

**Schedule B -- Discovery Requests Going to Issues of Radiological Safety and/or Plant
Construction and Operations**

ANR Discovery Requests

- Q.ANR:EN.1-5: How do you know that there are no other sources of the leak?
- Q.ANR:EN.1-6: Please provide all facts and identify all documents that support your conclusion that there are no other sources of a tritium leak at the VY station?
- Q.ANR:EN.1-7: Please identify and explain the facts that support the conclusion that the tritium detected in groundwater monitoring well GZ-11 does not signify another leak or another source of a leak.
- Q.ANR:EN.1-8: What was the depth of excavation work that allowed inspection?
- Q.ANR:EN.1-9: The Nuclear Power Industry has agreed to implement the Nuclear Energy Institute (NEI) "Industry Ground Water Protection Initiative - Final Guidance Document" NEI 07-07 [Final] dated August 2007 (GPI). Please produce the initial plan and schedule on how Entergy would meet the objectives of the GPI at the Vermont Yankee Nuclear Power Station ("VY").
- Q.ANR:EN.1-10: Please specify in detail the progress Entergy made in implementing the GPI at VY up until the discovery of elevated tritium in a ground water sampling well in January 2010.
- Q.ANR:EN.1-11: Under the GPI, if additional test wells other than the three placed into service in 2007 were to be installed prior to January 2010 at VY, please explain in detail why their installation was postponed.
- Q.ANR:EN.1-12: What other parts of the GPI plan for VY were not implemented on schedule prior to January 2010? Please explain in detail why implementation was not accomplished.
- Q.ANR:EN.1-13: Please provide the Entergy plan and schedule to accomplish all the objectives of the GPI at VY since the discovery of the tritium in the sampling well in January 2010.
- Q.ANR:EN.1-14: Identify all persons on the consultant team who provided input.
- Q.ANR:EN.1-15: What do you mean by "we will benchmark the industry to determine best practices;"
- a. How will you determine the benchmark?
 - b. How many plants will be utilized to determine the benchmark?

- c. Identify the names of the nuclear power plants that will be evaluated in determining benchmark
- d. Identify the similar and distinguishing characteristics of the plants to which you will refer in determining benchmark
- e. Identify any and all plants discarded and explain why, in determining the benchmark
- f. For what period of time will the benchmark be determined?
- g. For what practices are you determining best practices
- h. Identify any and all practices that are going to be evaluated and benchmarked

Q.ANR:EN.1-16: Has VY ever evaluated the risk of radionuclide leakage for applicable structures, systems, and components?

- a. Identify any and all inspections and evaluations undertaken, for what structures, systems, and components, and for what period of time.
- b. If there have been evaluations for the risk of radionuclide leakage for applicable structures, systems, and components, identify any and all risks previously noted or reported and identify and explain any and all remediation or corrective or preventative actions taken to prevent such leakage.
- c. Was the leakage in AOG pipe or other underground piping identified?
- d. If yes, what actions were taken to prevent the leak?
- e. If the leak in the AOG pipe was not detected, please explain why not.

Q.ANR:EN.1-18: Identify any and all factors that will be considered in deciding whether and in what circumstances to replace or relocate below-grade pipe to above ground.

Q.ANR:EN.1-19: Explain any and all factors that would result in a decision to leave below-grade pipe below ground.

Q.ANR:EN.1-20: Where will you be installing sentinel wells, monitoring wells, cameras or other detection devices to improve monitoring capabilities?

Q.ANR:EN.1-21: What other detection devices are being considered?

Q.ANR:EN.1-22: Regarding “[w]e will remove debris from the AOG pipe tunnel in the area of the floor drain.”

- a. Is this the same debris that VY has stated contributed to the leak from the AOG pipe?
- b. If not, where is this debris located?
- c. Identify and explain the source of the debris?
- d. Identify and describe the size or amount of the debris?

Q.ANR:EN.1-23: Identify and explain all facts that form the basis for your “estimate that contamination from those materials from the leakage is limited to approximately four to six feet near below the leakage.”

Q.ANR:EN.1-24: Identify the geographic location where the groundwater is being stored? where the site or location where [sic]

Q.ANR:EN.1-25: Regarding page 12, when will the root cause analysis be completed?

Q.ANR:EN.1-27: In CLF- EN-I-2, CLF asked you to admit that there have been leaks of radioactive material and radionuclides at the VT Yankee Nuclear Power Facility in Vernon, VT. Specifically, have there been any releases of cesium -137 at the VT Yankee Nuclear Power Facility? Produce any and all documents on which you rely for your response.

Q.ANR:EN.1-28: Have there been soil samples that show cesium-137 at the facility? Produce any and all documents on which you rely for your response.

Q.ANR:EN.1-29: Please identify the location of any and all spills containing cesium-137 that may have occurred in the past 40 years? Produce any and all documents on which you rely for your response.

Q.ANR:EN.1-30: Please produce all documents and communications that relate to the presence of cesium- 137 found on the Entergy VY site.

Q.ANR:EN.1-31: In your sworn affidavit on page 7 lines 17-18 you referred to the flow test conducted to determine the source of the leak.

- a. Please produce the results of this flow test and information on how the test was conducted.
- b. Please provide a detailed summary of what was found during the flow test.
- c. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-32: In your sworn affidavit on page 8 lines 6-7, you stated that two separate leaks were being treated as one leak.

- a. Please identify the location and extent of each leak.
- b. Please provide the documents and reasoning behind the conclusion that two leaks should be treated as one leak.
- c. Please identify the distance between leak one and leak two.
- d. Produce the documents on which you rely for your conclusions.

Q.ANR:EN.1-33: In your sworn affidavit on page 9 lines 2-3 you mention that the location and size of the leak in the Bravo drain line is not known. Provide any and all documents that pertain to the investigation, identification and repair of this leak.

Q.ANR:EN.1-34: Please provide the results of the flow estimates referred to on page eight lines 21-22. Produce the documents on which you rely for your conclusions.

Q.ANR:EN.1-35: Please indicate how you will accurately estimate the flow and discharge from the hole if you do not know the size or particular location of the Bravo line leak as stated on page 9 lines 2-3 of your sworn affidavit. Please provide any documents on which you rely for these estimates.

Q.ANR:EN.1-36: In your sworn affidavit on page 8 lines 10-13, you mention that Entergy VY was not able to gain access to the section of the tunnel containing the leaks.

- a. Please provide information that states how you were able to determine that the leaks were isolated, contained and repaired if access was impossible.
- b. Please produce all documents on which you rely upon for these conclusions.

Q.ANR:EN.1-37: Please produce the results from the twenty ground water monitoring wells mentioned in page 9 line 13-14 of your sworn affidavit. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-38: Regarding page 9-10 of you sworn affidavit,

- a. Please provide information on how the AOG pipe tunnel has been isolated and
- b. How the ROV equipment was used to make the determination of no further leakage.
- c. Please provide the documents on which you rely to make these conclusions.

Q.ANR:EN.1-39: How will you assure that the AOG pipe tunnel is cleaned and removed properly? Please provide any documents on which you rely for your response.

Q.ANR:EN.1-40: Please describe the testing completed to determine the chemical composition of the fluid contained in the Alpha and Beta drain lines. Please produce the documents associated with this testing.

Q.ANR:EN.1-41:

- a. Have there been any other constituents of the fluids found in the Alpha and Beta lines not listed in the analyte list in your Exhibit 2.
- b. Have any identified constituents caused an adverse reaction to the process in the past?
- c. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-42:

- a. What are “unacceptable constituents” as referred to on page 4 line I of your sworn affidavit?
- b. Please provide a list of these constituents.
- c. What do you test for to assure that there are no “unacceptable constituents”?
- d. Please explain this identification process and how unacceptable constituents are removed.
- e. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-43: For purposes of clarification:

- a. Is the analyte list presented as JH-2 a comprehensive list of all the constituents of the fluids contained in the Alpha and Bravo Units?
- b. It seems that they are only a list of analytes quantified by Entergy VY’s Chemistry department. Please provide the constituents of the fluids contained in the Alpha and Bravo Lines.
- c. Please produce the documents and on which you rely on to make these determinations.

Q.ANR:EN.1-44: Produce any and all documents having to do with the initial investigation into the leak. Identify the dates on which they were conducted and those persons involved.

Q.ANR:EN.1-45: Please produce any and all documents that Entergy VT has in its possession having to do with the human health effects of tritium. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-46: Please produce any and all documents that Entergy VT has in its possession having to do with the environmental effects of tritium. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-47:

- a. How is tritium handled within the facility?
- b. How is tritium disposed within your facility?
- c. Produce all documents on which you rely for this response including all permits governing the discharge of tritium and guidance documents.

Q.ANR:EN.1-48: Produce the soil sample test results from Dave Tkatch to which you referred in page 5 line 20 of your sworn affidavit.

Q.ANR:EN.1-49:

- a. On page 6 line 2 of your sworn testimony you refer to "Released materials."
- b. Clarify what is meant by "released material".
- c. What was contained in these "released materials?"
- d. Produce any and all documents relating to these "materials."

Q.ANR:EN.1-50: Exhibit JH-4 refers to a schedule of testing for each of the wells.

- a. Please identify by what means you make the determination whether each well is tested weekly, biweekly, monthly or daily.
- b. Produce any documents on which you rely for this response.

Q.ANR:EN.1-51: Please produce the test results from Teledyne-Brown Engineering Environmental Services Laboratory who conducted separate tests referred to in page 7 lines 9-11 of your sworn affidavit. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-52: Did the Teledyne-Brown tests reveal levels of cesium-137? Please produce any and all documents on which you rely for your response.

Q.ANR:EN.1-53:

- a. Did any tests conducted reveal the presence of Cesium-137?

- b. Please identify the location of these deposits.
- c. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-54: What were the tritium levels at the 23 wells listed by JH-5 referred to on page 7 line 14 of your sworn affidavit? Produce the documents on which you rely for your response.

Q.ANR:EN.1-55:

- d. Was there any radioactive material found outside of these “hard to detect” materials?
- e. Produce the test results from this search for radioactive materials.
- f. Please provide any and all other documents on which you rely for your response.

Q.ANR:EN.1-58: What are the Minimum Detectable Activity levels referred to in page 9 line 10? Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-59: What are the results of the Connecticut River tests referred to in page 9 line 15 of your sworn affidavit? Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-60: What are the results of the fish catch tests? Produce all documents relating to the results of these tests. Please provide any and all other documents on which you rely for your response.

Q.ANR:EN.1-61: On page 10 lines 1-2 of your sworn [sic] affidavit you reference AREVA’s assessment report which you assert concludes a “low level of risk to the public” at lines 3-4. How did you arrive at that conclusion from the summary AREVA provides in their study?

Q.ANR:EN.1-62: How was the AREVA test conducted? Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-63:

- a. Please explain in lay terms the extrapolated figures contained in the AREVA study.
- b. How is the conclusion of “low level of risk to the public” reached through the figures calculated by AREVA?
- c. Please produce all documents pertaining to these conclusions.

Q.ANR:EN.1-64: Please produce a lay summary of the AREVA report given as JH -6.

Q.ANR:EN.1-65:

- a. Please reconcile the summary of results final paragraph with the conclusion that there is “low level of risk to the public”?
- b. How does the AREV A data support this conclusion?
- c. Please provide any documents on which you rely to provide this response.

Q.ANR:EN.1-66: Produce the documents that have to do with the monitoring your company has completed for wells listed in A4 page 2 of your sworn testimony. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-68: Regarding page 6 lines 7-8 of your sworn affidavit, please expound on what is meant by the “few sporadic-low level detections”. What were the levels found in these tests? Please produce documents on which you rely for your response.

Q.ANR:EN.1-69: How did you arrive at the conclusions drawn regarding drinking water referred to on page 6 lines 8-9 of your sworn affidavit? Please provide all documents on which you rely for your response.

Q.ANR:EN.1-70: Regarding GZ-13D, you made the determination that “low levels of tritium” were found on page 6 line 13.

- a. Please explain these conclusions and provide the documents on which you rely for your response.
- b. What were the exact amounts of tritium detected at GZ 13D? Please provide documents on which you rely.
- c. On what scale are you comparing the levels to in order to determine that they are “low level”? Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-71: Regarding page 7 of your sworn affidavit: what conditions did you consider in placement/location of the wells? Provide any and all documents on which you rely for your response.

Q.ANR:EN.1-72: What is the estimate of the groundwater affected by the leak referenced in page 7 line 18? How did you arrive at this conclusion? Please provide a summary of how you arrived at your conclusions. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-73: Regarding page 8 line 5 of your sworn affidavit, provide the current data from GZ 13 D, 14d, 19, 19D, 20 and 21. Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-74: Regarding the approximate location of groundwater tritium activity referred to on page 8 line 12-13, how many wells were tested along the border of this boundary area? Please provide any and all documents on which you rely for your response.

Q.ANR:EN.1-75: On page 9 line 7 of your sworn affidavit you reference GZ-1 O. Provide the data from that well that supports this statement at page 9 line 8 that tritium levels have “dropped significantly”. Produce all documents on which you rely for your response.

Q.ANR:EN.1-76: Please provide your estimate of the tritiated water released and the documents on which you rely for your response.

Q.ANR:EN.1-77: Please provide any models that will be used to estimate the release of tritium. Provide all supporting documents.

Q.ANR:EN.1-78: On page 10 line 4 of your sworn affidavit you reference the ground water remediation plan. What does that plan entail? Produce all documents relating to this plan and documents on which you rely to determine that the ground water would be sufficiently remediated.

Q.ANR:EN.1-79: How do you plan to reduce tritium levels in groundwater at the site? Provide documents on which you rely.

Q.ANR:EN.1-80: What remedies are presently being used and put into place to contain and remove the released tritium? What tritium removal methods is Entergy VY planning to institute in the future? Please provide all documents retaining to this information.

Q.ANR:EN.1-81: Identify any remedies used or will be used by Entergy VY to contain tritium and any data pertaining to their success rates as used in the field. Please provide any and all other documents on which you rely for your response.

Q.ANR:EN.1-82: Regarding the removal of groundwater referred to in page 10 lines 9-10 of your sworn affidavit: how are you going to complete this phase of the remediation process? Explain methods and plans for removal; produce documents, plans, drawings, maps, etc. relating to this groundwater removal.

Q.ANR:EN.1-83: Produce data from the six wells listed on page II lines 5-6 of your sworn affidavit. Give lay summary of the results from the tests on these wells and produce all documents on which you rely for your response.

Q.ANR:EN.1-84: Please provide the results for each of the gamma-emitting radioisotopes identified in response to question 5.

Q.ANR:EN.1-85: Identify the equipment used to measure or evaluate the samples taken on January 10, 2010.

Q.ANR:EN.1-86: What is the significance, import, or meaning, of the claim that the levels detected on the January 10, 2010 samples are below those that can be measured on portable equipment?

Q.ANR:EN.1-89: What equipment did VY use to detect the samples taken in 1993 around the Protected Area at the VY Station?

Q.ANR:EN.1-90: What was the cause of the levels of CO-60 in the amount of $3.8E-8$ uCi/gm, and CS-137 in the amount of $3.7E-7$ uCi/gm taken in 1993?

Q.ANR:EN.1-91: What is the basis for the opinion that the eleven soil samples that contain trace amounts of radionuclides are not related to the tritium leak?

DPS Discovery Requests

Q.DPS:EN.1-1: The Nuclear Power Industry has agreed to implement the Nuclear Energy Institute (NEI) "Industry Ground Water Protection Initiative - Final Guidance Document" NEI 07-07 [Final] dated August 2007 (GPI). Please produce the initial plan and schedule on how Entergy would meet the objectives of the GPI at the Vermont Yankee Nuclear Power Station ("VY").

Q.DPS:EN.1-2: Please specify in detail the progress Entergy made in implementing the GPI at VY up until the discovery of elevated tritium in a ground water sampling well in January 2010.

Q.DPS:EN.1-3: Under the GPI, if additional test wells other than the three placed into service in 2007 were to be installed prior to January 2010 at VY, please explain in detail why their installation was postponed.

Q.DPS:EN.1-4: What other parts of the GPI plan for VY were not implemented on schedule prior to January 2010? Please explain in detail why implementation was not accomplished.

Q.DPS:EN.1-5: Please provide the Entergy plan and schedule to accomplish all the objectives of the GPI at VY since the discovery of the tritium in the sampling well in January 2010.

NEC Discovery Requests

Q.NEC:EN.1-1: Please explain why lab results on a sample taken November 17, 2009, which indicated elevated levels of tritium, were not received at Entergy VY until January 6, 2010.

Q.NEC:EN.1-2: Please explain why and/or how Entergy VY was able to perform confirmatory analyses within 24 hours of receiving the results of the sample taken November 17, 2009 (See pg. 3 of 13, line 11-13: sampling taken January 6th with reporting to regulators on January 7th).

Q.NEC:EN.1-3: Did Entergy VY perform an analysis or radiological measurement of a sample or samples from well GZ-3 prior to January 6, 2010?

- a. If not, why not?
- b. If so, please provide the results of those analyses and all relevant working documents (for example, correspondence, logs, notes, work orders, plans, condition reports, quality assurance reports, protocols, manuals, templates, meeting agendas and minutes, instrument printouts, etc).

Q.NEC:EN.1-4: Please provide installation dates and all sampling dates, lab results, and working documents (for example, correspondence, logs, notes, work orders, plans, condition reports, quality assurance reports, protocols, manuals, templates, meeting agendas and minutes, instrument printouts, etc) for wells GZ-1, GZ-2 and GZ-3.

- a. Are wells GZ-1, GZ-2 and GZ-3 sampled in sequence? If not, please explain why not.

Q.NEC:EN.1-5: Did Entergy VY take any other groundwater and/or drinking water samples for purposes of radiological measurement and/or analyses between August 1, 2009 and January 6, 2010?

- a. If not, why not?
- b. If so, please provide the location the sample was taken and the results of those analyses and all relevant working documents (for example, correspondence, logs, notes, work orders, plans, condition reports, quality assurance reports, protocols, manuals, templates, meeting agendas and minutes, instrument printouts, etc).

Q.NEC:EN.1-6: Please provide all documents regarding the siting, drilling, and sampling of groundwater test wells at the Vermont Yankee site since 2002.

Q.NEC:EN.1-7: Were borings (soils brought to the surface during drilling) from any test wells in the GZ series subjected to radiological measurement and/or analysis?

- a. If not, why not?
- b. If so, please provide the results of the testing and all relevant working documents (for example, correspondence, logs, notes, work orders, plans, condition reports, quality assurance reports, protocols, manuals, templates, meeting agendas and minutes, instrument printouts, etc).

Q.NEC:EN.1-8: Were workers engaged in AOG vicinity excavations in response to the tritium leak at any time obliged to wear radiation protective gear, such as gloves, booties, suits, head-covering, and or respirators or filter-masks?

- a. If so, why and which ones? If not, why not?
- b. Does Entergy VY agree that risk from radiation dose is cumulative and therefore it is desirable to minimize exposures where practicable?
- c. Does Entergy agree that exposure to background radiation may have negative health consequences?
- d. Does Entergy agree that exposure to any amount of radiation over and above background radiation may have negative health consequences?

Q.NEC:EN.1-9: Please provide copies of all currently valid or in-use Entergy aging management programs for underground, below-grade, subterranean, and/or buried piping.

Q.NEC:EN.1-10: At page 4 of 13 of Mr. Mitchell's affidavit, lines 11-19, it states, "The investigation team systematically evaluated potential sources of tritium leakage from various plant systems, structures, and components. These included:

- the condensate tank
 - various pipe trenches (which may also be referenced as pipe "tunnels" since they are enclosed on all sides)
 - electrical raceways
 - the AOG system; and
 - the radwaste systems
- a. What made the team's evaluation of potential sources "systematic"? Please fully e "systematic" evaluation and provide all documents generated in support of the "systematic" evaluation.

- b. How and when were priorities for examination of various systems, structures, and components (“SSC”) determined? Please provide all documents generated in support of determining search priorities for locating the source of the leak.
- c. Where in the list of priorities for purposes of scheduling, allocations of resources, and so on, did the condensate tank and AOG system rank? Please document your response.
- d. Please explain why Entergy VY did not investigate the AOG and condensate tank and the immediate vicinity of each until a groundwater monitoring well was drilled in that vicinity on February 6, 2010 – one month after the tritium matter was brought to Entergy VY’s attention.
- e. Mr. Mitchell’s Answer 8 on page 4 of his affidavit stated that the five above-quoted SSCs were considered “potential sources of tritium leakage.” Please explain the pathways by which water might reasonably be expected to become contaminated with radionuclides from each of the SSCs listed above. Please provide any schematics, drawings, and/or photographs that Entergy may have in its possession to illustrate your answer.
- f. Mr. Mitchell states that the “potential sources of tritium leakage” that were investigated include “various pipe trenches”. Please identify the location of all pipe trenches evaluated as part of the investigation, and all pipes that are in those trenches, as well as all materials (whether radionuclides or otherwise), contaminants, chemicals or other items or substances those pipes contain. Please provide all documents relevant to your answer.

Q.NEC:EN.1-11: How are pipe tunnels or trenches accessed for inspection, maintenance and/or repairs?

- a. Why weren’t the various pipe tunnels that Mr. Mitchell considered “potential sources of tritium leakage”, including the AOG pipe tunnel, examined prior to drilling additional test wells or excavating the AOG area in the search for the leak? Please provide any documents relevant to your answer.

Q.NEC:EN.1-12: Please provide all work orders, condition reports, quality assurance documents, radiation survey reports, contractor estimates, communications, meeting minutes, agendas, and notes and schedules generated in connection with the 18’X10’X15’ AOG excavation referenced by Mr. Mitchell on P. 5 of 13, lines 7-8 of his affidavit.

Q.NEC:EN.1-13: NEC understands that certain radionuclides, other than tritium, were found as a result or in connection with the AOG excavation. Please fully characterize these radionuclides as to isotope and concentration.

- a. Have any of these isotopes been found in comparable concentrations at any other time and location in the Vermont Yankee environs (outdoors, in soil, in sediment, on surfaces, in basements, drains, piping tunnels and conduits)?
- b. Please provide all documentation relevant to your answer.

Q.NEC:EN.1-14: Mr. Mitchell notes that the AOG pipe tunnel contained a drain that was clogged by “construction debris”. Please fully characterize the “construction debris” blocking the AOG tunnel drain.

- a. How and where was this debris disposed of after it was cleared?
- b. Please provide any photos in your possession of the “construction debris” and the drain that was clogged.
- c. Was the construction debris radiologically surveyed? If so, what was the result of that survey? Please document.

Q.NEC:EN.1-15: Please provide the number and location of all drains existing in pipe tunnels at the VY station.

- a. Please indicate whether or not these drains are clogged, and how Entergy has determined this information.
- b. Please explain how Entergy has addressed, or plans to address, the potential for these drains to be or become clogged.
- c. Does Entergy have plans to investigate and address potential clogging or the existence of construction debris in other pipe tunnels? If so, please provide those plans and all relevant documentation.

Q.NEC:EN.1-16: Were any of the identified leaking AOG condensate lines (which Mr. Mitchell describes as the Alpha and Bravo lines) inspected in the last ten years? If not, why not? If so, please provide the results of those inspections and all relevant documents that support your answer.

- a. If they were inspected, for what purpose were they inspected?
- b. Were the results of any such inspections submitted to any regulatory agency? Please document.
- c. Has Entergy ever inspected the AOG drain lines and AOG pipe tunnel? If not, why not? If so, please provide all documents relevant to the inspection(s).
- d. What is the material condition of the AOG piping?

- e. Will Entergy VY replace the AOG piping? If so, when and to what extent?

Q.NEC:EN.1-17: On Page 8 of 13, in Answer 10, Mr. Mitchell has listed several “improvements” in the form of a six-point program that Entergy VY will undertake to respond to the tritium leak at Vermont Yankee. Please explain how any of the measures Entergy proposes to undertake will help prevent new leaks in the near term.

- a. To what extent has Entergy completed the “assessment and scoping efforts” for these improvements, which Mr. Mitchell stated on Page 8, Line 20 “are underway”? Please provide any documents generated in support of your efforts.
- b. To what extent are the six-point program and the bulleted improvements under consideration (page 8, lines 9-19) duplicative of actions and considerations in the NEI groundwater initiative that initially spurred installation of the Vermont Yankee test wells?

Q.NEC:EN.1-18: On Page 9, in Answer 11, Mr. Mitchell states that Entergy VY took core-bore samples near the AOG pipe tunnel to test for radionuclides. Please describe the extent, methodology, and individual results of the “core-bore samples” testing and any other radiological sampling, testing, and analysis performed in response to the discovery of Co-60 and Cs-137 in soil near the AOG pipe tunnel at the interface leak point (described on lines 20-22). Please describe the locations and spatial frequency of the sampling.

- a. Was dispersal of these radionuclides aggravated by the excavation and/or other tritium leak search related activities?
- b. Please describe in detail the protocols, manuals, and/or codes Entergy intends to employ in its “detailed characterization of the contaminated soil” (p. 10, line 6) (for example RESRAD, MARSSIM, or some other protocol, code or manual).
- c. Does Entergy plan to reconcile its “detailed characterization” with dose or risk standards contained in NRC guidance or prescribed by NRC for decommissioning? If so, please explain how. If not, why not?

Q.NEC:EN.1-19: What is the total (or estimated) volume of fluid that leaked from the AOG drain lines?

- a. Was the fluid in the AOG lines under pressure at any time during the leak episode? If so, for what duration and at what nominal pressure?

Q.NEC:EN.1-20: On Page 10, lines 14-15 of Mr. Mitchell’s affidavit he states that Entergy VY will “pump out groundwater from an extraction well in the area affected by the leak.” Does Entergy anticipate that creating a low pressure zone through groundwater pumping will draw water to the low pressure zone from the north and west - that is from areas up-gradient of the pumping? Please provide any analysis that Entergy may have performed in this regard.

Q.NEC:EN.1-21: What steps did Entergy take, between January 6, 2010 and February 15, 2010; and between February 15 and March 31, 2010, to mitigate or lessen the tritium leak or the amount of tritium entering the groundwater at the VY site?

Q.NEC:EN.1-22: Is it Entergy VY's belief that the fluid leaking from the AOG pipe trench consisted entirely of condensate from the AOG drain lines?

- a. Is it possible that the leak contained material that did not originate as AOG condensate? Please explain and provide documentation.

Q.NEC:EN.1-23: Admit that one means of slowing or stopping the flow of fluid or tritium from the identified leak points would have been to shut down and depressurize the entire system?

- a. Why wasn't this done? Please provide all relevant documentation supporting your answer.

Q.NEC:EN.1-24: Admit that, all other things remaining equal (including the amount of time it took to find the source of the leak), if the plant had been shut down as soon as the tritium leaks were detected, less tritium would have been emitted into the soil and groundwater at VY.

Q.NEC:EN.1-25: The pathways to soil from the leaks were described, by Mr. Mitchell on Page 6 of 13 in Answer 8, as a void at "an interface or junction point... of the AOG pipe tunnel... where the pipe tunnel connects with a concrete-encasement..." as well as "a crack in the concrete surrounding the 2-inch condensate drain concrete encasement line."

- a. How many similar interface junction points exist in pipe trenches at VY?
- b. Please provide the location and current status (i.e. whether a void or crack exists) for every interface junction point and/or concrete encasement line, whether in a pipe tunnel or otherwise underground, at VY. Please provide the basis for determining this information and document your answer.
- c. Please explain how Entergy has addressed, or plans to address, the potential for these areas to form cracks or voids.

Q.NEC:EN.1-26: The source of the tritium leak has been described, by Mr. Mitchell, as "a steam leak from the Bravo drain line," and a "dime-sized hole in the Alpha drain line."

- a. Please explain what Entergy has determined to be the cause of the steam leak and dime-sized hole in the drain lines. Please provide all relevant documentation.
- b. How long has the dime-sized hole existed in the Alpha drain line? Please provide the basis for this information.
- c. Please explain how Entergy has addressed, or plans to address, the potential for these holes to form in pipes.

Q.NEC:EN.1-27: Please provide a description of the AOG pipe tunnel and associated piping as follows:

- a. What is the length of the AOG pipe tunnel?
- b. Please provide a complete list of all pipes contained in the AOG pipe tunnel.
- c. How many lines (pipes) in total are located in the leak affected section of the AOG pipe tunnel?
- d. Please describe the number, size, thickness, condition, contents, path, purpose and physical condition of the lines (pipes) in the affected section of pipe tunnel that carry radionuclides.
- e. What are pH levels of the fluid in the pipes that carry radionuclides in the AOG pipe tunnel?
- f. Please provide scale section drawings showing the location of the pipes within the affected area of the AOG piping tunnel.
- g. What means are used by Entergy to inspect these pipes?
- h. When, prior to January 7, 2010, was the most recent inspection of the AOG pipe tunnel performed? Was the inspection subjected to quality review? Please provide the relevant documents.
- i. Please describe the chemistry of “process” condensate, water, steam, or gas in the pipes that carry radionuclides in the AOG pipe tunnel?
- j. Please describe the radiological content of “process” condensate, water, steam, or gas in the pipes that carry radionuclides in the AOG pipe tunnel?
- k. Is the AOG pipe tunnel fitted with hatches, man-ways, or other fixtures that make it accessible for direct visual inspection?
- l. Is there at any point in the AOG treatment process the potential for service water to mix with fluids in the AOG piping; through a leaking cooler or condenser for example?

Q.NEC:EN.1-28: Please provide a description of the condensate tank and associated piping as follows:

- a. What is the length and course of the pipe tunnel or tunnels associated with the condensate tank?

- b. How many lines (pipes) in total are located in the associated pipe tunnel or tunnels?
- c. Please describe the number, size, thickness, condition, contents, path, purpose and physical condition of the lines (pipes) and associated pipe tunnel or tunnels that carry radionuclides.
- d. What means are used by Entergy to inspect these pipes?
- e. Is any part of the condensate tank itself below grade or configured in such a way that it is not accessible for visual examination?
- f. When, prior to January 7, 2010, was the most recent inspection the condensate tank and associated SSC's performed? Was the inspection subjected to quality review? Please provide the relevant documents.
- g. Please describe the chemistry of "process" condensate, water, steam, or gas in pipes associated with the condensate tank that carry radionuclides.
- h. What are pH levels of the fluid in the pipes associated with the condensate tank that carry radionuclides?
- i. Please describe the radiological content of "process" condensate, water, steam, or gas in pipes associated with the condensate tank that carry radionuclides
- j. Is the condensate tank pipe tunnel fitted with hatches, man-ways, or other fixtures that make it accessible for direct visual inspection?
- k. Is there at any point in the condensing process the potential for service water to mix with fluids in the condensate piping (through a leaking cooler or condenser for example)?

Q.NEC:EN.1-29: On page 8 of 12, line 6 of his affidavit, Mr. Trask stated that Entergy considers the two identified pathways to soil to be a single leak source. Please explain how these two separate points of concrete failure – the void at the interface of the AOG pipe tunnel and the crack surrounding the concrete encasement line – are related.

- a. What has Entergy determined to be the cause of each of these points of failure?

Q.NEC:EN.1-30: Exhibit EN-TT-5 provides only 2 color copies of photographs taken of the excavated area next to the AOG pipe tunnel. Please provide all photographs taken of the pipe tunnel, as well as any and all photographs taken as part of the investigation into the tritium leaks at VY.

- a. Please provide all video footage taken as part of the tritium leak investigation at VY.

Q.NEC:EN.1-31: On Page 9 of his affidavit, Mr. Trask states that as of March 31, 2010 “the remote inspections have not yet been able to conclusively establish the location or size of the leak in the Bravo drain line.

- a. Has Entergy VY determined the location and size of the leak in the “Bravo” drain line as of this interrogatory? If so, please provide all information on the location, size and cause of the leak in the “Bravo” drain line, as well as any photos or communications relevant to finding that leak.
- b. If not, what action(s) is Entergy VY undertaking to conclusively establish the location and size of the leak in the Bravo drain line? Please provide all documents and correspondence relevant to this effort.

Q.NEC:EN.1-33: Admit that the presence of tritium in fish present in the Connecticut River may increase over time due to bioaccumulation.

Q.NEC:EN.1-34: In Answer 8 on page 4, Mr. Hardy states at lines 18-19 that a low energy beta particle cannot penetrate the [human] skin. How does this apply to radiation dose or exposure from ingestion of tritiated water or inhalation of tritium gas?

- a. Does Mr. Hardy have any information regarding what a beta particle from tritium can and cannot penetrate once tritium is inhaled or ingested? Please provide this information, and the basis for Mr. Hardy’s testimony.

Q.NEC:EN.1-35: On page 7, in Answer 11, Mr. Hardy states “(Page 1 of Exhibit EN-JH-5 shows two positive results for groundwater monitoring well GZ-1 on January 18, 2010 that were subsequently determined to be false positives due to laboratory error...)” Please explain Entergy’s process for subsequent determination of a “false positive.”

- a. Were confirmatory samples taken and analyses performed? If so please provide documentation.

Q.NEC:EN.1-36: Exhibit EN-MS-4 supposedly depicts the extent of the tritium plume resulting from the leaks. What is the volume of soil within this identified plume area, above the level of the silt layer depicted on Exhibit EN-MS-2? Please provide an explanation for this calculation.

Q.NEC:EN.1-37: On page 3 in Answer 5, Mr. Tkatch describes the soil sampling and testing that was undertaken at VY, which included core-bore samples.

- a. What is Entergy’s rationale for sampling at the surface, then two, four, and six feet? Were samples at any time combined prior to analysis? Please explain and provide documentation.

- b. Has the presence of the detected radionuclides (described on page 3, lines 4-7) at any time previously been detected in the vicinity of the AOG? Please document your answer.
- c. Were similar core bore samples previously taken elsewhere on site? If so, please describe the circumstances and provide documentation of the process and the results.

Q.NEC:EN.1-38: On page 4 in Answer 7, lines 7-8 Mr. Tkatch states that sampling was performed “in 1993 around the Protected Area at the VY Station...” Please provide documentation of the sampling Mr. Tkatch referred to and the results of that analysis.

- a. If the information obtained through the 1993 sampling has been incorporated or considered in decommissioning estimates, please show where and how this was done. Please provide the relevant documents.

Q.NEC:EN.1-39: Please provide any documents, including all correspondence, meeting minutes, notes, reports, etc. filed or shared or exchanged with the US Nuclear Regulatory Commission regarding tritium leak(s) and/or aging management and material condition of buried or underground piping, and/or AOG and/or condensate tank since August 1, 2009.

Q.NEC:EN.1-40: Please provide any documents, including all correspondence, meeting minutes, notes, reports, etc. filed or shared or exchanged between Entergy VY, Entergy, Inc. and/or Entergy Nuclear Operations regarding tritium leak(s) and/or aging management and material condition of buried or underground piping, and/or AOG and/or condensate tank since August 1, 2009.

Q.NEC:EN.1-41: Please provide any documents, including all correspondence, meeting minutes, notes, reports, etc. filed or shared or exchanged with any contractor, consultant, or nuclear trade organization (such as the Nuclear Energy Institute or the Institute of Nuclear Power Operations or the Boiling Water Reactor Owners Group), regarding tritium leak(s) and/or aging management and material condition of buried or underground piping, and/or aging management of AOG and/or condensate tank since August 1, 2009.

Q.NEC:EN.1-42: Please provide the total amount of soil that has been affected (or the total amount that may have been affected) by the recent leaks identified at Vermont Yankee, as well as the basis for this calculation. For purposes of this question, the term “affected” means soils that have been in contact with water containing contaminants (including tritium and/or other radionuclides or other chemicals) released during the leak incident.

- a. If soil will be removed from the site, where will the soil be removed to?
- b. Please provide the estimated cost (per cubic foot) of removing the soil affected by the leak at VY.

- c. Please provide the estimated cost (per cubic foot) of disposing of the soil affected by the leak at VY.
- d. Please provide the estimated cost of radiologically characterizing the soil (per cubic foot) at the time of decommissioning.

WRC Discovery Requests

Q.WRC:EN.1-1: The prefiled testimony of Timothy Mitchell dated March 31, 2010 (page 3, line 4), identifies the date of an initial ground water sampling as November 17, 2009, and identifies the date the results were received as January 6, 2010. He identifies subsequent results from Entergy's own confirmatory tests as having been available much faster.

- i) Please describe why there was an extended delay between the November 17, 2009 sampling, and the date the test results were obtained (approximately 50 days).
- ii) Is there a process now in place to obtain test results in a timelier manner?
 - (1) Please explain this process, and provide assurances that future test results will be delivered in a timely manner.
- iii) What was the date of the most recent sampling prior to November 17, 2009?

Q.WRC:EN.1-2: Timothy Trask states that the pipe tunnel where the leak of tritium was discovered encases "various lines" (PWT, March 31, 2010, page 6, line 14).

- i) How many lines are in the tunnel?
- ii) How many of those lines carry material that contains radionuclides?
- iii) Please identify the specific material transported through each line.
- iv) Please identify the material used to construct each line.

Q.WRC:EN.1-3: Graphics released publicly by Entergy depict a water leak and a steam leak from pipes marked 154-A (water) and 154 - B (steam) in a concrete tunnel. The testimony of Timothy Mitchell appears to identify a steam leak from the Bravo line with pooling water in the tunnel (PWT, March 31,2010, page 5, line 15), and an approximately dime sized hole in the Alpha line (PWT, March 31,2010, page 7, line 10). Please distinguish between water and steam leaks, and state why one pipe would leak steam, and the redundant pipe would leak water, if that is the case. If we are misinterpreting the testimony and graphics, please clarify.

Q.WRC:EN.1-4: The graphic labeled as EN-TT-4 shows a green pipe labeled as the "AOG Drain."

- i) Is this pipe in direct contact with soil?
- ii) Is this pipe designed to carry radionuclides?
- iii) What material is this pipe is made of?

Q.WRC:EN.1-5: The testimony of Mr. Trask states the Alpha drain line that had been returned to service on February 14, 2010 was later inspected by an ROV equipped with a video camera, and was found to contain “an approximately dime sized hole” (PWT, March 31, 2010, page 8, line 15)

- i) What was the date of this video inspection?
- ii) Was the pipe in service at the time of the inspection?
 - (1) If so, for how many days had the pipe been in service?
- iii) Was this pipe in service at any point between the sample date of November 17, 2009, and February 14, 2010 when it replaced the Bravo line?
- iv) What actions did plant operators take upon discovering a second leak in the same tunnel?

Q.WRC:EN.1-6: Mr Trask stated “VY has made temporary modifications to the Alpha and Bravo drain systems, placing new lines that run to floor drain lines that connect directly to the Rad Waste Building. The Alpha and Bravo lines in the AOG pipe tunnel have both been isolated and their use discontinued.” (PWT, page 9, line 19). On what date were the Alpha and Bravo lines isolated and the alternate lines placed in service?

Q.WRC:EN.1-7: Please identify the cause of the leaks in each pipe, and identify what steps have been taken to immediately identify and prevent such leaks in other pipes,

- i) Have the leaking pipes been forensically inspected?
- ii) Will a detailed report of the cause of pipe failure be available to the public?
- iii) If Entergy does plan to provide a public report on the cause of pipe failure, how, when, and to whom will it be distributed?
- iv) Please describe the intended inspection process.

Q.WRC:EN.1-8: Please provide any available photographs of the elements identified in prefled written testimony and listed below. If there are multiple photographs available, please provide a sufficient collection of images to adequately depict the structure or element. If still images are not available, but remotely obtained video images are, please provide frame captures or screen grabs sufficient to identify the requested element, or alternatively provide video files. The intent of this question is to secure sufficient visual material for the parties and public to understand the structures and structural materials, the relationship between structures, and where damage or construction anomalies exist, the nature of the damage or anomaly. We greatly appreciate the clear graphics previously offered by Entergy as exhibits, and would like that material supplemented by photographic evidence. If specific photographs or video do not exist, please state that.

- i) Exterior images of the concrete tunnel containing the leaking pipes
- ii) Interior images of the concrete tunnel containing the leaking pipes
- iii) Images of the drain inside the tunnel, including images of the blockage and pooled water, and images of the drain after it was cleared.
- iv) Images of the leak identified in the Alpha drain line (discussed in PWT of Timothy Trask March 31, 2010, page 8, line 20)
- v) Images of the leak in the Bravo drain line, if it has been identified visually
- vi) Images of the actual pipe damage that is believed to have been responsible for the leaks in the Alpha and Bravo lines.
- vii) Exterior images of the drain line depicted in exhibit EN -TT-4 as a green pipe labeled "AOG Drain."
- viii) Images of the interior and exterior of the pipe tunnel where a concrete encased, 2-inch drain line interfaced with the AOG pipe tunnel (PWT of Timothy Trask, March 31, page 7, line 14, and PWT of Timothy Mitchell, March 31, page 6, line n)
- ix) Images of what has been identified as a "second, less significant pathway to soil" (PWT of Timothy Mitchell, March 31, 2010, page 6, line 16)
- x) Images of the concrete blocks prior to removal from along the pipe tunnel, and the void used to introduce the ROV into the tunnel (PWT of Timothy Mitchell, March 31, 2010, page 7, line 8)
- xi) Images of any additional anomalies, damage, or leaks that have been identified, and images of any other component, structure, or system that will assist the public in understanding the structures and systems.

Q.WRC:EN.1-9: The affidavit of Jeffery Hardy mentions that the Kepner-Tregoe problem analysis method was used to assist in defining appropriate corrective action (Affidavit of Jeffery Hardy, February 3, 2010, page 4, paragraph 13).

- i) Is this a standard analysis tool used by Entergy and/or Vermont Yankee?
- ii) Was the possibility of shutting the plant down considered through this decision making model at any point(s), and if so was it considered as a strategic objective or an operational objective?

- iii) Please discuss the relative value assigned to continued operation and shutting down, and how those values were applied to the model.
- iv) Did the profitability of continued operation enter into the decision making process, and if so was it considered as a strategic objective or an operational objective?
- v) Did the cost associated with continued leak-flow and leak remediation enter into the decision making process, and if so was it considered as a strategic objective or an operational objective?
- vi) Did the balance between continued operation and ceasing operation change when the test results showed increasing concentrations of tritium? Please explain.

Q.WRC:EN.1-10: In defining a remediation strategy for the tritium leak, Mr. Mitchell has described a process of soil and water removal (PWT dated March 31, 2010, page 9, line 18).

- i) Is the removal of soil and water considered an operational expense?
- ii) Are the current costs of removing contaminated soil and water going to be completely paid for with operating funds? If not, please explain what funds will be used.
- iv) Does Entergy, ENVY, ENO, or any other subsidiary maintain insurance that will provide payments for remediation of this or future leaks?

Q.WRC:EN.1-11: When asked if the tritium leakage will affect the cost of decommissioning, Mr. Mitchell stated the following: "We do not believe there should be any material effect since we are taking remediation measures now. However, the results of the current remediation effort will be reviewed in the preparation of the next decommissioning-cost study as will the adequacy of the current funding estimate for groundwater and soil remediation." (PWT of Timothy Mitchell dated March 31, 2010, page 12, line 4).

- i) Please identify exactly what expenses or what types of leak related remediation expenses will be borne by the decommissioning fund.
- ii) If your answer is dependent on a period of license extension beyond March 21, 2012, or if your answer assumes the use of SAFSTOR, please state the effect that license termination on March 21, 2012, and the inability to use SAFSTOR, would have on decommissioning costs related to this leak.
- iii) Please identify when the next decommissioning cost study will be prepared.

Q.WRC:EN.1-12: The prefiled testimony of Timothy Mitchell indicates that the "Tritium Team" recognized from industry experience that "these types of leaks" could be small and take months to find, and states "We proceeded with urgency working seven days a week" (PWT of

Timothy Mitchell, March 31, 2010, Page 4, line 1). Was the “Tritium Team” aware of any industry experience that leaks might not be small?

Q.WRC:EN.1-13: Have there been leaks of radionuclides from either buried or underground pipes at other Entergy plants? Please describe any leaks that have occurred, the cause of each (if known), and how each was remediated including the costs. The purpose of this question is to assist the parties and the public to understand the recent ENVY leak relative to industry experience.

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