

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

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 10 V.S.A. §§ 6501-) Docket No. 7862
6504 and 30 V.S.A. §§ 231(a), 248 & 254, for)
authority to continue after March 21, 2012,)
operation of the Vermont Yankee Nuclear Power)
Station including storage of spent nuclear fuel)

**PREFILED TESTIMONY OF
KIM L. GREENWOOD
ON BEHALF OF
VERMONT NATURAL RESOURCES COUNCIL AND
CONNECTICUT RIVER WATERSHED COUNCIL**

October 22, 2012

Ms. Greenwood's testimony will explain the application of Vermont's public trust doctrine and Vermont's groundwater protection rules to groundwater in Vermont, including groundwater beneath the Entergy Vermont Yankee facility, and will provide opinions regarding Entergy's lack of compliance with Vermont's public trust doctrine and groundwater protection rules.

EXHIBITS

Exhibit KLG-1	Resume of Kim L. Greenwood
Exhibit KLG-2:	ANR Groundwater Protection Rule and Strategy
Exhibit KLG-3:	A.VNRC/CRWC:EN.RTP.1-5 and NRC Ground Water Monitoring Inspection Report 05000271/2010010
Exhibit KLG-4	Docket 7600 A.CLF:EN.1-4 and Excerpts of Attachment A.CLF:EN.1-4a

1 Q1: Please state your name.

2 A1: Kim L. Greenwood.

3

4 Q2: Please state where are you employed and your title.

5 A2: I am Water Program Director and Staff Scientist at the Vermont Natural
6 Resources Council.

7

8 Q3: What is the purpose of your testimony?

9 A3: My testimony presents information on Vermont's public trust doctrine as it
10 applies to groundwater in Vermont, including groundwater beneath the Entergy
11 Vermont Yankee ("VY") facility. I will also introduce information on Vermont's
12 groundwater protection rules and their applicability to groundwater contamination
13 at the VY facility. Finally, I will provide opinions regarding VY's lack of
14 compliance with Vermont's public trust doctrine and groundwater protection
15 rules.

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17 Q4: Please describe your qualifications for providing expert testimony on water
18 quality issues in this case, including your educational and professional
19 background.

20 A4: I hold a Bachelor of Science degree in Aquatic Resources from the University of
21 Vermont and an Associate Degree in Engineering Technology in mechanical
22 engineering from Vermont Technical College. I have worked at Scitest
23 Laboratories where I analyzed various matrices for inorganic and organic
24 parameters. I have worked as a project engineer and sales engineer for Husky
25 Injection Molding Systems and as a water quality engineer for the Vermont

1 Agency of Natural Resources ("ANR") where I represented ANR in Act 250
2 proceedings, permitted projects and performed compliance and enforcement
3 inspections and participated in enforcement proceedings. I was the principal for
4 Solid Ground Environmental, LLC, specializing in training and education for
5 contractors and engineers in the field of erosion prevention and sediment control.
6 At VNRC, I provide science-based input on policy discussions, with a focus on
7 statewide water policy, for our organization. With respect to my testimony in this
8 matter, I worked in tandem with VNRC's legal counsel on the passage of Act 199
9 of 2008, which, among other things, declares groundwater to be a public trust
10 resource in Vermont. In addition, I have submitted prefiled testimony on water
11 quality matters in proceedings before the Public Service Board, including in
12 Docket 7600 regarding the Board's investigation into tritium contamination of
13 groundwater at the VY facility. My resume is attached as Exhibit KLG - 1.

14
15 Q5: Are you familiar with groundwater and surface water protections that are
16 currently in place in Vermont? Please explain.

17 A5: Yes I am. I represent VNRC as the water quality specialist on Vermont's Septic
18 Technical Advisory Committee ("TAC"). The TAC, a statutory committee whose
19 members are appointed by the Governor of Vermont, is charged to assist the
20 secretary of ANR in periodically reviewing and, if necessary, revising the rules
21 governing the Wastewater System and Potable Water Supply Rules to ensure that
22 the technical standards remain current with the known and proven technologies of
23 potable water supplies and wastewater systems. The secretary is required to seek
24 advice from the TAC. The governor must appoint at least one representative of
25 the following entities on the committee: professional engineers, site technicians,

1 well drillers, hydrogeologists, town officials with jurisdiction over potable water
2 supplies and wastewater systems, water quality specialists (which is VNRC's role
3 on the TAC), technical staff of ANR and technical staff of the Department of
4 Health.

5
6 Separate from the appointment to the TAC, I have also served on the sub-
7 committee of ANR that was charged with drafting the rules that regulate the
8 withdrawal of large amounts of groundwater. That sub-committee addressed the
9 technical issues in the Groundwater Withdrawal Reporting and Permitting Rules
10 that were adopted in June of 2011.

11
12 As provided in 10 V.S.A. § 1392, the ANR secretary is responsible for the
13 development of a comprehensive groundwater management program for
14 Vermont. Furthermore, the Vermont legislature has established a Groundwater
15 Coordinating Committee ("GWCC") with representation from the private sector as
16 well as other departments and agencies (10 V.S.A. § 1392). The Committee's role
17 is to "provide advice in the development of the [groundwater management]
18 program and its implementation". The secretary is required to give due
19 consideration to the recommendations of the Groundwater Coordinating
20 Committee. The work of the GWCC is to ensure that, among other things, rules
21 relating to public water sources and groundwater protection are sound, including
22 considering and making recommendations on proposed reclassifications of
23 groundwater in Vermont. I have participated in the meetings of this group for
24 over five years.
25

1 Q6: Please describe how groundwater is required to be managed in Vermont to assure
2 that it is protected and not degraded.

3 A6: Groundwater is a resource that belongs to all Vermonters. Approximately 70% of
4 Vermonters get their drinking water from groundwater. Vermont considers its
5 groundwater to be an irreplaceable and important resource – this is stated directly
6 in Title 10, Chapter 48 of Vermont Statutes that, among other things, set forth the
7 groundwater protection policy in Vermont. 10 V.S.A. § 1390 stresses the
8 importance of protecting groundwater as follows:
9

10 “It is the policy of the State of Vermont that it shall protect its groundwater
11 resources to maintain high quality drinking water. It shall manage its
12 groundwater resources to minimize the risks of groundwater quality
13 deterioration by limiting human activities that present unreasonable risks
14 to the use classifications of groundwater in the vicinities of such
15 activities.”
16

17 One of the ways that Vermont protects its groundwater is through the
18 Groundwater Protection Rule and Strategy (“GPRS”) adopted in 2005 and
19 attached as KLG-2. This rule establishes a groundwater classification system
20 along with a strategy for managing risks to groundwater quality. This rule defines
21 four classes of groundwater in Vermont as follows:
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23 *“Class I groundwater” means groundwater that has been classified by the*
24 *Secretary and approved by the General Assembly, if required by 10 V.S.A.*
25 *1394(f), and that:*

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- (a) *is suitable for public water supply use;*
- (b) *has uniformly excellent character;*
- (c) *has no exposure to activities which pose a risk to its current or potential use as a public water supply source; and*
- (d) *is in use as a public water supply source, or is determined by the Secretary to have a high probability for such use.*

"Class II groundwater" means groundwater that has been classified by the Secretary and that:

- (a) *is suitable for public water supply use;*
- (b) *has uniformly excellent character;*
- (c) *is exposed to activities which may pose a risk to its current or potential use as a public water supply source; and*
- (d) *is in use as a public water supply source, or is determined by the Secretary to have a high probability for such use.*

"Class III groundwater" means groundwater that has been classified by the statute or reclassified by the Secretary and that is suitable as a source of water for individual domestic water supply, irrigation, agricultural use and general industrial and commercial use.

"Class IV groundwater" means groundwater that has been classified by the Secretary and that is not suitable as a source of potable water but suitable for some agricultural, industrial and commercial use.

1 (GPRS § 12-201(7-10)). All water in Vermont is classified as Class III unless the
2 Secretary of the Agency of Natural Resources reclassifies it (10 V.S.A. §
3 1394(b)). The water beneath Vermont Yankee is Class III groundwater.
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5 Under the public trust doctrine, no entity has a right to use groundwater over
6 another entity. Certain uses are, however, presumed to be in compliance with the
7 public trust doctrine, including agricultural uses and drinking water for Vermont's
8 residents (10 V.S.A. § 1410).
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10 Q7: Please generally describe the levels of tritium contamination that have been
11 measured in groundwater at the VY facility since the tritium leak has been
12 discovered.

13 A7: As shown in a Nuclear Regulatory Commission report that includes tritium levels
14 reported by Entergy (Exhibit KLG-3) and in graphs of tritium levels from Entergy
15 (Exhibit KLG-4), tritium levels in groundwater collected from monitoring wells at
16 the VY facility have ranged from no detectable activity to greater than 2,000,000
17 picocuries per liter.
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19 Q8: Please describe whether the contamination of groundwater at the VY facility
20 complies with Vermont's requirements for managing groundwater as a public trust
21 resource.

22 A8: It does not. Vermont has classified the groundwater beneath Vermont Yankee as
23 Class III. State requirements require that this water is potable. The definitions in
24 the Groundwater Protection Rules and Strategy for "non-potable groundwater"
25 and "potable groundwater" are:

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"Non-potable groundwater" means water which is not "potable groundwater" or which will not be "potable groundwater" for at least five years, or is scientifically predicted to become unsuitable as a source of "potable groundwater" within five years.

"Potable groundwater" means groundwater free from impurities in amounts sufficient to cause disease or harmful physiological effects, and having biological, chemical, physical and radiological quality conforming to applicable standards of the Agency.

(GPRS § 12-201(21-22)). EPA has set tritium standards in drinking water at the equivalent of 20,000 picocuries per liter. The values at Vermont Yankee have exceeded 2 million picocuries per liter. Because the groundwater beneath Vermont Yankee was not free from impurities the groundwater was not potable. It does not matter if the groundwater was being consumed or whether it could be consumed in the future. Because groundwater, like surface water, is a public trust resource, it must be maintained at all times as potable for the benefit of all Vermonters.

Q9: Please describe whether the contamination of groundwater beneath the VY facility was in compliance with Vermont's public trust doctrine and the GPRS.

A9: It was not. Every Vermonter owns Vermont's groundwater – including the groundwater beneath Vermont Yankee. The importance of the designation of groundwater as a public trust resource in 10 V.S.A. § 1410 cannot be overemphasized. This designation means that groundwater belongs to all, not

1 one, and not one who owns the land above it. As such, it must be managed to the
2 benefit of all Vermonters who are free to utilize the groundwater as long as it
3 doesn't impact the rights of other users to a similar usage. The public trust
4 doctrine and groundwater classification scheme do not allow for contamination of
5 groundwater even beneath an individual's property. Groundwater flows across
6 property boundaries (like surface water) and therefore these boundaries are
7 meaningless for public trust resources.

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9 Q10: Does the radioactive or non-radioactive nature of contamination in groundwater
10 affect Vermont's protections of groundwater?

11 A10: No. The protections of Vermont's groundwater apply regardless of what is being
12 discharged to them. Noncompliance with Vermont's groundwater protection laws
13 and rules is not determined by the source of the contamination or the activity that
14 resulted in the contamination. Noncompliance with Vermont's groundwater
15 protection laws and rules occurs when contamination reaches groundwater and
16 renders it non-potable.

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18 Q11: What action should Vermont Yankee be required to take to clean up and monitor
19 the groundwater contamination they have admitted to?

20 A11: Vermont Yankee must clean up the releases, just as any other polluter is held
21 responsible for its unlawful discharges under Vermont law. To the extent
22 groundwater contamination remains at the facility, VY must continue to monitor
23 subsurface conditions through regular sampling from monitoring wells.

24

1 Q12: Are remediation and monitoring of contaminated groundwater measures that
2 would be expected of any facility in Vermont to satisfy the requirements for
3 protecting groundwater as a public trust resource and the requirements of the
4 GPRS?

5 A12: Yes. In my previous capacity at the Agency of Natural Resources, I routinely
6 performed compliance and enforcement site visits. It was not unusual to require
7 remediation activities in addition to any penalties that were levied. In fact, almost
8 all projects found to be in violation required some remedial activities to be
9 performed in an attempt to return the site to pre-impact conditions.

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11 Q13: Why is compliance with Vermont's groundwater protection laws and rules
12 important for purposes of issuing a renewed Certificate of Public Good ("CPG") in
13 this Docket?

14 A13: Based on my professional experience, it is my opinion that it is important to look
15 at the track record of facilities in Vermont with respect to their compliance or
16 noncompliance with the State's laws and rules to decide whether there is a
17 heightened risk for future noncompliance. In the case of Vermont Yankee, non-
18 compliance with Vermont's groundwater protection laws and rules raises concerns
19 that VY is not able to anticipate a risk such as a tritium leak like those that had
20 been experienced at other nuclear facilities. Additionally, any investigation into
21 compliance with Vermont's environmental laws and responses to address
22 noncompliance - including but not limited to tritium leaking into groundwater -
23 requires the expenditure of increasingly limited ANR and Public Service Board
24 time and resources. These compliance issues raise concerns that the Public

1 Service Board should consider when deciding whether to issue a new CPG to VY
2 for operation of the facility after March 21, 2012.

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4 Q14: Does this conclude your testimony at this time?

5 A14: Yes, it does.