

**Summary Notes of the NRR
Public Meetings on Groundwater Contamination at Nuclear Power Plants
April 19th and 20th, 2010**

The below notes cover the key points and highlights from the two public meetings associated with the 2010 GROUNDWATER CONTAMINATION TASK FORCE tasked by the Executive Director for Operations in the 5 March, 2010 Groundwater Task Force Charter.

**KEY POINTS & HIGHLIGHTS OF GROUNDWATER CONTAMINATION WORKSHOP
April 19, 2010**

Recommendations

- Consider/revisit the NRC's policy on conducting independent split samples in response to ongoing tritium leaks. [This was a takeaway by Sam C.]
- Conduct another public meeting when the results of the GW Task Force are complete (this would involve Chuck Casto and could be coupled with the upcoming AAM in mid-to-late-June timeframe).

Observations

- The NRC never responds to issues raised by the public at these kinds of meetings [B. Mallet promised to return and discuss the GW Task Force results]
- The NEI Initiative is too weak. There should be a better way of detecting leaks rather than waiting for the water to make its way to a monitoring well. There needs to be more wells; more frequent sampling and the samples need to be processed more quickly.
- ROP is flawed. It didn't anticipate leaks at VY, despite years of "low risk" high profile events at VY because it doesn't trend issues over a longer period of time. The ROP is not predictive and does not look at long term trends [This was a takeaway by Sam C.]
- NRC relies too much on self-reporting in lieu of direct observation/inspection
- NRC oversight of tritium released to groundwater is inadequate since this is a public health issue.
- NRC regulations don't require preventing leaks/accidental discharges and NRC doesn't enforce the regulations it has.
- NRC should not allow natural attenuation as a remediation alternative.
- NRC should have better requirements for detecting or preventing leaks.... better than detecting the leak in wells after they've occurred.

- Less than detectable amounts of tritium in the Connecticut River do not mean that the release is safe. NRC should understand the exact amount of radioisotopes going into the river.
- The NRC knew about the underground pipes and did nothing. This is a trust and confidence issue.
- There is a lack of transparency with the NRC and there is no trust in the NRC or its regulations.
- Information [specifically licensee RCAs] regarding health and safety are withheld from the public. [B. Mallet promised to investigate]
- Trust has been broken. We can't believe you when you tell us there's no risk from the tritium since you didn't correct the information about underground piping. NRC doesn't believe the research that shows all radiation is bad.
- The NRC is too closely tied to the nuclear industry.
- Profits trump over safety and as a mature industry, the nuclear industry should be better run and regulated.
- The VT State legislature cannot make informed and irreversible decisions because federal preemption allows the rules to be changed after the legislature has made their decisions, example include:
 - Were told that high level waste would only be stored onsite for 20 years, but ISFSI license extension appears likely
 - Were told that the plant site would be returned to a Greenfield after cessation of operations, but it appears that the plant can be entombed for 60 years in Safestor

Unanswered Questions/Challenges

- How will the public meeting [April 19th] information be used in the regulatory review process? [B. Mallet promised to return and discuss the GW Task Force results]
- Address the assertion that NRC has turned over its regulatory oversight to the industry with the "voluntary" NEI initiative. The Task Force should address whether aspects of the voluntary initiative should be made mandatory or incorporated into regulations.
- Provide clear/understandable perspective on "legalities" associated with the recent tritium leak (i.e., what was legal vs. illegal, monitored vs. unmonitored, planned vs. unplanned - in light of John Deans' comments from Greenpeace).
- Provide perspectives on assertions made about the risks of tritium and other radionuclides (i.e., mutant cells no matter what the exposure, etc.).

- What have licensees [other than Vermont Yankee] done to prevent leaks from occurring?
- How can the NRC better allocate resources to inspecting BOP systems to ensure that problems are identified before the problems become safety issues?
- How can tritium be released to the environment and not violate NRC regulations [P. Blanch]?
- Does the NRC adequately regulate underground pipes?
- How is the licensee remediating the plume, because natural attenuation is not an acceptable solution. [Casto – there could be rulemaking to have licensees identify underground pipes carrying radioactive isotopes.]
- GDCs 60 and 64 are not being enforced
- D. Lochbaum has shown that since 1963, 102 (not 25 stated by NRC) reactors have leaked radioactivity into the ground

KEY POINTS & HIGHLIGHTS OF GROUNDWATER CONTAMINATION WORKSHOP April 20, 2010

The workshop was held at NRC Commission Briefing room on April 20, 2010 from 10:00 to 4:30 p.m. It was coordinated by NRR (Robert Nelson) and Region IV, for the purpose of obtaining perspective of external stakeholders regarding NRC's regulatory framework and planned activities involving Groundwater contamination at commercial nuclear power plants. Approximately 100 attendees participated in the workshop.

The workshop was conducted in a panel discussion style with key panelists included: Dr. J. Till (Risk Assessment Cooperation), A. Marion (NEI), Dr. W. Reece (Texas A&M Univ.), Dr. J. Abraham (Unicore Health), P. Musegaas (Riverkeeper), D. Scott (Rad. Safety and Control Service), W. Buscher (State of Ill. EPA), and A. Honnellio (U.S. EPA).

Recommendations

- Require onsite groundwater monitoring and reporting at all currently operating reactors.
- Require licensees with documented leakage incidents to affirmatively prove cessation of leaks and evaluate status/condition of all systems, structures, and components that carry radioactive fluids.
- Require licensees to submit all records pursuant to 10 CFR 50.75(g) (specifically (g)(1), (2)(3)) to the NRC for public disclosure..
- The Commission should consider carefully the risks involved with ground water contamination and make adjustments based on this risk. Moderate doses of radiation produce trivial risk and the consequences of burdensome regulation may be counterproductive to overall safety and environmental quality.
- The regulatory culture needs to be revised to address potable groundwater. Groundwater needs to be treated as a resource because it becomes a resource when it leaves the licensed property. Contaminated groundwater, although it may be below regulatory limits, has a negative impact on property values when/if the contamination leaves the licensed site. Therefore, tritium is not only a health issue, but also a "resource" issue. This reveals a significant difference in regulatory philosophy between the NRC and some other regulators.
- Groundwater monitoring should be conducted closer to the potential sources of leakage/contamination (i.e. closer to the reactor than to the site boundary). As it stands now, by the time the contamination reaches the monitoring wells it is "too late" to keep it within the site boundary.
- More monitoring wells are needed with increased testing frequency.
- Employ independent/split sampling.

- It's time for the Commission to take a new look at how we assess tritium. The last NCRP report on this topic was published in 1979. An updated review by an independent scientific organization should be performed.
- Current annual reporting under REMP: data is difficult to extract and is too old by the time it's published. The NRC needs to look at revising its reporting requirements for utilities.
- In addressing the concerns of "advocacy groups" the NRC needs to communicate to the public the "trade offs" between protection of the environment and our standard of living.
- If inaccessibility is an issue in monitoring then new methods of monitoring are needed.
- Studies on the health effects of GW contamination should come from a source sufficiently distant from the source of the contamination. Otherwise the perception will be that the study was "paid for by the polluters."
- All results of studies should be open to review by the public, including the data, the data analysis, and the modeling (per the RACER model).

Observations

- Tritium in the environment is one of the most benign radionuclides. However, public perception is huge and that is the dilemma. Focus should be on credibility, trust & respect.
- Delaying site cleanup, including groundwater remediation, until decommissioning is not appropriate.
- Communication to external stakeholders of inadvertent leaks or spills is required regardless of risk.
- Investigations are slow and cannot yield answers quickly, regardless of public pressure to provide prompt solutions.
- A groundwater protection plan, including proactive characterization of site hydrogeology and routine monitoring of groundwater quality, is a source of rational data that can relatively quickly provide a technical basis for response to leaks and spills if it is implemented before they occur.
- Effective remediation methods to control groundwater contamination: (1) source removal; (2) install impermeable lines; (3) establish hydraulic controls; and (4) increase monitoring activities.
- The public needs to be engaged in meaningful dialog including prioritizing approaches based on risk. Rules of engagement are needed. Engage with the public on meeting agendas to ensure that you understand the issue and public concerns.

- [Note: EPA offered to assist NRC in developing public outreach plans/approaches based on its extensive experience and lessons learned at RCRA & CERCLA sites.]
- The most fundamental element of public trust is the measurements that we take.
- NEPA requires NRC to look beyond public health impacts to broader environmental impacts.
- Elements of the issue: (1) public health; (2) protection of the environment; (3) trust/credibility; and (4) state of the industry/age of the plants.
- Groundwater transport modeling needs to be performed at the licensed facilities when contamination is found. Current efforts are focused on making measurements, not focused on risk assessment and not focused on modeling of the tritium contamination. By doing this current industry efforts are missing out on the bigger picture associated with tritium contamination.
- Dilution is not the solution to pollution.
- Several states have much lower allowed values for tritium in groundwater. In Illinois, the limit is 200 pCi/liter compared to the EPA drinking water limit of 20,000. It was noted by another panelist that the state of Texas would not meet this limit.
- The industry sees itself operating safely and protecting the environment, but perceives that the NRC is facing a “policy issue” with regard to how they handle tritium leaks.
- Some members of the public perceive the approach to tritium leakage as “leak first, fix later.”
- Some members of the public felt that issues of human exposure to tritium GW contamination were being trivialized. These members of the public interpreted NRC regulations as including license conditions for each plant to control and monitor effluents and that leaks must be prevented rather than fixed after the fact.
- Although the Clean Water Act does not apply to GW, certain states (e.g. NY) require that GW be potable.
- You cannot make substantial gains in credibility unless you go beyond what is expected.
- The NRC appears to treat their licensees differently than other regulators treat their regulated community (e.g. Hazwate, solid waste). Other differences include the use of technology-based effluent standards, reporting requirements and permit terms. In addition, the NRC didn’t appear to be “enforcing what’s already

on the books.” Also, most effluents have designated discharge points and it’s a violation to discharge at other locations.

- The NRC needs to engage the public on risk due to this issue, develop a rational basis for moving forward on the issue and then implement that.
- The ROP does not include inspections on this issue as part of the inspection baseline. Inspections are only increased AFTER something happens.
- We are running into limits in our ability to communicate with each other because we have different ideas about what the issues are. Some think it is only a public health issue. Others think it is a public confidence issue. The public’s interest in the issue is multi-faceted.
- Some members of the public is concerned because this issue was discovered “accidentally” in their eyes, they see little regulatory response, only voluntary initiatives, and wonder that if this happened then what else? This issue may be indicative of others.
- In the past, “public confidence” was once part of the SDP.
- Trust is gained through transparency. The industry undermines this by holding back root cause analyses, condition reports and other documentation.
- It appears that the “terms are being dictated to you, the regulator.”

Unanswered Questions/Challenges

- When was the last time a licensee was fined by NRC? There have been no fines because the NRC does not usually go through the traditional enforcement process.
- NRC has relinquished its authority in this area and needs to take it back.
- Reports on voluntary industry initiatives, root cause evaluations and condition reports are not publicly available but should be.
- NRC does not have the legal authority to permit releases of radioactivity to groundwater.
- What is the regulatory burden of increased monitoring & reporting?
- Why are nuclear power plants regulated differently from other industries re: groundwater contamination?
- Licensees with groundwater contamination are not in compliance with the GDCs and therefore not in compliance with their license.
- NRC has the power to react via enforcement but is not doing so.

- What is the real risk from ground water contamination?
- What is the likelihood of additional leaks during the extended operation of nuclear power plants?
- NRC has an “overly close” relationship with the licensee.
- There is ongoing tension between the NRC and state agencies over “preemption concerns”
- The industry is “lucky” with the experience so far with tritium leakage.

Round Table Participants in the April 20, 2010 Workshop.

Dr. John Till	Risk Assessment Corporation
Dr. John E. Abraham	Unicore Health
Phil Musegaas	Riverkeeper
Alex Marion	NEI
Dr. Dan Reece	Texas A & M
Dave Scott	Radiation Safety & Control Services
Bill Buscher	State of Illinois
Anthony Honnellio	EPA
Undine Shoop	NRC