

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Amended Petition of Entergy Nuclear Vermont Yankee, LLC, and)
Entergy Nuclear Operations, Inc. for amendment of their Certificate)
of Public Good and other approvals required under 30 V.S.A.)
§ 231(a) for authority to continue after March 21, 2012, operation)
of the Vermont Yankee Nuclear Power Station, including the)
storage of spent nuclear fuel)

Docket No. 7862

DIRECT TESTIMONY OF GREGORY A. MARET
ON BEHALF OF THE
VERMONT DEPARTMENT OF PUBLIC SERVICE

October 22, 2012

Summary: Mr. Maret's testimony presents the results of an analysis of the most recent decommissioning cost estimate for the Vermont Yankee Nuclear Power Station (the "VY Station"), the "Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station" prepared by TLG Services, Inc., dated February 2012 (the "TLG Report"). The TLG Report provides costs for six possible decommissioning scenarios, four of which are based on operation of the VY Station until 2032. Mr. Maret also provides information regarding the financial requirements for the decommissioning of the VY Station including uncertainties that could substantially impact cost, environmental remediation considerations, storage of spent nuclear fuel, and site closure activities.

Mr. Maret sponsors the following exhibits:

Exhibit PSD-GAM-01	Resume of Gregory A. Maret
Exhibit PSD-GAM-02	Yankee Rowe Nuclear Power Station Site Closure Project Plan

1 Q1. State your name and business address.

2 A1. Gregory A. Maret, 163 Pleasant Street, Suite 4, Attleboro, MA 02703.

3

4 Q2. On whose behalf are you testifying?

5 A2. I am testifying on behalf of the Vermont Public Service Department.

6

7 Q3. What is your occupation?

8 A3. I am a consultant with Sequoia Consulting Group and provide services to the
9 nuclear industry. For this proceeding my services are contracted to ABZ,
10 Incorporated, an engineering consulting firm engaged in providing nuclear-related
11 services including decommissioning cost estimating and planning and cost
12 estimating and analysis with respect to spent fuel management and disposition. I
13 have over 31 years of experience in the nuclear industry and have held executive
14 responsibility for nuclear power plant operations, decommissioning, spent fuel
15 management and nuclear plant site environmental remediation and restoration.
16 My resume, Exhibit PSD-GAM-01, contains a summary of my experience.

17

18 Q4. Have you previously provided expert testimony?

19 A4. Yes. I have provided expert witness testimony in numerous proceedings before
20 the United States Court of Federal Claims.

21

22

1 Q5. What is your educational and professional background?

2 A5. I have a B.S. in nuclear engineering, a Master of Engineering in nuclear
3 engineering, and a Master of Engineering in electric power engineering, all from
4 Rensselaer Polytechnic Institute. I completed Senior Reactor Operator
5 certification at the Vermont Yankee Nuclear Power Station (the “VY Station”),
6 and am a graduate of the Senior Nuclear Plant Manager program at the Institute of
7 Nuclear Power Operations.

8 After obtaining my Masters degrees, I worked for Yankee Atomic Electric
9 Company’s Nuclear Services Division providing engineering services for the VY
10 Station, Yankee Rowe, Seabrook, and Maine Yankee nuclear plants. After four
11 years I transferred to the Yankee Rowe Nuclear Power Station, where I provided
12 reactor engineering services, performed refueling outage management, and served
13 as Technical Director in support of the Yankee Rowe plant operation. After the
14 Yankee Rowe plant permanently shut down I led the initial decommissioning
15 effort at the site known as the “Component Removal Project.” In 1994 I joined
16 the Vermont Yankee Nuclear Power Corporation as the Operations
17 Superintendent, and I was responsible for all plant operations, maintenance and
18 scheduling activities. In 1996, I was promoted to Plant Manager and had
19 responsibility for all aspects of the VY Station site. In 1998 I was promoted to
20 Director of Operations with corporate executive responsibility for all aspects of
21 the operation of the VY Station. In 1999, I joined the Sequoia Consulting Group
22 where I am still employed. During part of my tenure with Sequoia, I was

1 contracted to the Yankee Atomic Electric Company in various capacities,
2 including Vice President of Operations and Decommissioning, during which I had
3 executive responsibility for the handling and storage of spent nuclear fuel,
4 decommissioning of the Yankee Rowe plant, and environmental remediation and
5 restoration of the site.

6

7 Q6. What is the purpose of your testimony in this proceeding?

8 A6. The purpose of my testimony is to present the results of the analysis conducted by
9 myself and ABZ, Incorporated of the most recent decommissioning cost estimate
10 for the VY Station, the “Decommissioning Cost Analysis for the Vermont Yankee
11 Nuclear Power Station” prepared by TLG Services, Inc., dated February 2012 (the
12 “TLG Report”). Our analysis is introduced into this proceeding as Exhibit PSD-
13 WKB-02 to the prefiled testimony of Warren K. Brewer. My portion of the
14 analysis included evaluation of the estimated costs for decontamination and
15 dismantlement, as well as storage and management of spent nuclear fuel. I also
16 analyzed site environmental remediation and restoration considerations, and their
17 potential impact on cost.

18

19 Q7. Please describe the scope of your analysis of the decommissioning cost estimate.

20 A7. Our analysis included review of the TLG Report, the supplemental data that
21 formed the basis for that estimate, information and documents provided through

1 the discovery process in this proceeding, and publicly available documents
2 containing information relevant to the VY Station decommissioning cost estimate.

3

4 Q8. Generally, how was the analysis performed?

5 A8. We began our analysis by reviewing the estimate assumptions, both scenario
6 dependent and scenario independent assumptions. Next we evaluated the estimate
7 details based on our experience and comparison with actual decommissioning
8 activities at other nuclear power plant sites with which I am familiar. I also
9 evaluated whether estimate details were consistent with accomplishment of the
10 implied necessary activities as informed by the actual conduct of
11 decommissioning. After this review of these estimate details, I analyzed areas of
12 risk or uncertainty.

13

14 Q9. Did you discover any items missing from the TLG cost estimate that in your
15 experience should have been included as necessary to accomplish the scope of
16 work described in the estimate and related communications?

17 A9. Yes. For example, it is my understanding that Entergy Nuclear Vermont Yankee,
18 LLC and Entergy Nuclear Operations, Inc. (collectively "Entergy") has
19 committed to not reuse concrete rubble from demolition of site structures for fill
20 on-site and, instead, to dispose of this material off-site. I was unable to find costs
21 associated with off-site disposal of this material in the TLG Report. Furthermore
22 I was unable to find costs associated with the necessary radioactive material

1 surveying, sampling, and analysis that would be required to demonstrate the
2 acceptability of off-site disposal of this material at a location other than a licensed
3 radioactive waste disposal facility.

4

5 Q10. Did you find other items missing from the TLG Report and analysis?

6 A10. Yes. The TLG Report assumes that all reinforcing steel from concrete structures
7 (this reinforcing steel is commonly referred to as “rebar”) will be segregated from
8 the concrete, released from the site, and recycled at no cost to Entergy. I was
9 unable to identify costs in the TLG Report to account for the work necessary to
10 achieve this planned outcome, including the cost to physically segregate and
11 manage the rebar material, and to perform appropriate radiological surveying to
12 demonstrate compliance with off-site release requirements. Based on my
13 experience, I would expect that a portion of the rebar will contain licensed
14 radioactive material that cannot be released from the site without appropriate
15 regulatory controls. This does not appear to be considered in the TLG Report cost
16 estimate assumptions.

17

18 Q11. Are there any other examples where the TLG Report does not include appropriate
19 assumptions regarding the planned disposal of materials?

20 A11. Yes. The TLG Report cost estimate assumes that most of the containment steel is
21 recycled at little or no cost to Entergy. It is my expectation that coatings on the
22 containment steel will have to be removed as part of the effort needed to

1 decontaminate the external surfaces of the steel to prepare it for release from the
2 site. The potential exists for the containment steel coatings to contain hazardous
3 material such as lead. Removal of coatings containing hazardous materials
4 requires complex work and material control activities by specialized service
5 providers under specific regulatory control. The TLG Report cost estimate does
6 not appear to include this potential significant effort that may be required to
7 accomplish the planned recycling of the containment steel. Whether or not the
8 coatings contain hazardous material, activities necessary to remove containment
9 steel coatings do not appear to be included in the estimate. Based on my
10 experience, it is my expectation that at least some, if not all, of the containment
11 steel coating will have to be removed to enable radiological surveying in
12 accordance with regulatory requirements prior to release of the steel from the site.
13 There does not appear to be a cost in the TLG Report estimate to account for this
14 activity.

15

16 Q12. Have you reached any conclusions regarding non-radiological site remediation
17 and restoration activities expected for the VY Station site?

18 A12. Yes. For example both the Yankee Rowe and Connecticut Yankee
19 decommissioning projects included remediation of areas of the site where
20 construction-related debris had been disposed. Similar conditions may be
21 discovered at the VY Station site during efforts associated with decommissioning
22 and site restoration. Although the need for remediation of the construction fill

1 area at the Yankee Rowe site was known and included in planning and executing
2 the decommissioning work, discovery of unexpected and unplanned for hazardous
3 materials within the construction fill area had significant scope, schedule, and cost
4 impact for the Yankee Rowe project. Several million dollars of additional costs
5 were incurred to address this unexpected scope of work. The potential exists for
6 discovery of similar construction debris and hazardous materials—and similar
7 related scope, timing and cost impacts—during execution of the decommissioning
8 at the VY Station.

9

10 Q13. Do you have reason to believe that construction-related debris like that discovered
11 during the Yankee Rowe and Connecticut Yankee decommissioning may exist at
12 the VY Station?

13 A13. Yes. Construction of the VY Station followed shortly after the construction of the
14 Yankee Rowe and Connecticut Yankee plants and before the federal
15 environmental law which created the environmental regulatory framework of
16 today. Based on the Yankee Rowe and Connecticut Yankee decommissioning
17 experiences it is my expectation that the on-site disposal of construction related
18 waste was a common practice prior to the promulgation of the environmental and
19 hazardous material regulations. In addition, materials such as asbestos, fuel oil,
20 hydraulic oil, and coatings containing PCBs were commonly used in construction
21 at that time, and not generally recognized as potential environmental
22 contaminants.

1 Q14. How does discovery of unexpected hazardous materials impact site remediation
2 and cost?

3 A14. Unexpected discovery of hazardous materials brings planned work to a halt while
4 controls are placed over the impacted work area to assure the material is not
5 disturbed until regulatory required permits are obtained and the appropriate
6 remediation resources, including appropriately qualified workers, materials and
7 work controls, can be assembled. This has direct cost impact due to the expansion
8 of remediation work scope as well as indirect cost impact due to the inefficiency
9 of redeploying resources to other work while the hazardous material discovery is
10 resolved.

11

12 Q15. Is separate regulatory approval needed to resolve such unexpected discoveries
13 during decommissioning?

14 A15. In general yes. Notifications of the appropriate regulatory authority and approval
15 of proposed remediation activities and hazardous material disposal plans are all
16 necessary.

17

18 Q16. Do you have other conclusions regarding site remediation and restoration
19 activities that may be required during the decommissioning of VY Station?

20 A16. Yes. External structural coatings, should they contain hazardous materials, could
21 be a source for widespread site and local environmental contamination due to
22 flaking and washout of the materials over the operating life of the plant. This was

1 experienced with the containment steel coatings at the Yankee plant. There is
2 potential that the VY Station external coatings could contain hazardous material
3 and should be evaluated as part of the decommissioning cost estimating process. I
4 did not find any consideration of this potential situation in my review of the TLG
5 Report cost estimate. Late discovery, during decommissioning-related excavation
6 for instance, has the potential to be much more costly than it otherwise would be
7 if the need to manage such scope is known and incorporated into the overall
8 planning of the decommissioning effort.

9

10 Q17. Do you have any conclusions with regard to regulatory oversight of the
11 decommissioning and site restoration process?

12 A17. Yes. The TLG Report cost estimate specifically excludes costs associated with
13 dual regulation by the Nuclear Regulatory Commission (“NRC”) and
14 Environmental Protection Agency (“EPA”). The Site Closure Project Plan for the
15 Yankee Rowe plant, attached hereto as PSD-GAM-02, captures an overview of
16 the scope of significant regulatory interactions necessary to perform the Yankee
17 Rowe plant decommissioning and site restoration, and the iterative nature of
18 regulatory interaction to assure that all regulated actions were accomplished in
19 full satisfaction of all applicable requirements. The exclusion of costs associated
20 with dual regulation in the TLG Report cost estimate is inconsistent with my
21 understanding of the conditions at the VY Station site and the experience at the
22 nearby Yankee Rowe site. For example, groundwater contamination by tritium

1 can be expected to result in direct EPA regulatory oversight of this environmental
2 contaminant. As I discussed earlier, there is substantial potential for discovery of
3 other hazardous materials during performance of the decommissioning work that
4 could also result in direct EPA regulatory oversight.

5

6 Q18. Are there any other regulatory oversight conclusions you wish to share?

7 A18. Yes. As with the Maine Yankee, Connecticut Yankee, and Yankee Rowe
8 decommissioning projects in their respective states, this is the first nuclear power
9 plant decommissioning project that will be conducted within the State of Vermont.
10 As a result, it can be expected that regulatory activities necessary to demonstrate
11 that the site is safe to release will be less well defined than those necessary to
12 achieve termination of the NRC license, complicated by discovery of unexpected
13 conditions during decommission, and subject to extensive interaction with
14 multiple regulatory agencies with overlapping jurisdictions. The fact that the
15 TLG Report cost estimate specifically excludes consideration of costs associated
16 with dual regulation leads me to conclude that costs associated with regulatory
17 interaction have been underestimated.

18

19 Q19. Does this conclude your testimony?

20 A19. Yes it does, at this time.