fish habitat.
Marine Mammal Protection Act of 1972 (MMPA) (16 USC § 1361 et seq.)	The Marine Mammal Protection Act (MMPA) prohibits the take of marine mammals in U.S. waters or by U.S. citizens on the high seas without an MMPA Take Permit issued by the National Marine Fisheries Service. MMPA also prohibits importation of marine mammals and marine mammal products into the United States.
Fish and Wildlife Coordination Act (16 USC § 661 et seq.)	To minimize adverse impacts of proposed actions on fish and wildlife resources and habitat, the Fish and Wildlife Coordination Act requires that Federal agencies consult Government agencies regarding activities that affect, control, or modify waters of any stream or bodies of water. It also requires that justifiable means and measures be used in modifying plans to protect fish and wildlife in these waters.
Pennsylvania Code, Title 58, <i>Recreation</i> , Part II, Fish and Boat Commission, Chapter 75, Endangered Species (58 PA Code 75)	This code provides a lists of endangered, threatened, and candidate species in the State of Pennsylvania. The code prohibits the catching, taking, killing, possessing, importing or exporting from the State of Pennsylvania, selling, or offering to sale or purchase of any species listed without a special permit from Executive Director of the Pennsylvania Fish and Boat Commission.
Historic preservation	
National Historic Preservation Act (NHPA) (16 USC § 470 et seq.)	The National Historic Preservation Act (NHPA) directs Federal agencies to consider the impact of their actions on historic properties. To comply with NHPA, Federal agencies must consult with State Historic Preservation Officers and, when applicable, tribal historic preservations officers. NHPA also encourages state and local preservation societies.

C.2 Operating Permits and Other Requirements

Table C–2 lists the permits and licenses issued by Federal, state, and local authorities for activities at LGS.

Table C–2. Licenses and Permits

Permit	Number	Dates	Responsible Agency
Operating license	NPF-39	Issued: 08/8/1985 Expires: 10/26/2024	NRC
Operating license	NPF-85	Issued: 08/25/1989 Expires: 06/22/2029	NRC
NPDES Permit	PA0051926	Issued: 03/31/2006 Expires: 03/31/2011 (administratively continued)	Pennsylvania Department of Environmental Protection (PADEP)
NPDES Permit	PA0052221	Issued: 07/1/2009 Expires: 06/30/2014	PADEP
Submission of project for Delaware River Basin Commission (DRBC) approval and determination as to whether project impairs or conflicts with the DRBC comprehensive plan	D-69-210 CP	Issued: 11/7/1975 (Rev. 13–05/08/2013) Expires: 12/31/2018	DRBC
Submission of project for DRBC approval and determination as to whether project impairs or conflicts with the DRBC comprehensive plan	D-69-52 CP	Issued: 02/18/1981 Expires: No expiration date indicated	DRBC
Submission of project for DRBC approval and determination as to whether project impairs or conflicts with the DRBC comprehensive plan	D-77-110 CP	Issued: 10/24/1984 Expires: No expiration date indicated	DRBC
Submission of project for DRBC approval and determination as to whether project impairs or conflicts with the DRBC comprehensive plan	D-65-76 CP	Issued: 12/18/1981 Expires: No expiration date indicated	DRBC
Title V Operating Permit	TVOP-46-00038	Issued: 12/07/2009 Expires: 12/07/2014	PADEP
Approval of design modifications, operation, and maintenance of Bradshaw Reservoir Dam	D09-181A	Issued: 12/30/1986 Expires: 12/30/2036	PADEP

Permit	Number	Dates	Responsible Agency
Maintenance Dredging Permit	19616	Issued: 07/16/1976 Expires: No date listed on permit	PADEP
Maintenance Dredging Permit	19615	Issued: 07/16/1976 Expires: No date listed on permit	PADEP
General Permit No. 11 for Maintenance Dredging	044610317	Issued: 12/07/2010 Expires: No expiration date indicated	PADEP
Permit to operate a public water system or a substantially modified facility	4696508	Issued: 03/25/1997 Expires: No date listed on permit	PADEP
Permit to operate a public water system or a substantially modified facility	4606501	Issued: 06/30/2006 Expires: No date listed on permit	PADEP
Permit to operate a public water system or a substantially modified facility	4609503	Issued: 11/20/2009 Expires: No date listed on permit	PADEP
Notification of regulated waste activity to obtain an EPA identification number for hazardous waste	PAD000797951	Issued: 01/01/2001 Expires: N/A	EPA
Certificate of registration/permit to operate storage tanks	None	Issued: 02/04/2011 Expires: Renewed Annually	PADEP
Hazardous Materials Certificate of Registration	051713 550 083VX	Issued: 05/17/2013 Expires: 06/30/2016	U.S. Department of Transportation
Fire Marshall approval for storage and handling of flammable and combustible liquid	172,943	Issued: 02/25/1972 Expires: No date listed on approval	Pennsylvania Department of Labor and Industry, Boiler Section
Fire Marshall approval for storage and handling of flammable and combustible liquid	186,609	Issued: 08/15/1977 Expires: No date listed on approval	Pennsylvania Department of Labor and Industry, Boiler Section
Fire Marshall approval for storage and handling of flammable and combustible liquid	186,610	Issued: 08/15/1977 Expires: No date listed on approval	Pennsylvania Department of Labor and Industry, Boiler Section

Appendix C

Permit	Number	Dates	Responsible Agency
Fire Marshall approval for storage and handling of flammable and combustible liquid	187,162	Issued: 11/17/1977 Expires: No date listed on approval	Pennsylvania Department of Labor and Industry, Boiler Section
Environmental laboratory certificate of accreditation under PA Code 252	PA Lab ID No. 46-0128, Cert. 003	Issued: 08/31/2010 Expires: Renewed Annually	PADEP
Permit to operate encroachment	E 09-77A	Issued: 02/12/1988 Expires: 02/11/2038	PADEP
Approval for disposal of licensed material generated by licensee's activities	N/A	Issued: 07/10/1996 (NRC) Issued: 03/23/1998 (PADEP) Expires: No date listed on approvals	NRC and PADEP

Source: Exelon 2011

C.3 Reference

[Exelon] Exelon Generation Company, LLC. 2011. *License Renewal Application, Limerick Generating Station, Units 1 and 2, Appendix E, Applicant's Environmental Report, Operating License Renewal Stage*. Agencywide Documents Access and Management System (ADAMS) No. ML11179A104.

APPENDIX D
CONSULTATION CORRESPONDENCE

CONSULTATION CORRESPONDENCE

D.1 Background

The Endangered Species Act of 1973, as amended; the Magnuson Stevens Fisheries Management Act of 1996, as amended; and the National Historic Preservation Act of 1966 (NHPA) require that Federal agencies consult with applicable State and Federal agencies and groups before taking action that may affect threatened or endangered species, essential fish habitat, or historic and archaeological resources, respectively. This appendix contains consultation documentation.

Table D-1 lists the consultation documents sent between the U.S. Nuclear Regulatory Commission (NRC) and other agencies. The NRC staff is required to consult with these agencies based on the requirements of the statutes listed above.

Table D–1. Consultation Correspondence

Author	Recipient	Date of Letter/email
Wrona, D., NRC	M. Roberts, U.S. Fish and Wildlife Service (FWS)	September 8, 2011 ML11258A248
Wrona, D., NRC	H. Ellis, Absentee-Shawnee Tribe of Oklahoma	September 13, 2011 ML112340045
Wrona, D., NRC	B. Obermeyer, Delaware Tribe	September 13, 2011 ML112340045
Wrona, D., NRC	R. Dushane, Cultural Resource Officer, Eastern Shawnee Tribe of Oklahoma	September 13, 2011 ML112340045
Wrona, D., NRC	C. Halftown, Heron Clan Representative, Cayuga Nation	September 13, 2011 ML112340045
Wrona, D., NRC	T. Francis, Tribal Historic Preservation Office, Delaware Nation	September 13, 2011 ML112340045
Wrona, D., NRC	R. Hill, Tonawanda Seneca Nation	September 13, 2011 ML112340045
Wrona, D., NRC	N. Patterson, Tuscarora Nation	September 13, 2011 ML112340045
Wrona, D., NRC	J. Bergevin, Oneida Indian Nation	September 13, 2011 ML112340045
Wrona, D., NRC	C. Burke, Oneida Nation of Wisconsin	September 13, 2011 ML112340045
Wrona, D., NRC	T. Gonyea, Onondaga Nation	September 13, 2011 ML112340045
Wrona, D., NRC	L. Watt, Seneca Nation of Indians	September 13, 2011 ML112340045
Wrona, D., NRC	P. Barton, Seneca-Cayuga Tribe of Oklahoma	September 13, 2011 ML112340045
Wrona, D., NRC	S. White, Stockbridge-Munsee Band of the Mohican Nation of Wisconsin	September 13, 2011 ML112340045
Wrona, D., NRC	A. Printup, St. Regis Mohawk Tribe	September 13, 2011 ML112340045
Wrona, D., NRC	K. Jumper, Shawnee Tribe	September 13, 2011 ML112340045
Wrona, D., NRC	J. Cutler, Pennsylvania Historical and Museum Commission	September 15, 2011 ML11221A265
Wrona, D., NRC	T. McCulloch, Advisory Council on Historic Preservation	September 16, 2011 ML11245A083
Obermeyer, B., Delaware Tribe Historic Preservation Office	D. Wrona, NRC	September 23, 2011 ML11279A113
White, S., Stockbridge-Munsee Tribal Historic Preservation Office	D. Wrona, NRC	September 28, 2011 ML11279A114
Urban, C., Pennsylvania Fish & Boat Commission	D. Wrona, NRC	October 5, 2011 ML11291A077

Author	Recipient	Date of Letter/email
Gonyea, A., Onondaga Nation	D. Wrona, NRC	October 15, 2011 ML11305A006
McLearen, D., Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation	D. Wrona, NRC	October 26, 2011 ML11307A383
Mowery, O., Pennsylvania Game Commission	D. Wrona, NRC	November 17, 2011 ML11339A042
Riley, C., FWS	D. Wrona, NRC	November 22, 2011 ML11339A043
Susco, J., NRC	D. Morris, National Marine Fisheries Service (NMFS)	May 30, 2012 ML12138A347
Colligan, M., NMFS	J. Susco, NRC	June 27, 2012 ML12226A163
Wong, M., NRC	D. McLearen, Pennsylvania Historical and Museum Commission	May 6, 2013 ML13066A492
Wong, M., NRC	G. Blanchard, Absentee Shawnee Tribe of Oklahoma	May 7, 2013 ML13066A482
Wong, M., NRC	C. Halftown, Cayuga Nation	May 7, 2013 ML13066A482
Wong, M., NRC	T. Francis, Delaware Nation	May 7, 2013 ML13066A482
Wong, M., NRC	P. Pechonick, Delaware Tribe of Indians	May 7, 2013 ML13066A482
Wong, M., NRC	G. Wallace, Eastern Shawnee Tribe of Oklahoma	May 7, 2013 ML13066A482
Wong, M., NRC	R. Halbritter, Oneida Indian Nation	May 7, 2013 ML13066A482
Wong, M., NRC	E. Delgado, Oneida Nation of Wisconsin	May 7, 2013 ML13066A482
Wong, M., NRC	T. Gonyea, Onondaga Nation	May 7, 2013 ML13066A482
Wong, M., NRC	B. Snyder, Seneca Nation of Indians	May 7, 2013 ML13066A482
Wong, M., NRC	L. Howard, Seneca–Cayuga Tribe of Oklahoma	May 7, 2013 ML13066A482
Wong, M., NRC	R. Hart, St. Regis Mohawk Tribe	May 7, 2013 ML13066A482
Wong, M., NRC	R. Sparkman, Shawnee Tribe	May 7, 2013 ML13066A482
Wong, M., NRC	R. Chicks, Stockbridge–Munsee Band of the Mohican Nation	May 7, 2013 ML13066A482
Wong, M., NRC	D. Hill, Tonawanda Seneca Nation	May 7, 2013 ML13066A482

Appendix D

Author	Recipient	Date of Letter/email
Wong, M., NRC	L. Henry, Tuscarora Nation	May 7, 2013 ML13066A482
Wong, M., NRC	R. Nelson, Advisory Council on Historic Preservation	May 7, 2013 ML13066A480
Wong, M., NRC	W. Weber, FWS	May 7, 2013 ML13107A988
Wong, M., NRC	M. Colligan, NMFS	May 7, 2013 ML13064A064
Colligan, M., NMFS	M. Wong, NRC	May 13, 2013 ML13134A134
Smith, C., Delaware Nation	E. Larson, NRC	May 14, 2013 ML13135A152
Jumper, K., Shawnee Tribe	E. Larson, NRC	May 20, 2013 ML13141A124
Thees, D., FWS	B. Grange, NRC	July 2, 2013 ML13196A362
Zimmerman, L., FWS	D. Wrona, NRC	August 16, 2013 ML13242A072

APPENDIX E
CHRONOLOGY OF ENVIRONMENTAL REVIEW CORRESPONDENCE

CHRONOLOGY OF ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and external parties as part of its environmental review for Limerick Generating Station, Units 1 and 2 (LGS). All documents, with the exception of those containing proprietary information, are available electronically from the NRC's Public Electronic Reading Room found on the Internet at the following Web address:

<http://www.nrc.gov/reading-rm.html>. From this site, the public can gain access to the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of NRC's public documents in ADAMS. The ADAMS accession number for each document is included in the following list. To locate a reference in ADAMS, click on the "Simple Search" tab at the top of the web page, and enter the ADAMS accession number in the search box.

E.1 Environmental Review Correspondence

Table E-1 lists the environmental review correspondence in date order beginning with the request by Exelon to renew the operating license for LGS.

Table E-1. Environmental Review Correspondence

Date	Correspondence Description	ADAMS No.
June 22, 2011	Letter from Exelon forwarding the LGS license renewal application and request to renew operating licenses for additional 20 years	ML11179A096
June 30, 2011	NRC press release announcing the availability of license renewal application for LGS	ML11181A084
July 13, 2011	Letter to Exelon, "Receipt and Availability of the License Renewal Application for the Limerick Generating Station, Units 1 and 2"	ML11180A040
July 26, 2011	<i>Federal Register</i> Notice of Receipt and Availability of Application for Renewal of Limerick Generating Station, Units 1 and 2 Facility Operating License Nos. NPF-39 and NPF-85 for an Additional 20-Year Period (76 FR 44624)	ML11180A178
August 12, 2011	Letter to Exelon, "Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding the Application from Exelon Generating Station Company, LLC for Renewal of the Operating Licenses for Limerick Generating Station, Units 1 and 2"	ML11206A206
August 17, 2011	Letter to Exelon, "Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process for License Renewal for the Limerick Generating Station, Units 1 and 2"	ML111213A206
August 24, 2011	<i>Federal Register</i> Notice of Acceptance for Docketing of the Application and Notice for Opportunity for Hearing Regarding the Renewal of Facility Operating License Nos. NPF-39 and NPF-85 for an Additional 20 Years Period, Exelon Generation Company, LLC, Limerick Generating Station (76 FR 52992)	ML11206A206
August 26, 2011	<i>Federal Register</i> Notice of Intent To Prepare an Environmental Impact Statement and Conduct Scoping Process for Limerick Generating Station, Units 1 and 2 (76 FR 53498)	ML11214A048
September 7, 2011	NRC press release announcing the LGS license renewal environmental scoping meeting	ML11250A162
September 8, 2011	Letter to Mr. Mark Roberts, U.S. Fish and Wildlife Service	ML11258A248
September 8, 2011	Letter to Ms. Olivia Braun, Environmental Planner, Pennsylvania Game Commission	ML11234A650
September 8, 2011	Letter to Mr. Chris Urban, Pennsylvania Fish and Boat Commission	ML11234A024
September 13, 2011	Letter to Henryetta Ellis, Absentee-Shawnee Tribe of Oklahoma	ML112340045
September 13, 2011	Letter to Clint Halftown, Heron Clan Representative, Cayuga Nation	ML112340045
September 13, 2011	Letter to Ms. Tamara Francis, Tribal Historic Preservation Office, Delaware Nation	ML112340045
September 13, 2011	Letter to Dr. Brice Obermeyer, Delaware Tribe	ML112340045
September 13, 2011	Letter to Ms. Robin Dushane, Cultural Resource Officer, Eastern Shawnee Tribe of Oklahoma	ML112340045
September 13, 2011	Letter to Chief Rogers Hill, Tonawanda Seneca Nation	ML112340045

Date	Correspondence Description	ADAMS No.
September 13, 2011	Letter to Mr. Neil Patterson, Director, Tuscarora Nation	ML112340045
September 13, 2011	Letter to Ms. Kim Jumper, Tribal Historic Officer, Shawnee Tribe	ML112340045
September 13, 2011	Letter to Mr. Arnold Printup, Historic Preservation Officer, St. Regis Mohawk Tribe	ML112340045
September 13, 2011	Letter to Ms. Sherry White, Cultural Preservation Officer, Stockbridge-Munsee Band of the Mohican Nation of Wisconsin	ML112340045
September 13, 2011	Letter to Mr. Paul Barton, Historic Preservation Officer Seneca-Cayuga Tribe of Oklahoma	ML112340045
September 13, 2011	Letter to Ms. Lane Watt, Tribal Historic Preservation Office Seneca Nation of Indians	ML112340045
September 13, 2011	Letter to Mr. Tony Gonyea, Faithkeeper, Onondaga Nation	ML112340045
September 13, 2011	Letter to Ms. Corina Burke, Tribal Historic Preservation Office Oneida Nation of Wisconsin	ML112340045
September 13, 2011	Letter to Mr. Jesse Bergevin, Historian, Oneida Indian Nation	ML112340045
September 15, 2011	Letter to Ms. Jean Cutler, Deputy State Historic Preservation Officer, Pennsylvania Historical and Museum Commission	ML11221A265
September 16, 2011	Letter to Mr. Chris Firestone, Pennsylvania Department of Conservation & Natural Resources	ML11230B346
September 16, 2011	Letter to Mr. Tom McCulloch, Advisory Council on Historic Preservation	ML11245A083
September 23, 2011	Letter from Dr. Brice Obermeyer, Delaware Tribe Historic Preservation Office	ML11279A113
September 28, 2011	Letter from Ms. Sherry White, Tribal Historic Preservation Officer, Stockbridge-Munsee Tribal Historic Preservation Office	ML11279A114
October 5, 2011	Letter from Mr. Chris Urban, Pennsylvania Fish and Boat Commission	ML11291A077
October 15, 2011	Letter from Mr. Anthony Gonyea, Onondaga Nation	ML11305A006
October 26, 2011	Letter from Mr. Douglas McLearn, Pennsylvania Historical and Museum Commission	ML11307A383
November 17, 2011	Letter from Ms. Olivia Mowery, Pennsylvania Game Commission	ML11339A042
November 22, 2011	Letter from Mr. Clinton Riley, U.S. Fish and Wildlife Service	ML11339A043
February 24, 2012	Letter to Exelon, "Request for Additional Information for the Review of the Limerick Generating Station, Units 1 and 2, License Renewal Application Environmental Review"	ML12041A443
March 27, 2012	Letter from Exelon, "Limerick Generating Station, Units 1 and 2--Response to NRC Request for Additional Information, Dated February 28, 2012, Related to the License Renewal Application"	ML12088A366
April 11, 2012	Memorandum, "Summary of Telephone Conference Call on February 23, 2012, Between the U.S. Nuclear Regulatory Commission and Exelon Generation Company, LLC, Concerning Request for Additional Information Pertaining to the Limerick Generating Station License Renewal Application"	ML12083A211

Appendix E

Date	Correspondence Description	ADAMS No.
May 21, 2012	Summary of Site Audit Related to the Environmental Review of the License Renewal Application for Limerick Generating Station, Units 1 and 2	ML12124A127
May 30, 2012	Letter to Mr. Daniel Morris, National Marine Fisheries Service	ML12138A347
June 27, 2012	Letter from Ms. Mary Colligan, National Marine Fisheries Service	ML12226A163
March 11, 2013	Letter to Exelon, "Issuance of Environmental Scoping Summary Report Associated with the Staff's Review of the Application by Exelon Generation Company, LLC., for Renewal of the Operating License for Limerick Generating Station Units 1 and 2"	ML12131A499
April 30, 2013	Letter to Exelon, "Notice of Availability of Draft Plant-Specific Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Limerick Generating Station Units 1 and 2"	ML13058A384
April 30, 2013	Letter to Mr. Shawn M. Garvin, Environmental Protection Agency	ML13067A317
May 6, 2013	Letter to Mr. Douglas C. McLearn, Pennsylvania Historical and Museum Commission	ML13066A492
May 7, 2013	<i>Federal Register</i> Notice of Availability of Draft Supplement 49 to the Generic Environmental Impact Statement for License Renewal of Nuclear Plants and Public Meetings for the License Renewal of Limerick Generating Station, Units 1 and 2 (78 FR 26663)	ML13058A481
May 7, 2013	Letter to Governor George Blanchard, Absentee Shawnee Tribe of Oklahoma	ML13066A482
May 7, 2013	Letter to Mr. Clint Halftown, Heron Clan Representative, Cayuga Nation	ML13066A482
May 7, 2013	Letter to Ms. Tamara Francis Cultural Preservation Director, Delaware Nation	ML13066A482
May 7, 2013	Letter to Chief Paula Pechonick Delaware Tribe Indians	ML13066A482
May 7, 2013	Letter to Chief Glenna J. Wallace, Eastern Shawnee Tribe of Oklahoma	ML13066A482
May 7, 2013	Letter to Mr. Raymond Halbritter, Nation Representative, Oneida Indian Nation	ML13066A482
May 7, 2013	Letter to Mr. Ed Delgado, Chairman, Oneida Nation of Wisconsin	ML13066A482
May 7, 2013	Letter to Tony Gonyea, Faithkeeper, Onondaga Nation	ML13066A482
May 7, 2013	Letter to Barry E. Snyder, Sr., President, Seneca Nation of Indians	ML13066A482
May 7, 2013	Letter to Mr. LeRoy Howard, Chief, Seneca-Cayuga Tribe of Oklahoma	ML13066A482
May 7, 2013	Letter to Chief Randy Hart, St. Regis Mohawk Tribe	ML13066A482
May 7, 2013	Letter to Chief Ron Sparkman, Shawnee Tribe	ML13066A482

Date	Correspondence Description	ADAMS No.
May 7, 2013	Letter to Robert Chicks, Tribal President, Stockbridge–Munsee Band of the Mohican Nation	ML13066A482
May 7, 2013	Letter to Chief Darwin Hill, Tonawanda Seneca Nation	ML13066A482
May 7, 2013	Letter to Leo Henry, Chief, Tuscarora Nation	ML13066A482
May 7, 2013	Letter to Mr. Reid Nelson, Director, Advisory Council on Historic Preservation	ML13066A480
May 7, 2013	Letter to Ms. Wendi Weber, U.S Fish and Wildlife Service	ML13107A988
May 7, 2013	Letter to Ms. Mary A. Colligan, National Marine Fisheries Service	ML13064A064
May 13, 2013	Letter from Ms. Mary A. Colligan, National Marine Fisheries Service	ML13134A134
May 14, 2013	Letter from Mr. Corey Smith, Delaware Nation	ML13135A152
May 20, 2013	Letter from Ms. Kim Jumper, Shawnee Tribe	ML13141A124
June 27, 2013	Letter from Ms. Barbara Rudnick, Environmental Protection Agency	ML13183A033
July 2, 2013	E-mail from Ms. Dianne Thees, U.S. Fish and Wildlife Service	ML13196A362
August 16, 2013	Letter from Ms. Lora L. Zimmerman, U.S. Fish and Wildlife Service	ML13242A072
February 12, 2014	Letter to Exelon, “Request for Additional Information for the Review of the Limerick Generating Station License Renewal Application”	ML14029A162
March 11, 2014	Memorandum, “Summary of Telephone Conference Call on January 30, 2014, Between the U.S. Nuclear Regulatory Commission and Exelon Generation Company, LLC, Concerning Request for Additional Information Pertaining to the Limerick Generating Station License Renewal Application”	ML14055A532
March 12, 2104	Letter from Exelon, “Requests for Additional Information for the review of the Limerick Generating Station, Units 1 and 2, License Renewal Application”	ML14071A378

APPENDIX F
DESCRIPTION OF PROJECTS CONSIDERED IN THE CUMULATIVE
IMPACTS ANALYSIS

DESCRIPTION OF PROJECTS CONSIDERED IN THE CUMULATIVE IMPACTS ANALYSIS

F.1 Description of Projects Considered

To evaluate cumulative impacts, the incremental impacts of the proposed action, as described in Sections 4.1–4.9, are combined with other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. The U.S. Nuclear Regulatory Commission (NRC) staff (staff) used the information in the environmental report (ER); responses to requests for additional information (RAIs); information from other Federal, State, and local agencies; scoping comments; and information gathered during the visits to the Limerick Generating Station, Units 1 and 2 (LGS) site to identify other past, present, and reasonably foreseeable actions. Other actions and projects that were identified during this review, and considered in the staff's independent analysis of the potential cumulative effects, are described in Table F–1.

Table F–1. Projects and Actions Considered in the Cumulative Impacts Analysis

Project Name	Summary of Project	Location	Status
Moser Generating Station Oil Plant	60 MW, 3 unit oil-fired peaking plant	Lower Pottstown Township, approximately 2 miles (mi) west (W) of LGS	Operational (Exelon Corp. 2012); (Exelon 2011)
Linfield Energy Center	616 MW, 3 unit natural gas plant	3 mi northwest (NW) of LGS	Air-quality permitted in 2002, but project “withdrawn” and not constructed (EJN; Enviro 2002)
Schuylkill Generating Station	196 MW, 3 unit oil power plant	29 mi NW of LGS	Operational (Exelon Corp. 2012)
Cromby Generation Station	2 unit fossil fuel power plant located on the Schuylkill River	8 mi south (S) of LGS	Both units were retired from service in 2011 (EPA 2012a; Exelon 2011)
Titus Coal Plant	261 MW, 5 unit coal power plant	18 mi NW of LGS	Expected deactivation date is April 2015 (NRG 2012)
Ontelaunee Energy Center Gas Plant	728 MW, 3 unit gas power plant	23 mi northeast (NE) of LGS	Operational (GEO 2012b)
Montenay Montgomery LP Waste Plant	32 MW, 1 unit waste power plant	17 mi southeast (SE) of LGS	Operational (GEO 2012c)
Grays Ferry Cogeneration Gas Plant	193 MW, 2 unit gas power plant	29 mi SE of LGS	Operational (GEO 2012d)
Chester Generating Station Oil Plant	56 MW, 3 unit oil power plant	20 mi southwest (SW) of LGS	Operational (GEO 2012e)
Philadelphia Refinery Waste Plant	30 MW, 3 unit waste power plant	30 mi SE of LGS	Operational (GEO 2012f)
Delaware Generating Station Oil Plant	392 MW, 4 unit oil power plant	30 mi SE of LGS	Operational (GEO 2012g)
Eddystone Generating Station	820 MW, 6-unit fossil power plant (2 units natural gas or oil; 4 units oil)	20 mi SE of LGS	Operational (Exelon Corp. 2013)

Project Name	Summary of Project	Location	Status
Florida Power & Light Energy Marcus Hook Gas Plant	836 MW, 4 unit gas power plant	30 mi SE of LGS	Operational (GEO 2012h)
Chester Operational Coal Plant	67 MW, 1 unit coal power plant	29 mi SE of LGS	Operational (GEO 2012i)
Royersford Borough	Sewage/wastewater treatment plant that discharges 54 millions of gallons per day (mgd) to the Schuylkill River	4 mi SE of LGS	Operational (EPA 2012b)
Spring City Borough	Sewage/wastewater treatment plant that discharges .345 mgd to the Schuylkill River	7 mi SE of LGS	Operational (EPA 2012b)
Limerick Township Municipal Authority	Sewage/wastewater treatment plant that discharges 1.7 mgd to the Schuylkill River	3 mi SE of LGS	Operational (EPA 2012b)
East Vincent Municipal Authority	Sewage/wastewater treatment plant that discharges .5 mgd to the Schuylkill River	4 mi S of LGS	Operational (EPA 2012b)
North Coventry Municipal Authority	Sewage/wastewater treatment plant that discharges 1.5 mgd to the Schuylkill River	2 mi W of LGS	Operational (EPA 2012b)
Phoenixville Borough Sewage Treatment Plant	Sewage/wastewater treatment plant that discharges 4 mgd to the Schuylkill River	9 mi SE of LGS	Operational (EPA 2012b)
Lower Frederick Township Sewage Treatment Plant	Sewage/wastewater treatment plant that discharges .2 mgd to the Perkiomen Creek	7 mi NE of LGS	Operational (EPA 2012b)
Schwenksville Borough Authority Sewage Treatment Plant	Sewage/wastewater treatment plant that discharges .3 mgd to the Perkiomen Creek	7 mi NE of LGS	Operational (EPA 2012b)
Pottstown Water Treatment Plant	Sewage/wastewater treatment plant withdraws up to 5 mgd from the Schuylkill River	2 mi W of LGS	Operational (EPA 2012c)
Pennsylvania American Water Company, Shady Lane Water Treatment Plant	Sewage/wastewater treatment plant that discharges .111 mgd to the Schuylkill River	2 mi S of LGS	Operational (EPA 2012b)
JBS Souderton, Inc., Industrial Waste Water Treatment Plant	Sewage/wastewater treatment plant that discharges .832 mgd to the Skippack Creek at River Mile 92.47 – 32.3 – 3.0 – 12.8 (Delaware River – Schuylkill River – Perkiomen Creek – Skippack Creek)	15 mi NE of LGS	Operational (DRBC 2011)

Appendix F

Project Name	Summary of Project	Location	Status
Warwick Drainage Company	Public wastewater collection, treatment, and disposal that discharges .0135 mgd to the French Creek (Schuylkill River Tributary)	8 mi NW of LGS	Operational (EPA 2012b)
Doehler-Jarvis Limited Partnership	Aluminum die casting	5 mi W of LGS	Operational (EPA 2012b)
Sun Co., Inc.	Major gas service station	3 mi NE of LGS	Operational (EPA 2012b)
Pottstown Trap Sanatoga Quarry	Quarry	3,650 feet NW, directly adjacent to Schuylkill River and contiguous with the LGS plant site property	Operational (Exelon 2011)
Uniform Tubes, Inc.	Steel parts manufacturing	6 mi SE of LGS	Operational (EPA 2012b)
Plotts Oil Co.	Heating oil distribution	4 mi SE of LGS	Operational (EPA 2012b)
Specialty Chemical Systems	Inorganic chemical production	4 mi SE of LGS	Operational (EPA 2012b)
Spring City Electric Manufacturing Company	Iron foundry discharges	4 mi SE of LGS	Operational (EPA 2012b)
Unitech Services Group, Inc.	Industrial launderer	3 mi SE of LGS	Operational (EPA 2012b)
Smurfit-Stone Container	Paper packaging	9 mi SE of LGS	Operational (EPA 2012b)
Wyeth Pharmaceuticals	Biotechnology research and development	8 mi SE of LGS	Operational (EPA 2012b)
GlaxoSmithKline	Pharmaceutical manufacturing	7 mi SE of LGS	Operational (EPA 2012b)
Evansburg State Park	3,349 acre state park in south-central Montgomery County between Norristown and Collegeville	10 mi east of LGS	Operational (DCNR 2012a)
Fort Washington State Park	493 acre state park in Springfield and Whitemarsh Townships, Montgomery County	20 mi SE of LGS	Operational (DCNR 2012b)
Norristown Farm Park	690 acre park in East Norriton and West Norriton Townships and the Borough of Norristown	14 mi SE of LGS	Operational (DCNR 2012c)

Project Name	Summary of Project	Location	Status
Marsh Creek State Park	1,727 acre state park in Chester County	11 mi SW of LGS	Operational (DCNR 2012d)
Valley Forge National Park	3,500 acre national historic park	11 mi SE of LGS	Operational (NPS 2013)
French Creek State Park	7,730 acre state park in North Coventry and Warwick Townships in Chester County and Robeson and Union Townships in Berks County	10 mi W of LGS	Operational (DCNR 2012e)
Ridley Creek State Park	2,606 acres of Delaware County woodlands and meadows	25 mi SE of LGS	Operational (DCNR 2012f)
Independent Spent Fuel Storage Installation (ISFSI)	The ISFSI provides dry storage for spent fuel at the LGS site	At LGS	Operational (Exelon 2011)
Recticon/Allied Steel Corp.	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site	1 mi S of LGS	CERCLA site (EPA)
Occidental Chemical Corporation Remediation Site (Formerly Firestone Tire and Rubber Manufacturing Facility)	Occidental Chemical Corporation is remediating under the oversight of EPA	2.5 mi W of LGS	Superfund site (Exelon 2011)

F.2 References

[DCNR] Pennsylvania Department of Conservation and Natural Resources. 2012a. Available at <<http://www.dcnr.state.pa.us/stateparks/findapark/evansburg/index.htm>> (accessed 8 August 2012).

[DCNR] Pennsylvania Department of Conservation and Natural Resources. 2012b. Available at <<http://www.dcnr.state.pa.us/stateparks/findapark/fortwashington/index.htm>> (accessed 8 August 2012).

[DCNR] Pennsylvania Department of Conservation and Natural Resources. 2012c. Available at <<http://www.dcnr.state.pa.us/stateparks/findapark/norristown/index.htm>> (accessed 8 August 2012).

[DCNR] Pennsylvania Department of Conservation and Natural Resources. 2012d. Available at <<http://www.dcnr.state.pa.us/stateparks/findapark/marshcreek/index.htm>> (accessed 8 August 2012).

[DCNR] Pennsylvania Department of Conservation and Natural Resources. 2012e. Available at <<http://www.dcnr.state.pa.us/stateparks/findapark/frenchcreek/index.htm>> (accessed 8 August 2012).

Appendix F

[DCNR] Pennsylvania Department of Conservation and Natural Resources. 2012f. Available at <<http://www.dcnr.state.pa.us/stateparks/findapark/ridleycreek/index.htm>> (accessed 8 August 2012).

[DRBC] Delaware River Basin Commission. 2012. DOCKET NO. D-1996-021-4, JBS Souderton, Inc., Industrial Wastewater Treatment Plant, Franconia Township, Montgomery County, Pennsylvania. Available at <<http://www.state.nj.us/drbc/library/documents/dockets/1996-021-4.pdf>> (accessed 7 July 2012).

[EJN] Energy Justice Network. Linfield Energy Center. Available at <<http://www.energyjustice.net/map/displayfacility-68986.htm>> (accessed 11 July 2012).

[Enviro] Enviro.blr.com. 2002. Environmental Compliance News. "DEP Issues Air Plan Approval to Florida Power and Light for Its Linfield Energy Center Project." April 10, 2002. Available at <<http://enviro.blr.com/environmental-news/air/air-permitting/DEP-Issues-Air-Plan-Approval-to-Florida-Power-and-/>> (accessed 11 July 2012).

[EPA] U.S. Environmental Protection Agency. 2012a. Envirofacts. Air Facility System (AFS). Available at <http://ofmpub.epa.gov/enviro/afs_reports.detail_plt_view?p_state_county_compliance_src=4202900003> (accessed 11 July 2012).

[EPA] U.S. Environmental Protection Agency. 2012b. Envirofacts, Permit Compliance System (PCS) and Integrated Compliance Information System (ICIS) databases. Available at <<http://www.epa.gov/enviro/facts/pcs-icis/index.html>> (accessed 11 July 2012).

[EPA] U.S. Environmental Protection Agency. 2012c. Envirofacts. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). Available at <http://ofmpub.epa.gov/enviro/cerclisquery.get_report?pgm_sys_id=PAD002353969> (accessed 11 July 2012)

[Exelon] Exelon Generation Company, LLC. 2011. Applicant's Environmental Report –Operating License Renewal Stage, Limerick Generating Station, Units 1 and 2, Docket Numbers 50 352 and 50-353, License Numbers NPF-39 and NPF-85. Exelon Generation Company, LLC. Agencywide Documents Access and Management Systems No. ML11179A104.

[Exelon Corp] Exelon Corporation. 2012. Energy Diversity for Pennsylvania. Available at <<http://www.exeloncorp.com/community/locations/pennsylvania.aspx>> (accessed 11 July 2012).

[Exelon Corp] Exelon Corporation. 2013. "Eddystone Generating Station." Available at <<http://www.exeloncorp.com/powerplants/eddystone/Pages/profile.aspx>> (accessed 2 July 2013).

[GEO] Global Energy Observatory. 2012a. Available at <<http://globalenergyobservatory.org/geoid/1737>> (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012b. Available at <<http://globalenergyobservatory.org/geoid/4624>> (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012c. Available at <<http://globalenergyobservatory.org/geoid/4351>> (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012d. Available at <<http://globalenergyobservatory.org/geoid/3386>> (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012e. Available at <http://globalenergyobservatory.org/geoid/2651> > (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012f. Available at <http://globalenergyobservatory.org/geoid/4778> > (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012g. Available at <http://globalenergyobservatory.org/geoid/5080> > (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012h. Available at <http://globalenergyobservatory.org/geoid/3221> > (accessed 11 July 2012).

[GEO] Global Energy Observatory. 2012i. Available at <http://globalenergyobservatory.org/geoid/320> > (accessed 11 July 2012).

[NPS] National Parks Service. 2013. Available at <http://www.nps.gov/vafo/index.htm> > (accessed 22 October 2013)

[NRG] NRG Energy, Inc. 2012 Form 10-K. 2012. Available at http://www.nrgenergy.com/pdf/NRG_10K_2012.pdf > (accessed 22 October 2013)

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev.,
and Addendum Numbers, if any.)
NUREG-1437, Supplement 49,
Volume 2
Final Report

2. TITLE AND SUBTITLE

Generic Environmental Impact Statement for License Renewal of Nuclear Plants
Supplement 49 Regarding Limerick Generating Station, Units 1 and 2, Volume 2
Final Report

3. DATE REPORT PUBLISHED

MONTH	YEAR
August	2014

4. FIN OR GRANT NUMBER

5. AUTHOR(S)

See Chapter 10

6. TYPE OF REPORT

Technical

7. PERIOD COVERED (Inclusive Dates)

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)

Same as above

10. SUPPLEMENTARY NOTES

Docket Nos. 50-352, 50-353

11. ABSTRACT (200 words or less)

This draft supplemental environmental impact statement has been prepared in response to an application submitted by Exelon Generation Company, LLC (Exelon) to renew the operating license for Limerick Generating Station, Units 1 and 2 (LGS) for an additional 20 years. This draft supplemental environmental impact statement includes the preliminary analysis that evaluates the environmental impacts of the proposed action and alternatives to the proposed action. Alternatives considered include natural gas combined-cycle (NGCC); supercritical pulverized coal; new nuclear; wind power; purchased power; and not renewing the license (the no action alternative). The U.S. Nuclear Regulatory Commission's preliminary recommendation is that the adverse environmental impacts of license renewal for LGS are not great enough to deny the option of license renewal for energy planning decisionmakers. This recommendation is based on the following: (1) the analysis and findings in NUREG 1437, Volumes 1 and 2, Generic Environmental Impact Statement for License Renewal of Nuclear Plants; (2) the environmental report submitted by Exelon; (3) consultation with Federal, state, and local agencies; (4) the NRC's environmental review; (5) consideration of public comments received during the scoping process; (6) consideration of public comments received on the draft supplemental environmental impact statement; and (7) consideration of the information presented in the Natural Resources Defense Council's severe accident mitigation alternatives-related waiver petition.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

Limerick Generating Station, Units 1 and 2
Limerick
Exelon Generation Company, LLC
Exelon
Supplemental to the Generic Environmental Impact Statement, SEIS
Generic Environmental Impact Statement, GEIS
National Environmental Policy Act, NEPA
License Renewal
NUREG-1437, Supplement 49

13. AVAILABILITY STATEMENT

unlimited

14. SECURITY CLASSIFICATION

(This Page)

unclassified

(This Report)

unclassified

15. NUMBER OF PAGES

16. PRICE



Federal Recycling Program



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, DC 20555-0001

OFFICIAL BUSINESS



**NUREG-1437,
Supplement 49, Vol. 2
Final**

**Generic Environmental Impact Statement for License Renewal of Nuclear Plants
Regarding Limerick Generating Station, Units 1 and 2**

August 2014