

**From:** Bower, Fred  
**Sent:** Wednesday, June 24, 2015 5:01 PM  
**To:** ACEActivists@comcast.net  
**Cc:** Klukan, Brett; R1ALLEGATION RESOURCE; Ennis, Rick; Scott, Michael; Nieh, Ho; OPA1 RESOURCE; Screnci, Diane; Sheehan, Neil; Tifft, Doug; McNamara, Nancy; Broaddus, Doug; Barber, Scott; Jackson, Christopher; OPA1 RESOURCE; Noggle, James; Bower, Fred; Schroeder, Daniel  
**Subject:** RE: ACE - Questions from the Limerick AAM on May, 21, 2015 - [EDATS R1-2015-0195]

The Alliance for a Clean Environment (ACE)

ACE - Questions from the Limerick AAM on May, 21, 2015 - [EDATS R1-2015-0195]

Dear Dr. Cuthbert (ACE),

This is a closeout response to questions that you raised at our May 21, 2015, Annual Assessment Meeting that summarized Limerick Generating Station performance for 2015. At this meeting, the Deputy Director of the Division of Reactor Projects in the Region I office of the NRC, Mr. Michael Scott, accepted the following three questions from you and requested that I respond to you.

1. What is the highest burnup to which Limerick Generating Station (LGS) licensed to fuel and when did they get that level authorized?

Burnup refers to the uranium consumed in the nuclear reaction. It is typically expressed in gigawatt-days per metric ton of uranium (GWd/MTU) - a measure of how long a fuel assembly is in the core and the power level at which it operated. High burnup fuel is generally understood to mean fuel exposure beyond 45 GWd/MTU.

When LGS was originally licensed, it was licensed based on the typical BWR design of allowing the fuel to remain in the reactor for three operating cycles which corresponded to a fuel burnup of up to 45 Gigawatt-days per metric ton uranium. Each operating cycle contained an 18 or 24 month period of operation followed by a refueling outage (RFO). During this outage, fuel assemblies in the core are relocated (shuffled) to minimize peaking factors and to optimize core life. Once this is done for each fuel assembly for three successive operating cycles, the fuel assembly is discharged and stored in the fuel pool. In the 1980's, this practice was changed with the generic licensing of high burnup fuel which allowed licensees to burn a fuel assembly for only one more operating cycle for a total of four operating cycles.

As is typically the case for General Electric (GE) Boiling Water Reactors (BWRs), the analytical methods used to determine the LGS, Units 1 and 2, reactor core operating limits each operating cycle are based on the latest NRC-approved revision of GE topical report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel." In 1985, the NRC approved a revision to this topical report which approved certain GE fuel designs which have been used at LGS. These fuel designs were approved for exposures beyond 45 GWd/MTU. The actual burnup limits are non-public, since they are considered proprietary information by GE. The NRC considers proprietary information to be privately owned knowledge or data, such as that protected by a

registered patent, copyright, or trademark. NRC rules for nondisclosure of proprietary information can be found in 10 CFR 2.390 at the following link:

<http://www.nrc.gov/reading-rm/doc-collections/cfr/part002/part002-0390.html>

In summary, LGS is currently licensed to burn high burnup fuel. Limerick uses a GE methodology generically approved by the NRC for its reactor core designs. This methodology allowed the use of high burnup fuel since the 1985 timeframe.

2. Has spent fuel from other plants been shipped to LGS?

In general, no spent fuel has been shipped to LGS from other sites with one exception related to the decommissioning of Shoreham nuclear power plant in the 1990s. The slightly irradiated nuclear fuel from Shoreham, consisting of 560 fuel bundles, was purchased by Philadelphia Electric Company (PECO) for reuse at its LGS nuclear units. The transfer involved 33 shipments of fuel between September 1993 and June 1994. The fuel was burned in the LGS reactors and all of that fuel has been subsequently discharged into the LGS spent fuel pools. This fuel essentially replaced new fuel that PECO would have had to purchase for those operating cycles.

3. Where does low level radioactive waste from LGS go?

This question was previously addressed in my interim response (ML15155B411) dated June 3, 2015.

I trust you will find this fully responsive to your question.

Sincerely,

*Fred Bower*

**USNRC Region I Branch Chief with Oversight Responsibility for Limerick, Peach Bottom and Susquehanna**

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**From:** Bower, Fred

**Sent:** Wednesday, June 03, 2015 5:00 PM

**To:** [ACEActivists@comcast.net](mailto:ACEActivists@comcast.net)

**Cc:** Klukan, Brett; R1ALLEGATION RESOURCE; Ennis, Rick; Scott, Michael; Nieh, Ho; OPA1 RESOURCE; Bower, Fred; Screnci, Diane; Sheehan, Neil; Tifft, Doug; McNamara, Nancy; Broaddus, Doug; Barber, Scott; Jackson, Christopher; OPA1 RESOURCE

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The Alliance for a Clean Environment (ACE)

ACE - Questions from the Limerick AAM on May, 21, 2015 - [EDATS R1-2015-0195]

Dear Dr. Cuthbert (ACE),

On May 21, 2015, the U. S. Nuclear Regulatory Commission (NRC) conducted a public open house at the Limerick Township Municipal Building in Limerick, PA. The NRC conducted the Annual Assessment Meeting (AAM) open house to discuss its assessment of the safety performance at Limerick Generating Station (LGS) for 2014. A summary of this meeting can be located in ADAMS using accession number ML15147A615. Publically available ADAMS documents can be located by entering accession number (ML) into the search box in the upper right corner of our homepage at [www.nrc.gov](http://www.nrc.gov).

At this meeting, the Deputy Director of the Division of Reactor Projects in the Region I office of the NRC, Mr. Michael Scott, accepted the following three questions from you.

1. What is the highest burnup to which Limerick Generating Station (LGS) licensed to fuel and when did they get that level authorized?
2. Has spent fuel from other plants been shipped to LGS?
3. Where does low level radioactive waste from LGS go?

Mr. Scott has requested that I respond to ACE with answers to these questions.

Regarding the third question, I note in an email (ML14118A047) dated April 24, 2014, Region I has previously fully responded to this ACE question. I trust this is sufficiently responsive.

I have previously responded to several inquiries from ACE regarding high burnup nuclear fuel. Regarding the above questions numbered 1 and 2, I have determined that both involve licensing information and require coordination with staff in the NRC's Office of Nuclear Reactor Regulation (NRR) in our Rockville, Maryland offices to develop a response. After coordination with NRR's project manager for LGS, we will respond to these two questions when we are able and likely within 30 – 60 days.

Sincerely,

*Fred Bower*

**USNRC Region I Branch Chief with Oversight Responsibility for Limerick, Peach Bottom and Susquehanna**

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