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November 17, 2015

Cindy Bladey
Office of Administration
Mail Stop: OWFN-12-H08
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain

Docket ID NRC-2015-0051

Dear Ms. Bladey:

On behalf of the Inyo County Board of Supervisors, I thank you for the opportunity to comment on the Supplement to the U.S. Department of Energy's (DOE) Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain (SEIS). As an Affected Unit of Local Government, only a few miles down watershed from the proposed Yucca Mountain repository, the long-term health, safety and welfare of Inyo County residents is our highest concern, particularly in relation to potential contamination of ground water resources as a result of the proposed repository. We thank the Nuclear Regulatory Commission (NRC) for addressing the County's concerns regarding the Draft SEIS and the County's concerns regarding potential groundwater contamination from the proposed Repository.

NRC's National Environmental Protection Act (NEPA) regulations (10 CFR § 51.109(c)(2)) provide that it will not be practicable to adopt any EIS prepared by DOE for a geologic repository if there is "significant and substantial new information or new considerations [that would] render such environmental impact statement inadequate." As identified in these comments, such new information exists and should be analyzed in the SEIS. In addition, we believe that the final SEIS should address mitigation, remediation and groundwater monitoring to ensure that any contaminants from the repository that enter the groundwater system are detected and that the impacts, should such contamination be detected, are mitigated.

The Adoption Determination Report prepared by the NRC for the DOE's Environmental Impact Statements for the Proposed Geologic Repository at Yucca Mountain (EIS) noted that the previous EISs did not provide a complete and adequate discussion of the impacts on soils and surface materials from a potential future discharge of contaminated groundwater, and specifically noted the following items should be addressed:

- NRC Item #1 - "A description of the locations of potential natural discharge of contaminated groundwater for present and expected future wetter periods;
- NRC Item #2 - A description of the physical processes at the surface discharge locations that can affect accumulation, concentration, and potential remobilization of groundwater-borne contaminants; and,
- NRC Item #3 - Estimates of the amount of contaminants that could be deposited at or near the surface. This involves estimates of the amount of groundwater involved in discharge or near-surface evaporation, the amounts of radiological and non-radiological contaminants in that water, contaminant concentrations in the resulting deposits, and potential environmental impacts (e.g. effects on biota)."

Additionally, Inyo County raised the following concerns with regard to the previous EISs:

- Inyo Item #1 - The full extent of the lower carbonate aquifer, particularly those parts that could become contaminated and how water can leave the flow system should be described;
- Inyo Item #2 - The potential for a decrease or elimination of the upward vertical gradient beneath Yucca Mountain due to proposed future up-gradient groundwater pumping and export by the Southern Nevada Water Authority;
- Inyo Item #3 - Impacts to Endangered Species that are dependent on the springs in the region; and,
- Inyo Item #4 - Cleanup and remediation measures should be described.

Inyo County has reviewed the SEIS in collaboration with two hydrogeologist consultants, Hydrodynamics and Andy Zdon and Associates, Inc, both of whom have extensive expertise in the proposed Yucca Mountain Nuclear Repository environmental analysis completed to date, with particular emphasis on the Death Valley Regional Flow System Numerical Model (DVRFM) used to inform the EIS and SEIS. Attached hereto are the independent analyses of the SEIS prepared by each of the aforementioned consultants.

Hydrodynamics' general opinion is that both DOE and NRC have done a credible job of extending the analysis to the accessible environment as Hydrodynamics suggested in comments on the original environmental documents (see attached Memorandum). Their analysis incorporated Hydrodynamics published reports providing the results of the Lower Carbonate Aquifer (LCA) and Death Valley hydraulic studies submitted in prior comments. Hydrodynamics notes that the DOE and NRC analyses did not indicate additional problems that would make the repository more hazardous. The following key points can be made from Hydrodynamics' review.

- **Point 1:** DOE/NRC analysis suggested that pumping at Amargosa Farms would capture all of the potential contamination. When pumping was included, no contaminants made it to Death Valley. Continued pumping into the future is a reasonable assumption.
- **Point 2:** DOE/NRC analysis indicate that the upward hydraulic head gradient between the LCA and the overlying Tertiary aquifer is a barrier to radionuclide transport both in the area of the repository and in the Amargosa Farms area. Should pumping stop at the Amargosa Farms or the upward gradient be degraded and contaminants migrate to the Carbonate aquifer, radionuclide transport through the LCA into the Death Valley Furnace Creek springs will be relatively fast. The upward head gradient must be preserved into the future to protect the human and natural resources of Inyo County.
- **Point 3:** Hydrodynamics' estimate of discharge in the Furnace Creek area and the DOE's estimates do not match. However, DOE's evapotranspiration (ET) values used in the DVRFM were significantly larger than Hydrodynamics' values, and represent a worst case scenario for radionuclide transport.
- **Point 4:** DOE/NRC particle tracking and radionuclide dose models for the Death Valley Furnace Creek and lower section of Amargosa Valley areas are SMALL, and are well within EPA health standards.
- **Point 5:** DOE's FEIS does not provide a viable mitigation plan as required by the NEPA permitting process. A mitigation plan is completely absent from the NRC 2015 Supplement to DOE's EIS in a Draft Report for Comment.

Since 2010, Inyo County has worked in collaboration with the U.S. Bureau of Land Management, U.S. Geological Survey (USGS), Nye County, and other interested parties to conduct detailed and ongoing analysis of the DVRFM used to inform the EIS and SEIS. The results of these studies document substantive changes to the conceptual model presented in previous Yucca Mountain analyses by the U.S. Department of Energy and NRC. This important new work has not been considered and incorporated into the analysis presented in the SEIS. The new field work and analysis by the USGS and consultants in the Inyo County portion of the Amargosa Basin (Shoshone-Tecopa area specifically) affects the conceptual model for the Amargosa Desert – Ash Meadows area. The post-2010 field work and studies are discussed at length in the attached Andy Zdon and Associates study.

The SEIS states on page 2-6 that “[S]ome small portion of the groundwater flow from beneath Yucca Mountain may enter the Southern Death Valley Subregion to the south and east.” The attached Andy Zdon and Associates report finds that by failing to consider existing conditions and post-2010 field work and analysis, the SEIS underestimates flow from the Amargosa Desert and Ash Meadows through the Amargosa River and the aquifer into Inyo County (particularly the Shoshone area). In addition, the report shows that the conceptual model as presented in the SEIS appears to have substantial uncertainties and inconsistencies. Further, the report finds that due to the absence of consideration of new data and analysis concerning the conceptual model of the Amargosa River basin that has been conducted since 2010, the SEIS is non-responsive to NRC items #1, 2, 3 and 4. Moreover, the SEIS is also non-responsive to Inyo County’s concerns concerning the previous EISs that are identified above because of the lack of consideration of new data and analyses pertinent to the SEIS.

The Andy Zdon and Associates study also identifies deficiencies in the SEIS resulting from: (1) the DVRFM’s failure to address potential changes associated with seismic activity in the region over the one-million year planning horizon; (2) potential changes in groundwater should water rights in the Amargosa Farms area be fully exercised or if the region’s solar energy production potential is realized; (3) lack of analysis of increased groundwater pumping up gradient from Yucca Mountain that may result from groundwater pumping and water export proposed by the Southern Nevada Water Authority (SNWA) pursuant to applications to pump groundwater that were filed with the Nevada State Engineer in 1989; (4) a lack of analysis of potential impacts of the repository on endangered and threatened species, such as the Amargosa Vole, Least Bell’s Vireo; and, (5) the continued absence of a remediation plan or analysis of potential environmental impacts should remediation be implemented. Items 1 through 3 are reasonable foreseeable events, which should be considered in the analysis according to NEPA and discussion of items 4 and 5 is also required by the Act.

With regard to the proposed groundwater pumping by SNWA, such pumping is reasonably foreseeable and should be analyzed in the SEIS to describe the impacts of such regional groundwater pumping on the hydrology under and in the vicinity of the proposed repository. It is clear that SNWA’s groundwater pumping is reasonably foreseeable. The Final SEIS on page 8-46 (§8.4.2), incorporates Chapter 5 of the Rail Alignment EIS. On page 5-37(§5.2.2.6), the Rail Alignment EIS describes potential groundwater development projects—including a massive groundwater extraction and importation project by the SWNA that is located over and within the regional carbonate aquifer. The Rail Alignment EIS states that “...cumulative water use for the projects described above could total more than 430 million cubic meters (350,000 acre-feet) per year.” Some of this groundwater may be withdrawn from the LCA or from areas recharging the LCA.

Moreover, with regard to the SWNA project, the SEIS does not mention a ruling of the Nevada State Engineer (Ruling 5465, January 4, 2005) (<http://water.nv.gov/scans/rulings/5465r.pdf>), which has already granted the SNWA the right to pump 8,905 acre-feet of groundwater from the Tikapoo and Three Lakes Valley hydrographic basins as part of its regional groundwater importation project. Significantly, in Ruling 5465, the State Engineer found that groundwater in Tikapoo and Three Lakes Valleys eventually discharges through the LCA at Ash Meadows and Death Valley. Despite the scope of the SNWA project, the only assessment of impacts of the proposed project assumes that such pumping will only be 10,600 acre-ft/yr as opposed to the 350,000 acre-ft/yr described in the Rail Alignment EIS (See SEIS, p. 2-18.)

In the vicinity of Yucca Mountain, there is an upward hydraulic gradient between the LCA and the overlying volcanic aquifers. The upward gradient is important to the performance of the repository because it restricts groundwater flow and radionuclide transport pathways to overlying volcanic and alluvial aquifers and it prevents radionuclides from entering the LCA. The SEIS should analyze the potential groundwater pumping under the SNWA project to determine whether such pumping would affect the upward hydraulic gradient beneath Yucca Mountain. As identified in the attached Andy Zdon and Associates Study (page 3-18 – 3-19), a new numerical model of the regional aquifer system released by the USGS in 2014 can be used to assist in the required analysis.

Not only does SNWA’s project have the potential to affect the vital upward hydraulic gradient, but a continuation of existing groundwater pumping over the long-term could affect the gradient. The SEIS modeled the effects of maintaining 2003 pumping rates for 500 years and concluded that such pumping would not affect the hydraulic gradient (SEIS, p. 2-

28 to 2-29). In contrast, in a report done as part of the County of Inyo's assessment of the repository, Bredehoeft, J. and M. King., 2010, "Potential Contaminant Transport in the Regional Carbonate Aquifer Beneath Yucca Mountain, Nevada, USA." *Hydrogeology Journal*. Vol. 18, Issue 3. pp. 775-789, the authors found that when the Death Valley regional groundwater flow system hydrogeologic framework model (the DVRFM) developed by the U.S. Geological Survey *was run for 1000 years at 1995 groundwater pumping levels*, the model predicted drawdown of 10 meters in the lower carbonate aquifer in the vicinity of Yucca Mountain and more than 70 meters of additional drawdown in the Amargosa Valley in the next several hundred years. Given the importance of the upward hydraulic gradient, the SEIS should assess the potential impacts on the gradient of maintaining existing groundwater pumping over the long-term.

The DVRFM was used by DOE in the development of the site-scale hydrogeologic framework model (HFM2006), which in turn was used to develop the model used to simulate groundwater flow directions and flow rates of water from beneath the repository to the southern end of the controlled area boundary. The DOE's site scale model takes boundary conditions from the DVRFM. The DVRFM was calibrated to water levels observed in the mid-1990s. The model is capable of generating steady-state water levels that do not include the impacts of pumping on water levels. DOE used the steady-state water levels (that essentially excluded the impacts of a continuation of existing pumping) as the boundary condition for its hydrogeologic Site Model. Consequently, neither the predicted drawdown in the Amargosa Valley, nor the drawdown in the lower carbonate aquifer in the vicinity of Yucca Mountain that will result from a continuation of groundwater pumping at current levels in the vicinity of the repository, was considered in the SEIS's analyses of the potential impacts to upward gradient in the lower carbonate aquifer.

As noted NRC's Adoption Determination Report (Section 3.2.1.4.2), an incomplete and inadequate characterization of a potential impact constitutes a significant new consideration that renders the SEIS inadequate—irrespective of the magnitude of potential impacts.

Although the SEIS provides a discussion of potential cumulative impacts (SEIS Section 4.5.2), Inyo County believes that the SEIS fails to provide a sufficient analysis of cumulative impacts associated with the movement of contaminants through groundwater into the Amargosa desert and then into Inyo County from the proposed repository in combination with contaminants from Nevada National Security Site and/or the Beatty Low-Level Waste and Hazardous Waste Disposal Facilities (where a recent explosion caused a fire that may have released nuclear material into the atmosphere and the groundwater table). As defined in 40 CFR 1508.7, cumulative effects are those impacts that result from incremental impacts of a proposed action when added to other past, present and reasonably foreseeable future actions, regardless of whether a federal or nonfederal agency or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions that can take place over time. Actions causing cumulatively significant impacts should be examined in an EIS (40 CFR 1508.25(a)(2)). The federal courts have required that an agency take a "hard look" at the cumulative effects of a project, *Oregon Natural Resources Council v. Marsh*, 52 F. 3d 1485 (9th Cir. 1995).

The SEIS and DOE's previous EISs do not adequately address groundwater monitoring and mitigations for potential groundwater contamination affecting Inyo County communities, including Tecopa, Shoshone, and Furnace Creek. The SEIS and the previous environmental documents admit that there will be leakage of contaminants from the proposed repository. However, the SEIS and the previous EISs do not analyze mitigation and remediation measures that are necessary to protect the public health and safety and other environmental impacts from radionuclides and other contaminants leaving the repository site due to flooding or traveling through the saturated zone and surfacing within or outside of Inyo County. Rather, DOE defers mitigation and remediation planning to such time that "detection of any unusual conditions in groundwater." In addition, none of the environmental documents describe a monitoring plan that would be capable of detecting "unusual conditions in groundwater." The only commitment to monitoring is DOE statement that it will conduct monitoring activities, including monitoring groundwater quality, but no details are provided. (Final EIS, Chapter 9, p. 9-8 and 9-9.)

Procedures for monitoring existing baseline conditions and potential contamination escaping from the repository and groundwater quality through the Amargosa Basin need to be identified and analyzed in the SEIS. Monitoring procedures should also include protocols for informing affected residents of possible groundwater concerns should any contamination be detected. The SEIS should identify mitigations to prevent or minimize impacts to the health, safety and welfare of Inyo County residents, particularly to disadvantaged and Tribal communities.

The County also believes that the SEIS should provide a more robust analysis of environmental justice concerns and mitigations associated with the likelihood of disproportionate impacts to low-income communities and Native American tribes resulting from locating the repository in an area of predominantly disadvantaged communities than is provided in Section 3.4 of the SEIS. As described in the attached hydrogeological models, contaminants from the repository may impact groundwater in the communities of Furnace Creek, Shoshone and Tecopa. Groundwater contamination in and around Furnace Creek will directly impact the water in the historic home of the Timbisha-Shoshone Native American Tribe who continue to live in Death Valley. The community of Tecopa is a disadvantaged community with a 27% poverty rate. The SEIS should address environmental justice impacts for these communities which are most vulnerable to potential contamination and should address monitoring to ensure that these communities are protected.

In addition to health and safety concerns regarding potential impacts from the Yucca Mountain Repository, Inyo County is also concerned that potential groundwater contamination may also have widespread socioeconomic impacts affecting nearby residents, and Inyo County generally. Inyo County's base economic industries are agriculture and tourism, which largely supported by visitors to Death Valley National Park. As described in previously submitted comments, groundwater contamination from Yucca Mountain would irrecoverably devastate these industries and, if only a small amount of contaminates should escape from the repository, the resulting publicity would severely adversely affect tourism in Eastern Inyo County. Therefore, the SEIS inadequately analyzes socioeconomic impacts to Inyo County that would result from potential groundwater contamination.

In 2008, Inyo County contracted with economic consultants to determine the potential impacts of the Yucca Mountain Repository on the Inyo County economy¹. Their research indicated that above and beyond the financial impacts the County would realize from actual contamination, the mere existence of the Repository could stigmatize nearby areas. The impacts of this stigmatization were then modeled, and their analysis indicated that upon announcement of the Repository's operation, visitation to Death Valley National Park and vicinity will drop between 17.3 and 26.3 percent. If the Repository operates for ten years with no incident, it is estimated that the drop in visitation will be between five and 14.7 percent. If there is a transportation incident, it is estimated that visitation will drop between 29 and 57 percent. The resulting total annual losses resulting from loss of visitation to Death Valley are predicted to range from about \$32,000,000 to \$184,000,000. Predicted revenue decreases to the County range between about \$350,000 and \$4,000,000. Additional losses could occur from the diseconomies of scale and investment disincentives. As noted above, potential groundwater contamination raises similar concerns about socioeconomic effects.

Thank you again for the opportunity to comment on the DOE's SEIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain. If you have any questions, please contact the County's Administrative Officer, Kevin Carunchio, at (760) 878-0292 or kcarunchio@inyocounty.us.

Sincerely,



Supervisor Matt Kingsley, Chairperson
Inyo County Board of Supervisors

Attachments:

- 1) Bredehoeft, John, NAE, and King, Michael, R.G., C.E.G., C.HG, Memorandum Research Program for Evaluation of Yucca Mountain Nuclear Waste Repository Site, October 10th, 2015
- 2) Andy Zdon and Associates, LLC, Technical Review Summary of the Draft Supplement To U.S. Department Of Energy's Environmental Impact Statement For The Proposed Nuclear Fuel And High-Level Radioactive Waste Repository At Yucca Mountain, Nevada, October 23, 2015

¹ Gruen Gruen + Associates, *A County at Risk: The Socio-economic Impacts of the Proposed Yucca Mountain High-level Nuclear Waste Repository*, 2008.