

STATE OF VERMONT
PUBLIC UTILITY COMMISSION

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) Docket 8880
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PREFILED TESTIMONY OF GEROLD NOYES

On Behalf of the Vermont Agency of Natural Resources, Department of Environmental
Conservation, Waste Management and Prevention Division

Summary of Testimony

Mr. Noyes, Environmental Engineer with the Agency of Natural Resources (ANR) provides an overview of the Investigation and Remediation of Contaminated Properties Rule, the limited site investigation activities that have taken place at the Vermont Yankee Nuclear Power Station (Vermont Yankee Site or Site) to date, and the ANR's perspective on issues related to releases of non-radiological hazardous materials and non-radiological site restoration as it pertains to the petition to transfer ownership of Entergy Nuclear Vermont Yankee, LLC (Entergy) to NorthStar Decommissioning Holdings, LLC (NorthStar) and set site restoration standards for the Vermont Yankee Site.

Mr. Noyes sponsors the following exhibits:

- ANR-GN-1 Resume of Gerold Noyes
- ANR-GN-2 Investigation and Remediation of Contaminated Properties Rule
- ANR-GN-3 Environmental Compliance Services, Inc., Phase I & II Environmental Site Assessment (June 2001)
- ANR-GN-4 Radiation Safety & Control Services, Vermont Yankee Nuclear Power Station, Non-Radiological Historical Site Assessment (September 2014)
- ANR-GN-5 Hayley & Aldrich, Inc., Historical Site Characterization Report, Rev. A, Vermont Yankee Nuclear Power Station (March 2017)
- ANR-GN-6 Normandeau Associates, Phase I Environmental Site Assessment Report Vermont Yankee Nuclear Power Station (August 2017)
- ANR-GN-7 ANR Comments on Entergy Vermont Yankee Site Assessment Study (December 2014)
- ANR-GN-8 Hayley & Aldrich, Inc., Non-Radiological Site Sampling Plan, Rev. A, Vermont Yankee Nuclear Power Station (March 2017)
- ANR-GN-9 Hayley & Aldrich, Inc., Draft Voluntary Corrective Action Plan, Vermont Yankee Nuclear Power Station (June 2017)

1 **Q1. Please state your name, place of employment, and position.**

2 A1. My name is Gerold Noyes. I am employed by the Vermont Agency of Natural
3 Resources, Department of Environmental Conservation, Waste Management &
4 Prevention Division, Sites Management Section, 1 National Life Drive, Davis 1,
5 Montpelier, Vermont, 05620. My title is Environmental Engineer V.

6
7 **Q2. Please describe your education, professional background, and tenure at the Agency
8 of Natural Resources.**

9 A2. I have a Bachelor's and Master's Degree in Aeronautical Engineering from the Ohio
10 State University. I have a Master's Degree in Environmental Engineering from the
11 University of Cincinnati and a Vermont Professional Engineering license in
12 Environmental Engineering. I have worked in the Waste Management & Prevention
13 Division for the State of Vermont for 19 years and worked for a Vermont environmental
14 consulting firm for 3 years before that. Between 1999 and 2008, I was the site manager
15 for the Vermont Yankee Site for releases of non-radiological hazardous materials. I have
16 also been on the ANR Radiological Sampling Team for the Vermont Yankee Site for
17 approximately 7 years. My resume is attached as Exhibit **ANR-GN-1**.

18

19 **Q3. Have you previously provided testimony to the Public Service Board, the
20 Environmental Court, or the District Commissions?**

21 A3. No.

22

1 **Q4. What is the purpose of your testimony?**

2 A4. The purpose of my testimony is to provide an overview of the Investigation and
3 Remediation of Contaminated Properties Rule, the limited site investigation activities that
4 have taken place at the Vermont Yankee Site to date, and the ANR's perspective on
5 issues related to releases of non-radiological hazardous materials and non-radiological
6 site restoration as it pertains to the petition to transfer ownership of Entergy Nuclear
7 Vermont Yankee, LLC (Entergy) to NorthStar Decommissioning Holdings, LLC
8 (NorthStar) and set site restoration standards for the Vermont Yankee Site (Petition).

9

10 **Q5. Please describe the scope of your review of the Petition.**

11 A5. My review of the Petition is limited to issues related to releases and remediation of non-
12 radiological hazardous materials and non-radiological site restoration.

13

14 **Q6. Please summarize the conclusions you reach in your testimony.**

15 A6. It is my opinion that the minimal site investigation and characterization of the Vermont
16 Yankee Site conducted to date is inadequate and does not provide sufficient information
17 about the scope and extent of non-radiological contamination at the Site. Additional
18 investigation, including sampling of environmental media, at the Site is required to
19 understand the scope and extent of non-radiological contamination and the corrective
20 actions that are required to protect public health and the environment and restore the
21 Vermont Yankee site.

22

1 Based on my review of a draft corrective action plan prepared for NorthStar, it appears
2 that NorthStar is only considering on-site soil excavation as a remedy to address non-
3 radiological contamination and has not accounted for, for example, the possibility of
4 remediation to address non-radiological groundwater contamination or off-site non-
5 radiological contamination. Without an adequate characterization of the site, it is not
6 possible to know the degree and extent of non-radiological contamination on site, and
7 therefore, what corrective actions are necessary at the Vermont Yankee Site. In addition,
8 without an adequate characterization of the Vermont Yankee Site, it is not possible to
9 evaluate whether NorthStar's proposed corrective actions and cost estimates for non-
10 radiological remediation and site restoration are accurate.

11
12 **Q7. Please describe the ANR's authority with respect to the investigation and**
13 **remediation of releases of non-radiological hazardous materials onto soils,**
14 **groundwater, and surface water.**

15 A7. The release of non-radiological hazardous materials into the environment is prohibited
16 under Section 6616 of Title 10. Among other categories of parties potentially liable for a
17 release (potentially responsible parties or PRPs), current and former owners and operators
18 of a facility that has released or threatened to release non-radiological hazardous
19 materials are liable for the release and must take immediate action to investigate the
20 release and remediate any contamination.

21

1 The Investigation and Remediation of Contaminated Properties Rule, effective July 27,
2 2017, establishes requirements for conducting a site investigation and corrective actions
3 at properties where there is a release or a threat of a release of non-radiological hazardous
4 materials. See attached **Exhibit ANR-GN-2**. The rule sets forth procedures and
5 minimum requirements for investigations to determine the scope and extent of non-
6 radiological contamination of soil, groundwater, surface water, and air. The rule also
7 includes procedures and minimum requirements for corrective actions to address non-
8 radiological contamination, including source treatment, removal or containment, long-
9 term monitoring, and institutional controls.

10
11 **Q8. Please describe the procedures and requirements for a site investigation as set forth**
12 **in the Investigation and Remediation of Contaminated Properties Rule.**

13 A8. Any person or company who may be liable for a release or suspected release of non-
14 radiological hazardous materials must conduct a site investigation. The PRP must
15 provide a site investigation work plan within 30 days of the release or discovery of the
16 release, which must be approved by the Secretary before the site investigation begins.
17 The site investigation work plan is the scope of work that a PRP will perform to
18 (1) identify the degree and extent of the non-radiological contamination; (2) identify the
19 pathways that are or could convey non-radiological hazardous materials to sensitive
20 receptors; (3) identify sensitive receptors that are or may be impacted by a release of non-
21 radiological hazardous materials; (4) identify the need for additional investigation or
22 corrective action to address non-radiological contamination; and (5) develop and refine a

1 Conceptual Site Model (CSM). Among other things, the site investigation work plan
2 must include a site characterization strategy and a CSM. Once the site investigation work
3 plan is approved by the Secretary, the PRP must implement the work plan and submit a
4 site investigation report to ANR. Based on the investigation results, the PRP may have to
5 prepare and implement a corrective action plan to address non-radiological
6 contamination.

7
8 **Q9. What is a site characterization strategy?**

9 A9. A site characterization strategy is a description of known data gaps and the specific
10 actions the potentially responsible party will take to close data gaps, such as sampling of
11 environmental media and/or non-radiological contaminant characterization. The
12 characterization strategy must include the specific methodology for contaminant
13 characterization and sampling and the rationale for the proposed strategy.

14
15 **Q10. Why is a site characterization strategy required as part of a site investigation work
16 plan?**

17 A10. A site characterization strategy is required to ensure that proposed sampling will
18 adequately fill data gaps and provide the information necessary to determine what
19 corrective actions are required to protect public health and the environment and remediate
20 the site.

21

1 **Q11. What is a Conceptual Site Model?**

2 A11. A CSM is a written and illustrative representation of the physical, chemical, and
3 biological processes that control the transport, migration, and actual and potential impacts
4 of non-radiological contamination (in soil, air, groundwater, surface water or sediments)
5 to sensitive receptors.

6
7 **Q12. Why is a Conceptual Site Model required as part of a site investigation work plan?**

8 A12. The CSM is the organizational framework used to guide the investigation so that the
9 appropriate soil, soil gas, air, hydrological, geological, groundwater and building material
10 sampling is performed. As data is gathered the CSM is updated and used to guide
11 subsequent additional investigation. The CSM is used to evaluate the completeness of
12 the site investigation and, when there is sufficient information, to identify and implement
13 corrective actions.

14

15 **Q13. What types of site investigation activities are generally required where a release of**
16 **non-radiological hazardous materials has occurred or is suspected?**

17 A13. Depending upon the type of release, sampling of soil, soil gas, groundwater, surface
18 water, air, and/or building material will be performed to determine the source, degree,
19 and extent of non-radiological contamination. The results of the sampling are used to
20 refine the initial CSM, determine what corrective actions are necessary to protect human
21 health and the environment and remediate the non-radiological contamination at the site,

1 and determine appropriate disposal methods for building materials and soils contaminated
2 by non-radiological hazardous materials.

3
4 **Q14. Please explain why the ANR requires persons responsible for releases of hazardous**
5 **materials to conduct a site investigation and submit a report documenting the**
6 **results of the site investigation prior to addressing releases of hazardous materials.**

7 A14. A site investigation is required to define the source, degree, and extent of non-
8 radiological contamination on a site. Without an understanding of the scope and extent
9 of non-radiological contamination, the ANR is not able to determine what corrective
10 actions are required to protect human health and the environment from non-radiological
11 releases at a site and to remediate the non-radiological contamination at the site.

12
13 **Q15. What site assessments has Entergy and/or NorthStar conducted?**

14 A15. I am aware of four site assessments that Entergy and/or NorthStar have conducted:
15 (1) Environmental Compliance Services, Inc., June 2001, *Phase I & II Environmental*
16 *Site Assessment, Vermont Yankee Nuclear Power Corporation* (2001 ECS Report),
17 attached as **Exhibit ANR-GN-3**; (2) Radiation Safety & Control Services, September
18 2014, *Vermont Yankee Nuclear Power Station, Non-Radiological Historical Site*
19 *Assessment* (2014 RSCS HSA), attached as **Exhibit ANR-GN-4**; (3) Hayley & Aldrich,
20 Inc., March 2017, *Historical Site Characterization Report, Rev. A, Vermont Yankee*
21 *Nuclear Power Station* (2017 HA Report), attached as **Exhibit ANR-GN-5**; and (4)
22 Normandeau Associates, August 2017, *Phase I Environmental Site Assessment Report*

1 *Vermont Yankee Nuclear Power Station* (2017 Normandeau Report), attached as **Exhibit**
2 **ANR-GN-6.**

3
4 **Q16. Has Entergy and/or NorthStar conducted a site investigation for the Vermont**
5 **Yankee Site that meets the requirements of the Investigation and Remediation of**
6 **Contaminated Properties Rule? If not, please explain.**

7 A16. No. Entergy and/or NorthStar have conducted several site assessments, but none of these
8 assessments are complete or meet the minimum requirements for a site investigation
9 under Subchapter 3 of the Investigation and Remediation of Contaminated Properties
10 Rule. For example, these assessments do not include, among other things, the results of
11 environmental sampling; maps that show groundwater flow and non-radiological
12 contaminant distribution; a description of subsurface conditions such as monitor well
13 boring logs, test pit logs, non-invasive testing results, direct push test results; or field
14 notes, lab results, all calculations, and a qualitative or quantitative risk assessment.

15
16 **Q17. What general conclusions have you reached after reviewing these reports?**

17 A17. All four reports identify numerous actual or suspected releases of non-radiological
18 hazardous materials at the Vermont Yankee Site—though none of the reports appears to
19 identify all areas of concern. However, with the exception of the outdated 2001 ECS
20 Report, none of the site assessments include the results of environmental sampling or
21 otherwise identify the degree and extent of non-radiological contamination. None of the

1 four reports meets the requirements of Subchapter 3 of the Investigation and Remediation
2 of Contaminated Properties Rule.

3
4 **Q18. Why isn't the August 2017 Phase I Environmental Site Assessment prepared by**
5 **Normandeu Associates sufficient to meet the site investigation requirements of the**
6 **Investigation and Remediation of Contaminated Properties Rule?**

7 A18. By definition, a Phase I environmental site assessment (ESA) is limited to a review of site
8 files and site use history, interviews of persons knowledgeable about the site, and
9 information obtained during a site walkover by the consultant. No environmental
10 sampling is performed and the majority of the requirements of Subchapter 3 of the
11 Investigation and Remediation of Contaminated Properties Rule are not addressed.

12
13 The Phase I ESA prepared by Normandeu Associates “has identified no new or different
14 non-radiological RECs . . . in connection with the Site, beyond those already identified in
15 the Prior Site Assessments.” **Exhibit ANR-GN-6 at iv.** A recognized environmental
16 condition (REC) “means the presence or likely presence of any hazardous substances or
17 petroleum products in, on, or at a property: (1) due to any release to the environment; (2)
18 under conditions indicative of a release to the environment; or (3) under conditions that
19 pose a material threat of a future release to the environment. De minimis conditions are
20 not recognized environmental conditions.” The report referenced numerous RECs that
21 were identified in prior site assessments. No environmental sampling was performed
22 related to any of the RECs previously identified to determine the degree and extent of

1 non-radiological contamination. The buildings on the property were not inspected or
2 tested for asbestos containing materials, lead based paint, or polychlorinated biphenyls
3 (PCBs).

4
5 In addition, none of the radiologically controlled buildings were assessed for non-
6 radiological hazardous materials and RECs, including the parts washer area in the Rad
7 Waste building. The report did not assess septic systems or floor drains and related
8 discharge locations for releases of non-radiological hazardous waste materials. The
9 report also did not address reported spills associated with the use of mercury switches,
10 gauges, and fluorescent bulbs throughout the plant.

11
12 In the report, the following buildings were identified as having been removed as part of
13 decommissioning process since the 2014 RSCS HSA: the North Warehouse, the South
14 Warehouse, the Tan Ugly Building (TUB), the Clean Ware Building, the PUB, the ELF,
15 the Grounds Maintenance Building, and the Maine Yankee Building. The North
16 Warehouse was assessed and sampled by Hayley & Aldrich prior to its demolition and
17 the construction of the second ISFSI pad. However, the report does not describe if
18 similar sampling was performed or whether the potential for RECs was assessed at these
19 other buildings.

20
21 See also response to Q16.

1 **Q19. Why are the Vermont Yankee septic systems a potential source of non-radiological**
2 **hazardous materials?**

3 A19. By design, septic systems inject wastewater to the subsurface for biological treatment.
4 Septic systems are only capable of treating sewage. Septic systems are not capable of
5 reliably treating non-sewage wastes. When shop sinks, laboratory sinks, and floor drains
6 are used for waste disposal and discharge to septic systems, they are injecting wastes into
7 a disposal system that cannot treat these wastes.

8
9 In this case, according to the 2001 ECS Phase I and II ESA, "... laboratory wastes are
10 discharged to the septic systems." **Exhibit ANR-GN-3 at 13.** There appears to be no
11 other additional information about what wastes were discharged to the septic systems,
12 how much was discharged, and into which septic systems. The septic systems should be
13 evaluated for non-radiological contamination.

14

15 **Q20. Why are floor drains and related discharge locations potential sources of releases of**
16 **non-radiological hazardous materials?**

17 A20. In my experience, floor drains, shop sinks, laboratory sinks and similar discharge
18 locations are frequently used—intentionally and unintentionally—for improper disposal
19 of non-radiological hazardous materials. The liquids that discharge into these locations
20 enter attached septic systems or drywells. If the plumbing is old or incompatible with the
21 liquid wastes, the waste may leak out of the pipes before reaching the ultimate disposal

1 location. The result in any of these cases is a release of non-radiological hazardous
2 materials to the subsurface soil and groundwater.

3
4 **Q21. Why are parts washers a potential source of releases of non-radiological hazardous**
5 **waste materials?**

6 A21. Parts washers are solvent based wash stations typically used to degrease metal parts
7 either for maintenance or prior to painting, welding, etc. Parts washers are notorious as
8 sources of solvent contamination (e.g., perchloroethylene, a hazardous waste) in machine
9 shops or maintenance garages, due to the improper disposal of spent solvents or poor
10 housekeeping practices. Parts washers located in areas with shop sinks or floor drains
11 risk discharge to the subsurface. See also response to Q20.

12
13 **Q22. Why isn't the 2017 Historical Site Characterization prepared by Hayley & Aldrich**
14 **sufficient to meet the site investigation requirements of the Investigation and**
15 **Remediation of Contaminated Properties Rule?**

16 A22. A historical site assessment (HSA) is described in the Multi-Agency Radiation Survey
17 and Site Investigation Manual (MARSSIM) as a site review obtained through records
18 reviews and augmented through scoping surveys and characterization surveys. It is very
19 similar to a Phase I ESA and shares the limitations of a Phase I ESA.

20
21 The HSA prepared by Hayley & Aldrich identified numerous Areas of Concern (AOC).
22 AOCs in an HSA are essentially equivalent to RECs noted in Phase I Environmental Site

1 Assessments. See **Table 1 in Exhibit ANR-GN-5**. Again, no environmental sampling
2 was performed related to any of the AOCs to determine the source, degree, and extent of
3 non-radiological contamination.

4
5 See also response to Q16.

6
7 **Q23. Why isn't the 2014 RSCS Non-Radiological Historical Site Assessment sufficient to**
8 **meet the site investigation requirements of the Investigation and Remediation of**
9 **Contaminated Properties Rule?**

10 A23. In December of 2014, ANR provided detailed comments documenting the deficiencies in
11 the RSCS Non-Radiological HSA. See **Exhibit ANR-GN-7**. The 2014 HSA identified
12 approximately 134 AOCs in twelve categories. However, no environmental sampling
13 was performed related to any of the AOCs to determine the source, degree, and extent of
14 non-radiological contamination. Also, the 2014 HSA did not address potential
15 polychlorinated biphenyls (PCBs) throughout the Vermont Yankee Site. In addition, the
16 2014 HSA did not identify the following areas as AOCs:

- 17 1. petroleum-impacted soils, identified during the 2010 tritium release investigation,
18 that are located roughly 30 feet below ground surface at a location just northeast
19 of the Radiological Waste Building; and
20 2. building floor drains at the Vermont Yankee Site.

21 See also response to Q16.

22

1 **Q24. Does the June 2001 Phase I and Phase II by Environmental Compliance Services**
2 **meet the site investigation requirements of the Investigation and Remediation of**
3 **Contaminated Properties Rule?**

4 A24. The 2001 Phase I and Phase II are sixteen years old and do not address releases of non-
5 radiological hazardous materials that have occurred since the report was finalized. The
6 2014 HSA noted that 52 of the 134 AOCs identified, for example, were not addressed in
7 the 2001 Phase I and Phase II report. The following examples illustrate why the 2001
8 ECS Report is not sufficient to characterize current site conditions:

- 9 1. Petroleum-impacted soils, identified during the 2010 tritium release investigation,
10 that are located roughly 30 feet below ground surface at a location just northeast
11 of the Radiological Waste Building;
- 12 2. Fourteen spills reported to the VT DEC Spill Program from 2002 to 2013;
- 13 3. 2004 main transformer explosion and fire with a release of transformer oil and the
14 use of fire fighting foam; and
- 15 4. 2003 auto transformer spill.

16

17 **Q25. Please provide examples of the RECs and/or AOCs identified in the four site**
18 **assessments.**

19 A25. Examples of the RECs and AOCs identified in the site assessments are:

- 20 • REC/AOC 1: fuel oil release from the former 5,000-gallon UST on the west side
21 of the Turbine Building;

- 1 • REC/AOC 2: main transformer on the west side of the Turbine building:
2 explosion and fire in 2004 resulted in the release of transformer oil and the use of
3 fire fighting foam; 1996 oil spill and minor on-going oil seepage also reported;
- 4 • REC/AOC 3: 1991 leak in the sink drain for the chemistry department in the
5 Turbine Building: limited investigations were conducted;
- 6 • REC/AOC 4: 1982-1985 on site dry-cleaning operation near the truck bay on the
7 west side of the Turbine Building: chlorinated solvents were detected in
8 groundwater in COB well.
- 9 • REC/AOC 5: auxiliary transformer on the west side of the Turbine building:
10 explosion and fire in 1973 resulted in the release of transformer oil;
- 11 • REC/AOC 6: releases reported from the sulfuric acid AST in the intake structure
12 in 1970s and 1997;
- 13 • REC/AOC 7: release reported from the sodium hypochlorite AST in the intake
14 structure in 1996;
- 15 • REC/AOC 8: dissolved PCBs in the manhole MH-A oil/water separator for the
16 North System Stormwater Outfall: source of the outfall is reported as the Main
17 Transformer containment vault;
- 18 • REC/AOC 9: oil release in the late 1970s and a Condensate Storage Tank release
19 in 1976 both to the South System Stormwater Outfall;
- 20 • REC/AOC 10: 'laydown area' an area southeast of the cooling towers, which is
21 being used to store miscellaneous debris including soil, gravel, asphalt,

1 trees/brush, concrete blocks, and possible buried cabling from various
2 construction projects;

- 3 • REC/AOC 11: area B2 between two cooling towers used as storage for cooling
4 tower sediment and reportedly a location of historic waste oil spreading;
- 5 • REC/AOC 12: soil piles northeast of the VELCO substation from previous
6 construction projects;
- 7 • REC/AOC 13: VELCO Autotransformer spill in December 2003: transformer oil
8 spill was addressed, but contamination may exist under the transformer concrete
9 pad; and
- 10 • REC/AOC 14: samples from transformers for the East and West Cooling Towers
11 tested positive for PCBs in 2005.

12
13 See **Exhibits ANR-GN-3, ANR-GN-4, ANR-GN-5, and ANR-GN-6.**

14
15 **Q26. For each REC and/or AOC identified above, please explain what additional site**
16 **investigation activities Entergy and/or NorthStar must conduct to determine the**
17 **scope and extent of any releases of non-radiological hazardous materials?**

18 A26. Environmental sampling is required to determine the scope of and extent of non-
19 radiological contamination associated with the RECs identified in the draft Phase I report.
20 Specifically, the following sampling is required:

- 21 • REC/AOC 1: Soil and groundwater sampling required for petroleum and
22 chlorinated solvents;

- 1 • REC/AOC 2: Soil and groundwater sampling required for petroleum, PCBs, and
2 PFOA;
- 3 • REC/AOC 3: Soil and groundwater sampling required for volatile organic
4 compounds; semivolatile organic compounds, and RCRA metals;
- 5 • REC/AOC 4: Soil and groundwater sampling required for chlorinated solvents;
- 6 • REC/AOC 5: Soil and groundwater sampling required for petroleum, PCBs, and
7 PFOA;
- 8 • REC/AOC 6: Soil and groundwater sampling required for sulfuric acid;
- 9 • REC/AOC 7: Soil and groundwater sampling required for sodium hypochlorite;
- 10 • REC/AOC 8: Soil and groundwater sampling required for petroleum and PCBs;
- 11 • REC/AOC 9: Soil and groundwater sampling required for petroleum and PCBs;
- 12 • REC/AOC 10: Soil and groundwater sampling required for volatile organic
13 compounds, semivolatile organic compounds, PCBs, and RCRA metals;
- 14 • REC/AOC 11: Soil and groundwater sampling required for volatile organic
15 compounds, semivolatile organic compounds, PCBs, and RCRA metals;
- 16 • REC/AOC 12: Soil and groundwater sampling required for volatile organic
17 compounds, semivolatile organic compounds, PCBs, and RCRA metals;
- 18 • REC/AOC 13: Soil and groundwater sampling required for petroleum and PCBs;
19 and
- 20 • REC/AOC 14: Soil and groundwater sampling required for petroleum and PCBs.
21

1 Haley & Aldrich have prepared a draft non-radiological site sampling plan to characterize
2 the soils and groundwater at the Vermont Yankee Site and determine the scope and extent
3 of non-radiological contamination associated with the RECs. See Exhibit ANR-GN-8.
4 The draft plan proposes extensive sampling for PCBs, PAHs, VOCs, metals, and other
5 contaminants across the site. See **Tables 3.0-1 through 3.12-2, Exhibit ANR-GN-8.**

6
7 The proposed environmental sampling must be incorporated into a site investigation work
8 plan that meets the minimum requirements in § 35-303 of the Investigation and
9 Remediation of Contaminated Properties Rule. A site investigation work plan must be
10 submitted within 30 days of the release or discovery of the release and must be approved
11 by the Secretary of ANR. A PRP must implement an approved site investigation work
12 plan within 60 days from the date of the Secretary's approval and submit a site
13 investigation report that meets the requirements of § 35-305.

14
15 **Q27. Do you have any other concerns regarding the site assessments that have been**
16 **performed by Entergy and/or NorthStar?**

17 A27. Yes. The investigation of the 1991 leak in the chemistry lab sink drain was insufficient
18 and relied upon toxicity characteristic leaching procedure (TCLP) testing of soil.
19 Groundwater was not observed or sampled. The testing performed used the TCLP
20 method, which is not the appropriate test to determine if groundwater or soil enforcement
21 standards have been met. TCLP is a test used to determine if a material is a hazardous
22 waste for disposal purposes.

1 **Q28. Does the Petition filed by Entergy and NorthStar address the need for additional**
2 **site investigation at the Vermont Yankee Site? If so, how does the Petition address**
3 **this issue?**

4 A28. Yes. Mr. State states in his testimony that NorthStar intends to conduct a Phase II or
5 develop a corrective action plan within 120 days after the closing of the transaction if the
6 Phase I ESA prepared by Normandeau Associates identifies any RECs. **State PFT 29:7-**
7 **14.**

8
9 **Q29. Is this sufficient to address your concerns? Why or why not?**

10 A29. No. As I mentioned previously, the costs associated with remediation of non-radiological
11 contamination are directly dependent upon what corrective actions are required to protect
12 public health and the environment and remediate the site. In order to develop appropriate
13 corrective actions, the site must be characterized to determine the degree and extent of
14 non-radiological contamination. In the absence of this information, the ANR cannot
15 make a determination as to whether NorthStar's cost estimates for non-radiological
16 remediation and site restoration are accurate.

17

1 **Q30. Regarding the remediation and site restoration activities proposed by NorthStar,**
2 **are cost estimates for any activity dependent on adequate site characterization data?**
3 **If so, please explain why adequate site characterization data is necessary to estimate**
4 **costs.**

5 Q30. Generally, the cost of remediation and site restoration is dependent on the amount of
6 contamination, its toxicity, and its location. For example, waste disposal costs will
7 increase as the amount of waste materials increases. More toxic wastes will require
8 stricter cleanup standards and restricted disposal locations, both of which will increase
9 cost. The location of the contamination (i.e. under a building, in bed rock, in clay, below
10 the water table, etc.) will also limit potential remediation methods and impact the cost of
11 remediation.

12
13 Without an understanding of the source, degree, and extent of non-radiological
14 contamination, it is, at best, challenging to identify appropriate corrective actions to
15 protect human health and the environment and remediate contamination. Costs are
16 directly dependent on the corrective actions selected. Without adequate site
17 characterization data, it is problematic to evaluate whether cost estimates for non-
18 radiological remediation and site restoration are accurate.

19

1 **Q31. Does the ANR review cost estimates and financial assurance for proposed corrective**
2 **actions to address contamination? If so, how?**

3 A31. Yes. A corrective action plan must include cost estimates for the proposed corrective
4 actions for projects that are State or federally funded, enrolled in the Brownfields Reuse
5 and Environmental Liability Limitation Act program, or where the Secretary requests it.
6 The ANR has an interest in ensuring that cost estimates for the work are accurate and that
7 there are sufficient funds to pay for the work that is necessary to protect public health and
8 the environment and remediate non-radiological contamination at contaminated sites,
9 including the Vermont Yankee Site.

10

11 **Q32. With respect to a corrective action plan to address non-radiological contamination**
12 **at the Vermont Yankee Site, would the ANR request a cost estimate for proposed**
13 **corrective actions? Why or why not?**

14 A32. Yes. See the response to Q31.

15

16 **Q33. How does the ANR review cost estimates and financial assurance for proposed**
17 **corrective action? What is required for this review?**

18 A33. Part of a corrective action plan is the budget. The budget will be broken down into tasks
19 and the cost of each task depends on equipment needed, labor hours, labor rates,
20 materials, waste disposal costs, etc. The ANR will review costs and compare them to
21 ANR allowable labor and equipment rates. If those rates are not available, they are

1 compared to prevailing industry rates. Environmental consultants are required to solicit
2 bids from subcontractors and equipment manufacturers.

3
4 **Q34. Can the ANR conduct a meaningful review of cost estimates and financial assurance**
5 **for proposed corrective actions without adequate site characterization data and a**
6 **corrective action plan? Why or why not?**

7 A34. No. Corrective actions that protect public health and the environment cannot be designed
8 unless the site has been characterized and site conditions are known. Without site
9 characterization to determine the degree and extent of non-radiological contamination,
10 the remediation method and amount of contamination to be remediated are unknown. I
11 would not be able to evaluate whether the proposed corrective actions are appropriate or
12 to make a determination as to whether the cost estimates for work required to protect
13 public health and the environment and remediate the site are accurate.

14
15 **Q35. Have you reviewed the Draft Voluntary Corrective Action Plan prepared by Haley**
16 **& Aldrich dated June 2017?**

17 A35. Yes.

18
19 **Q36. Please describe your observations about this draft report.**

20 A36. Based on my review of the report, attached as Exhibit ANR-GN-9, it appears that
21 NorthStar intends to characterize the Vermont Yankee Site as they excavate the site and
22 that excavation is the only remediation method under consideration. Although Haley &

1 Aldrich claim they will do a CAFI and CAP for each contaminated area at the Vermont
2 Yankee Site, the assumption is that excavation is the primary site remediation option
3 under consideration.
4

5 **Q37. Is excavation a valid remediation option for the Vermont Yankee Site?**

6 A37. It depends. Excavation may be a valid remediation option for some areas. Excavation is
7 generally a good option for discrete releases that occur a short time ago and before
8 groundwater has been impacted. In other words, the PRP will “dig up” and properly
9 dispose of a spill before it spreads. However, once a spill has had time to spread out into
10 a larger area, groundwater, or bedrock, excavation is not effective for treating
11 groundwater contamination and/or can be an expensive option.
12

13 Because the site has not been characterized and we do not know the degree and extent of
14 non-radiological releases on the site, I cannot make a determination as to what the
15 appropriate remediation method may be for any of the releases or suspected releases.
16

17 **Q38. Does the draft Voluntary Corrective Action Plan address remediation methods
18 other than excavation to address non-radiological contamination?**

19 A38. No.
20

1 **Q39. Does the draft Voluntary Corrective Action Plan address remediation of non-**
2 **radiological contamination that may be released off-site?**

3 A39. No.

4
5 **Q40. Does the draft Voluntary Corrective Action Plan meet the requirements of the**
6 **Investigation and Remediation of Contaminated Properties Rule? Why or why not?**

7 A40. No. It is a very general Corrective Action Plan that is barely more than a template with
8 many missing elements. Some of these missing elements are:

- 9 1. environmental media standards that apply to the site;
- 10 2. compliance points to monitor compliance with the environmental media
11 standards;
- 12 3. estimates of the non-radiological contaminant mass or volume;
- 13 4. cross sections of this contaminated zone depicting soil stratigraphy, soil
14 contaminant concentrations, and groundwater levels;
- 15 5. list of required permits;
- 16 6. detailed plans and specification of correct action remedial design; and
- 17 7. a Vermont licensed professional engineer's signature of review.

18

19 Section 35-505 of the Investigation and Remediation of Contaminated Properties Rule
20 sets forth the minimum requirements of a corrective action plan.

21

1 **Q41. Given your understanding of the Vermont Yankee Site and your experience**
2 **managing other contaminated sites, are there any remediation and site restoration**
3 **activities that may be necessary but are not included in NorthStar’s proposal?**

4 A41. Without a complete site investigation and site investigation report, I have no way of
5 knowing what other remediation and site restoration activities are necessary but are not
6 included in NorthStar’s proposal. In light of the fact that the Vermont Yankee Site has
7 been operating as an industrial facility for several decades, the construction practices at
8 the time the facility was built, and the recognized environmental conditions identified in
9 several site assessments, it is my opinion that additional remediation may be required to
10 address non-radiological contamination.

11

12 **Q42. Do you have any other concerns regarding the joint petition filed by Entergy and**
13 **NorthStar? If so, please describe them.**

14 A42. Yes. First, NorthStar proposes to use the 2012 Investigation and Remediation of
15 Contaminated Properties (IROCP) Guidance site screening levels (SSLs) as cleanup
16 standards and to make these SSLs the site cleanup standards in perpetuity regardless of
17 changes in State of Vermont Standards. However, the 2012 IROCP Guidance has been
18 superseded by the Investigation and Remediation of Contaminated Properties Rule,
19 effective July 27, 2017. The environmental media standards contained in Appendix A of
20 this rule and any other applicable laws and regulations—at the time remediation and site
21 restoration occurs—are the appropriate standards for remediation and restoration.

22

1 **Q43. Does this conclude your testimony?**

2 A43. Yes.