STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Joint Petition of NorthStar Decommissioning Holdings, LLC, NorthStar Nuclear Decommissioning Company, LLC, NorthStar Group Services, Inc., LVI Parent Corporation, NorthStar Group Holdings, LLC, Entergy Nuclear Vermont Investment Company, LLC, and Entergy Nuclear Operations, Inc., and any other necessary affiliated entities to transfer ownership of Entergy Nuclear Vermont Yankee, LLC and for certain ancillary approvals, pursuant to 30 V.S.A. §§ 107, 231, and 232	)	Docket No. 8880

SUMMARY OF PREFILED TESTIMONY OF GREGORY A. MARET

Mr. Maret's testimony presents the results of an analysis of the proposed transfer of the Vermont Yankee Nuclear Power Station ("VY Station") from the Entergy Petitioners to the NorthStar Petitioners, and the plan for subsequent prompt decommissioning of the VY Station. Mr. Maret evaluates the decommissioning approach proposed by NorthStar and compares that to industry experience and norms, and identifies areas at risk for unanticipated costs, including identifying aspects of the NorthStar plan that are without precedent and that could also result in added costs. Mr. Maret explains why those risks must be considered to evaluate whether the proposed transfer offers sufficient resources to complete decommissioning of the VY Station, including NRC license transfer, spent fuel management, and site restoration.

Mr. Maret sponsors the following exhibits:

Exhibit DPS-GAM-1	Resume of Gregory A. Maret
Exhibit DPS-WKB/GAM-2	Review of Proposed Transfer of Vermont Yankee to NorthStar and Plan for Subsequent Prompt Decommissioning

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TESTIMONY OF GREGORY A. MARET

Q1. State your name and business address.

A1. Gregory A. Maret, 4451 Brookfield Corporate Drive, Suite 107, Chantilly, VA 20151.

Q2. On whose behalf are you testifying?

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

Q3. What is your occupation?

A3. I am an executive consultant for Four Points Group, Incorporated. Four Points Group is an engineering consulting firm engaged in providing services to the nuclear industry. The services provided by Four Points Group include decommissioning cost estimating and planning, and cost estimating and analysis with respect to spent fuel management and disposition. I have over 35 years of experience in the nuclear industry and have been involved in decommissioning cost estimating, planning, and execution since 1991.

Q4. Have you previously provided expert testimony?

A4. Yes. I have provided expert witness testimony before state regulatory bodies, and in numerous proceedings before the United States Court of Federal Claims. My resume, Exhibit DPS-GAM-1, contains a complete listing of the matters in which I have provided expert testimony.

Q5. What is your educational and professional background?

A5. I have a B.S. in nuclear engineering from Rensselaer Polytechnic Institute, and M.E.s in nuclear engineering and electric power engineering also from Rensselaer Polytechnic Institute. I was certified as a senior reactor operator at Vermont Yankee. I also completed a program for senior nuclear plant managers at the Institute of Nuclear Power Operations, and served on the executive committee on reactor safety for the American Nuclear Society.

I then worked for 14 years at Yankee Atomic Electric Company (Yankee Atomic), licensee at the Yankee Nuclear Power Station, or Yankee Rowe, in Rowe, Massachusetts, first as an engineer in Yankee Atomic's graduate engineer program, then as a Reactor Engineer. I then served as Refueling Coordinator for Outage Management, Assistant to the Plant Superintendent, Reactor Engineering Department Manager, Technical Director, and ultimately the Site Manager during decommissioning at Yankee Atomic. Following my role as Site Manager, I left Yankee Atomic to serve as Operations Superintendent, Plant Manager, and Executive Director of Operations for the Vermont Yankee Nuclear Power Corporation, which was at the time the owner and operator of the VY Station. After leaving the VY Station in 1999, I served as an Executive Consultant for

Sequoia Consulting Group, Inc., where I served as Vice President of Operations and Decommissioning for decommissioning of the Yankee Rowe, including transfer of fuel from wet to dry storage, decontamination and demolition of structures, and site radiological and environmental remediation and restoration. After the decommissioning of Yankee Rowe, I continued to consult for the nuclear industry, including providing testimony for the United States on decommissioning and spent fuel storage issues.

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

A6. The purpose of my testimony is to present my review of the proposed transaction, which involves the acquisition of Entergy Nuclear Vermont Yankee, LLC (ENVY), which owns the VY Station, by NorthStar Decommissioning Holdings, LLC from Entergy Nuclear Vermont Investment Company, LLC (ENVIC), which presently holds 100% of the membership interest in ENVY; the assumption by NorthStar Nuclear Decommissioning Company, LLC and NorthStar Group Services, Inc. of certain decommissioning obligations; and the plan for the subsequent prompt decommissioning of the VY Station. If the proposed transaction occurs, ENVY would be renamed NorthStar Vermont Yankee, LLC (NorthStar VY). Throughout my testimony, I refer to Petitioners ENVIC and Entergy Nuclear Operations, Inc., along with ENVY (pre-transfer or in the absence of a transfer) as "Entergy." I refer to Petitioners NorthStar Group Holdings, LLC; LVI Parent Corp.; NorthStar Group Services, Inc.; NorthStar Nuclear Decommissioning Co., LLC; and NorthStar Decommissioning Holding,

LLC, and (post-transfer) NorthStar VY, as "NorthStar." I evaluated the proposed NorthStar approach, and in particular, how that proposed approach compares to previous decommissioning experience and industry norms. I also evaluated the proposed approach to identify areas of risk for unanticipated costs, including identifying aspects of the NorthStar plan that are without precedent and that could also result in added costs. As part of my review, I prepared, with Warren K. Brewer, the joint expert report submitted as Exhibit DPS-WKB/GAM-2 to Mr. Brewer's and my testimony in this proceeding.

Q7. Please describe the scope of your review of the Entergy and NorthStar materials.

A7. I reviewed the Petitioners' Prefiled Testimony, the supporting exhibits, documents provided by Petitioners in response to information requests and publicly available documents, including available data from industry experience in decommissioning other nuclear power plants, relevant to evaluating risks associated with the potential costs for decommissioning of VY. I also compared NorthStar's plans to my own experience managing decommissioning and consulting for other owners on decommissioning issues.

Q8. What conclusions did you reach concerning the proposed transfer of VY to NorthStar and the plan for subsequent prompt decommissioning?

A8. My conclusions are:

1. NorthStar has not provided sufficient information to demonstrate that adequate analysis has been performed to fully identify and quantify the amount of material (primarily concrete and soil) that will contain volumetric

contamination and thus must be dispositioned at a licensed facility. As a result, the cost to dispose of waste materials may be understated.

2. Re-use of material involves significant costs to comply with radiological and non-radiological limits on hazardous material. NorthStar has not provided sufficient information to demonstrate that the costs to ensure compliance have been fully identified and included in its cost estimates. As a result, the costs to re-use waste materials as onsite fill may be understated.

3. Decontamination of systems and structures typically occurs during dismantlement to improve personnel safety and reduce the potential for spreading contamination. [redacted]

[redacted]

7. NorthStar proposes that contingency be removed from the trust funds as each task is complete. Removal of contingency on an ongoing basis may result in a shortfall if future needs require additional funding. Banking contingency for project use until the project is complete, at which time unused contingency (if any) can be distributed would be a more standard approach.

Q9. What is your understanding of the term "decommissioning"?

A9. Decommissioning means different things to different regulators. I am using this term in the broadest sense to include all post-shutdown activities to remove structures, systems, and components to terminate the Nuclear Regulatory Commission (NRC) operating license, to terminate the NRC fuel storage license, and to remediate the site as required by other local, state, and federal regulators.

Q10. What is the primary challenge of decommissioning?

A10. In my experience, the primary challenge of decommissioning is to safely and efficiently remove and segregate material into different waste categories for re-use on site or shipment to a disposal site.

Q11. What risks are associated with completing decommissioning within the projected costs?

A11. There are four primary risks: performance risk, scope risk, regulatory risk, and financial risk.

Q12. What is performance risk?

A12. Performance risk is risk that the defined scope of activities cannot be completed within the allotted schedule for the estimated cost.

Q13. What could prevent completion of the defined scope within the estimated cost and schedule?

A13. There are numerous issues that could cause costs to increase above estimates and shift the project schedule. These include delays in performance due to weather or other issues, resource conflicts, personnel turnover, equipment or tool issues, and other unforeseen delays. For example, certain decommissioning activities at the Connecticut Yankee Nuclear Power Plant (Connecticut Yankee) were delayed for several years due to litigation with the town of Haddam, Connecticut.

Q14. How is performance risk addressed during decommissioning?

A14. Licensees typically include contingency in decommissioning cost estimates to account for performance risk. Contingency generally ranges from 15 to 25 percent of the total estimate. Contingency is included for items that almost inevitably will

occur, but for which exact timing and affected projects cannot be known in advance. Contingency is typically provided for issues including:

1. Weather delays;
2. Unanticipated work difficulty associated with confined spaces;
3. Equipment or tool breakage;
4. Difficulty with waste packaging;
5. Personnel turnover;
6. Resource conflicts; and
7. Recontamination of previously cleaned areas.

Q15. What is the expectation with use of contingency?

A15. Managers typically expect all contingency to be utilized during the performance of the project. The distinction between contingency and other projected costs is that the exact projects requiring contingency funds cannot be predicted in advance.

Q16. What is scope risk?

A16. Scope risk is the risk that there are tasks required to complete decommissioning that were not foreseen in the decommissioning estimate. Numerous licensees, including Connecticut Yankee Atomic Power Company, Southern California Edison and Yankee Atomic, were faced with increased decommissioning costs when previously unknown underground items were discovered. These items can include abandoned pipes, cables, or structures that were not on current site drawings and thus were not included in the decommissioning scope.

In addition, previously unknown or unidentified radiological and hazardous material contamination can increase required scope. The licensees at Yankee Atomic and Connecticut Yankee, for example, identified soil contamination as a result of leakage, paint chips, or waste from original construction that required additional mitigation to complete decommissioning.

Q17. Is scope risk addressed by contingency?

A17. Contingency does not typically address scope risk, and historically additional funds have been needed to address expansions in scope. Scope risk cannot be completely eliminated, but can be reduced by performing a detailed site characterization prior to commencing work.

Q18. What is regulatory risk?

A18. Regulatory risk is risk that results from the inability to accurately predict future changes in regulations. Since unknown future changes cannot be evaluated, the cost estimate cannot include costs to comply with such regulations. Yankee Atomic faced this issue with radiological and non-radiological standards imposed for soil and concrete.

Q19. Is regulatory risk addressed by contingency?

A19. Contingency does not typically address regulatory risk. Estimates are generally based on current requirements or the licensee's understanding of those requirements. If the requirements change during execution, additional funds may be required to meet those new requirements.

Q20. What is financial risk?

A20. When planning decommissioning, cashflow is modeled to demonstrate that sufficient funds will be available to perform all activities. To create this cashflow, the estimator is required to make several financial assumptions, including, for example, the rate of inflation of costs over the decommissioning period as well as earnings on any funds used for decommissioning. Financial risk results from the risk that these assumptions are incorrect, and that as a result funds committed for decommissioning will not be sufficient to cover costs.

Q21. Does contingency address financial risk?

A21. Contingency does not typically address financial risk.

Q22. Have you seen any evidence that NorthStar has considered each of these risk types?

A22. Based on the information provided to date, no. NorthStar includes contingency in its estimate, but its handling of this contingency is different from the industry standard followed in previous projects. NorthStar assumes a flat 10 percent contingency on all line items, but proposes to remove any unused contingency on a line by line basis and retain those monies as profit, meaning that contingency would not be available for other line items.

Further, NorthStar's proposed 10 percent contingency is much lower than the 15 to 25 percent contingency assumed by other estimators, and, for example, the 17.3 percent contingency assumed in the Entergy estimate. In addition, removal of this contingency on a line-item basis effectively reduces the actual contingency that is available, particularly late in project execution.

NorthStar indicated that it may make some amount of the profit it captures after completion of a given task available to fund cost overruns of other activities until the decommissioning is complete, but it has made no firm commitment to doing so. Making those funds available would address some, but not all, of my questions regarding contingency.

Q23. Did you consider NorthStar's proposed $125 million support agreement as contingency?

A23. NorthStar's proposed $125 million support agreement could be viewed as another type of contingency, but doesn't represent actual funds, so I did not consider this as a type of contingency.

Q24. Did you identify any specific risks as part of your review?

A24. Yes, I identified risks associated with unknown site conditions, unanticipated costs associated with site restoration, and assumptions and approaches that are unprecedented in the commercial nuclear industry.

Q25. Regarding risk associated with unknown site conditions, what risks did you identify?

A25. There are two primary risks that I identified in my review. The first risk relates to volumetric contamination of concrete from tritium and/or carbon 14. Tritium and carbon 14 are both hard-to-detect radioactive isotopes that are naturally occurring and also produced in a nuclear reactor during operation. The presence of tritium or carbon 14 in materials determines (in part) what disposal options are available for those materials. At Yankee Atomic, for example, the existence of carbon 14 in

concrete derailed plans to use that concrete as on-site fill material, and instead the concrete was shipped off site to a burial facility at increased cost.

The second risk relates to volumetric contamination of soil from similar isotopes. From my experience with other decommissioning projects, the cost estimates at the start of decommissioning typically did not accurately consider the extent of radioactive contamination from these hard-to-detect isotopes. NorthStar has not provided information demonstrating that it fully considered the existence of these hard-to-detect isotopes in concrete structures and soils, and therefore that it accurately projected disposal needs and costs for these materials. Discovery of volumetric contamination, and the associated cost increases, could impact the decommissioning cost estimate in ways that affect all aspects of decommissioning, including site restoration.

Q26. What risks did you identify with unanticipated costs for site restoration?

A26. The primary risk with unanticipated costs for site restoration lies with the re-use of material on site. NorthStar points to Connecticut Yankee and Yankee Atomic as precedent for its proposal to re-use debris with low levels of radiological contamination but meeting NRC release standards to fill voids remaining after demolition of buildings. However, Connecticut Yankee ultimately removed all above-ground concrete from the site and did not use this material as on-site fill. Similarly, Yankee Atomic disposed of all concrete with distinguishable plant-related radioactivity at an off-site disposal facility. The proposed use of on-site material with radioactivity above background, but within NRC release standards,

is without precedent. In addition, it is not clear from the NorthStar estimate that sufficient funds have been included for adequate radiation surveying to ensure that concrete for re-use meets the applicable radiological requirements. This presents a risk that costs, including those for site restoration, may exceed those assumed by NorthStar.

Q27. Can you quantify the additional cost if NorthStar did not re-use radiologically contaminated concrete in the manner it assumes?

A27. NorthStar did not provide sufficient detail to determine the additional cost, if any, that could result if NorthStar were not permitted to re-use concrete as onsite fill. Additional information that would help in quantifying the additional cost includes characterization results for soil and concrete; estimated volumes of soil and concrete; estimated curie content of soil and concrete, by isotope; the volume of backfill required; and the cost of clean backfill.

Q28. What risks did you identify with NorthStar's assumptions and approaches?

A28. I identified four risks, three with NorthStar's proposed approach and one with NorthStar's assumptions. The three risks with approach involve use of decontamination services, use of fixatives, and use of explosives in demolition activities. [redacted]

Q29. What are decontamination services?

A29. During operation of a nuclear power plant, certain structures, systems, and components become contaminated with radioactive materials. This material can

be removed in part by wiping or scrubbing the surfaces, using mechanical means (such as scabbling or sandblasting), or using chemical flushes. Decontamination is used to reduce radiation levels to which workers are exposed, and is thus performed to improve worker safety. Decontamination does not generally make contaminated materials free of contamination (though in the case of concrete surfaces, it can be used to separate contaminated material from clean material). As a result, decontamination is generally limited to those situations where the most benefit can be obtained, such as the reactor coolant piping and concrete surfaces.

[redacted]

Q31. What are fixatives?

A31. Fixatives are commercial products that are generally used to prevent lead or PCB-containing paint from flaking off a surface, and to contain radioactive contamination. Fixatives lock the contamination in place on an item or structure, and in this respect, fixatives are the exact opposite of decontamination. However, fixatives are also used to improve worker safety, and can potentially accelerate decommissioning activities and reduce costs.

[redacted]

Q33. How are explosives used in decommissioning?

A33. Explosives can be used to assist in building and structure demolition. This approach has been used at least twice to assist in demolishing structures at commercial nuclear power plants, including demolition of the containment building at Maine Yankee and demolition of a cooling tower at Portland General Electric. In both cases, explosives were used to demolish structures that were not radioactively contaminated.

[redacted]

[redacted]

Q36. What is waste burial as it relates to decommissioning?

A36. Radioactively contaminated waste resulting from demolition of a nuclear power plant is generally transported from the site to a licensed facility where it is stored and monitored to ensure the safety of the public. NRC regulations divide the waste into classes: A, B, and C. Vermont has established a compact for waste disposal with Texas. Waste disposed under this compact would be buried at the Waste Control Specialists (WCS) site in Andrews County, Texas. Other waste may be disposed of at either a licensed hazardous waste site or as general debris depending on its content.

Q37. What are the costs for waste burial at WCS?

A37. The published rates for disposal of class A waste at the WCS NRC-licensed waste disposal site range from $100 per cubic foot to $180 per cubic foot. Waste that has very low levels of radiological contamination (typically concrete or soil) can be sent to licensed hazardous waste sites. [redacted]

[redacted]

[redacted]

Q40. Does this conclude your testimony?

A40. Yes, at this time.