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Dr. Jane Summerson, EIS Document Manager
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Combined comments regarding:
Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DOE/EIS-0250F-S1D)

Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada – Nevada Rail Transportation Corridor and Draft Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada (DOE/EIS-0250F-S2D and DOE/EIS-0369D)

Dear Ms. Summerson,

HOME appreciates the opportunity to comment on these supplements, and is very concerned that many across the United States were not informed regarding these significant changes to the Yucca Mountain Project. Given the extent of changes both in the repository process and national transportation scheme the Department of Energy (DOE) should have held public meetings across the country as it had for the original environmental impact process in 1999 and 2000.

We also see the 90 day comment period as inadequate for the general public to fully digest all the changes and additions of the DSEIS (we will use DSEIS to collectively refer to the National Environmental Policy Act, NEPA, documents under review here). Indeed, our organization consists of a volunteer board with experience in nuclear issues and Yucca Mountain and we were unable to fully process these documents as is needed. HOME fully supports the comments made by the State of Nevada, and adopts and incorporates those comments herein.

HOME would like to know how this supplemental Environmental Impact Statement (EIS) process fits into the NEPA process. Since the President and Congress has approved Yucca Mountain for the repository, is not the decision process that normally evolves from an EIS process mute? The process here does not appear to be a legitimate NEPA process. These supplements should have been done

before the site recommendation, and there appearance now underscores that the site recommendation was premature and the DOE continues to push on an unrealistic and unsound timeline.

Transportation Scheme

The detailed analysis of the Mina Corridor is a waste of the public's time. The DOE refers to this alignment as "not preferred," yet it is not even viable. As clearly stated in the DSEIS:

> *On April 17, 2007, the Tribal Council for the Walker River Paiute Tribe announced a resolution withdrawing support for the Tribe's participation in the EIS process. The Tribal Council based its decision on review of information gathered to that time and input from members of the tribe. The Council's resolution also renewed the Tribe's past objection to the transportation of nuclear waste through the Walker River Paiute Reservation. Accordingly, DOE has identified the Mina rail corridor and the Mina Implementing Alternative as nonpreferred in the Rail Alignment EIS. - DOE/EIS-0250F-S2D and DOE/EIS-0369D, pg S-4*

Even a nonpreferred alternative is still an alternative, and needs to be viable. The DOE has previously established a record of decision on the Caliente alignment as preferred, but renewed its interest in the Mina alignment upon a communication with the Walker River Tribe. HOME is concerned that the DOE will continue to be interested in the Mina alignment possibly reversing its previous decision regarding the Caliente alignment. We believe that is why a complete analysis was done for the Mina alignment even though the DOE knew well before releasing the rail alignment SEIS that it was not a viable alternative. Could the public get surprised much later, possibly after licensing has begun or later, with the DOE returning to the Mina alignment again? The DOE needs to address this question of viable alternative rail alignments.

Even though HOME does not see the Mina alignment as viable, if indeed the DOE can legally show that the Mina alignment is still viable, then the DOE needs to do a proper NEPA process across the country to fully inform and solicit comments on the potential for significant rerouting changes from the FIES, that assumed the waste would be shipped to southern Nevada directly and not through Northern Nevada first.

Beyond the potential for significant waste rerouting is the use of the TAD (transport aging and disposal) containers for most of the waste transport. The DOE needs to fully inform people across the country, by conducting complete NEPA hearings in at least all of the cities where hearing were held for the original EIS process in 1999 and 2000, of this change in transport containers. These containers have never been built, and to our knowledge there is no experience in using a TAD or similar containers that serves the multiple uses described. The public, across the country, needs to understand fully how these containers will be tested, and how transport using these containers will differ from using "standard" transportation casks. How does the TAD design differ form transportation casks in order to accommodate multiple functionality, and how do these changes affect the transport of the waste including safety considerations. HOME recognizes that the DSEIS contains transportation analysis with risk factors, etc., but there needs to be a discussion of the transport differences using TAD's. Alternatively, the DOE should detail the analytical results using TAD's instead of the GA-4 or other transportation casks that have been used as representative for transportation analysis – routine exposure, accidents and sabotage.

There needs to be full scale testing of the TAD container with the results given in the revised DSEIS. In the FEIS new transportation cask designs were shown, and at that time the public demanded full-scale testing, since the triangle of testing, modeling, and real-world accidents has never been fully connected. The same arguments apply to the TAD, and with even more strength since they are not typical transportation casks with little to no experience.

Back in the early 1990's the DOE had considered using a "dual-purpose" container, which appears to be very similar to the TAD. The dual-purpose container was rejected, and not in play during the NEPA process from 1995 to 2000. The DOE needs to explain why the dual-purpose container concept was dropped then, and why the DOE appears to be returning to this concept. This is another example of how the public looses any trust in the Yucca Mountain Project (YMP). Why is it that the DOE keeps making substantive changes like this? What new information exists now that was not known then that has brought the DOE back to this concept? The DSEIS needs to explain this thoroughly.

Evolving design

The DOE has stated in numerous locations in the DSEIS that the repository design is "evolving." Indeed, it has changed significantly since the FEIS was released in 2002. Had the Walker River Tribe not rejected the DOE's rail alignment plan there would have been a very different transportation profile. The development of a very large irradiated nuclear fuel (INF) aging pad is also a big departure, which could be a defacto dry cask storage facility. It is not clear that such a large storage facility is needed. If the oldest fuel is shipped first, as it should be, then could not strategic packing of this fuel as it arrives achieve the desired temperature profile in the drifts? The use of the TAD's is also a notable difference. Will there be further substantive changes during licensing and beyond?

There is also an enormous expansion in the inventory of Module 1, which would double the capacity of the repository. Currently the public expects a much smaller repository, and by law Module 1 and 2 are not viable. Why does the DOE continue to include these options? How does the DOE propose that these modules would be viable? Is there a plan to change the Nuclear Waste Policy Act? If so, the DOE needs to fully discuss this prospect, and if not, Modules 1 and 2 should be removed from the EIS as they are not viable.

A clear picture of the repository and all the accompanying process is needed to fulfill the goals of NEPA. As pointed out above the DSEIS is far from a "supplement." Exposure assumptions have been changed yielding dramatically different exposure versus time results. The DOE must finalize this plan through NEPA before and not after licensing is initiated. In 2002, the President and Congress approved of the project based on the FEIS, but now we are seeing a much-changed YMP. The FEIS was in a sense a fraud on the President, Congress, and the American people. Is this new EIS going to be a tossed out too as the DOE learns more? When will the public be able to review a final plan?

Over the years the public has seen citing rules evolve away, and the Environmental Protection Agency (EPA) radiation protection standard evolve into a much different regulation. In our view, the DOE is still not ready to move forward to license Yucca Mountain. HOME sees the DOE as acting in whatever way possible to move the YMP forward regardless of what the data indicates about the site. As new hurdles arise, the most recent being new proposed EPA radiation protection standard, the DOE seems to look for way s to adjust the dose calculations to show compliance despite the reality of

the site itself. HOME understands there are political pressures on the DOE to move forward, but it must act in the best interest of the public and it must be responsible to NEPA.

Containment Strategy

In the past the essential containment strategy has been primary isolation due to natural barriers, which was modified later to isolation through natural and engineered barriers. The ideal has been to contain the chemical and radioactive toxins to within the mountain system itself. The DOE realized early on that toxins would reach beyond the mountain system, but the containment system has always been Yucca Mountain. Now we see the following statement:

> *Groundwater beneath Yucca Mountain flows into a closed, sparsely populated hydrogeologic basin. A closed basin is one in which water introduced into the basin by precipitation cannot flow out of the basin to any river or ocean. This closed basin would provide a natural barrier to a general spread of radionuclides if radioactive contamination were to reach the groundwater. - DOE/EIS-0250F-S1D, pg 1-12.*

It appears as thought the DOE has changed its containment strategy to include the entire hydrogeologic basin as part of the containment system. Thus, extending the sacrifice zone to the Amargosa Valley and Death Valley. The statement implies that contamination there is ok, since is a closed system even though people live there and many people visit Death Valley each year. The DOE should not rely on a "containment system" that is outside of the Yucca Mountain Project. The design should not be dependant upon the aquifer outside and significantly downgradient of the YMP boundary to satisfy the objective of the project.

Radiation Protection Standard and Compliance

The compliance analysis is based on a standard that does not exist, and may never exist. Thus, the DSEIS is premature, just as the previous EIS was premature. There is no guarantee that the proposed EPA radiation protection standard will stand. It is assured that once the EPA releases its new radiation protecting standard as proposed the EPA will be sued by the State of Nevada, and potentially other groups. The DOE should not advance the NEPA process until there is a solid EPA standard in effect. If the EPA does release its new standard, and if the new standard is also vacated by the courts, the DOE will need to revise the EIS and initiate a proper NEPA process once again.

The point of compliance for the future EPA standard should be at the YMP boundary and not 18 kilometers from the repository. It appears as though the DOE is using at least a portion of the hydrogeologic basin as part of the containment strategy as a dilution factor, which is outside of the project boundary. Again, systems outside of the project should not be part of the containment approach. It is entirely possible that a drinking water well could be drilled very near the YMP boundary. The DOE needs to demonstrate that the repository will protect the public at its boundary.

Miscellaneous Issues

There is a case made in the DSEIS that, "contamination from Yucca Mountain is not likely to mix with carbonate aquifer waters and discharge to the surface at Ash Meadows or Devils Hole (DIRS 104983-

CRWMS M&O 1999, all) under current conditions." (*DOE/EIS-0250F-S1D, pg 5-22*). "Not likely" is not quantitative enough to describe the potential for contamination. However, in the next paragraph the DOE states that there will be "no contamination" of this resource. How does "not likely" translate into "no" contamination. This particular area is very important and part of the Death Valley National Monument, thus requiring very specific details on the expected level of contamination for public review.

The DOE has introduced the new language of "Analytical Periods" since the FEIS. These analytical periods appear to have a "wait and see" aspect to them. The DOE needs to explain in detail the kinds activities that will be conducted during these Analytical Periods. Will there be substantive changes to the repository or its processes due to the analysis during these periods? These periods appear to HOME to be another opportunity for the DOE to conduct characterization, which by law should have been finished years ago.

In general the DOE should not limit radiological impacts only to latent cancer fatalities.

Socioeconomic Impacts

Risk perception as a socioeconomic impact is not treated, and the DOE claims that there is not way to handle this issue.

> *While in some instances risk perceptions could result in adverse impacts on portions of a local economy, there are no reliable methods whereby such impacts could be quantified with any degree of certainty. DOE/EIS-0250F-S1D, pg 2-80.*

HOME agrees that risk perception is difficult to get a handle on, but the DOE could use analogies to other events of similar nature and perceptions around nuclear facilities to make an estimate of these impacts. It is our view that other aspects of the project are no less certain. Although not well defined, the dose plots indicate an uncertainly on the order of a factor of a thousand. If the DOE is willing to accept these kinds of uncertainties it should be willing to make an effort on this potentially important socioeconomic impact. Of course the State of Nevada has done so, and HOME suggests that the DOE examine what the State of Nevada has done in this regard.

Under the impacts for the "no-action" alternative it is stated:

> *Loss of approximately 4,700 jobs (1,800 person workforce for decommissioning and reclamation, 1,400-person engineering and technical personnel in locations other than the repository site, and 1,500 indirect jobs) in the socioeconomic region of influence. - DOE/EIS-0250F-S1D, pg 2-67.*

This is an improper impact assessment. Under "no-action" there would not be any of these jobs to loose. One could also speculate on job "losses" from lack of shipping waste. Following this analysis job losses should also be counted under the preferred action due to the lack of construction of extensive and ongoing on-site storage facilities.

The DOE merely states under the "no-action" option scenario 1 that the impact would be "Small; population and employment changes would be compared with totals in the regions," (*DOE/EIS-0250F-S1D, pg 2-67).* The actual employment estimates need to be included here as well as for the preferred action.

TSPA and Related Analysis

HOME continues to oppose the sole use of the Total System Performance Assessment (TSPA) to determine the suitability and licensing of any site for permanent disposal of highly radioactive waste. The current dose results in the DSEIS are markedly different than the FEIS results by a fact of about 100. The DSEIS states a number of "refinements" in the modeling which accounts for this dramatic improvement in repository performance. One such refinement is the tenfold increase in the longevity of the drip shields to an expected lifetime of 260,000 to 310,000 years. This is the kind of fantastic results that lead HOME to seriously question the validity of the extrapolated corrosion experiments. The DOE needs to explain this further; 1) how did the corrosion rate vary in time during those experiments, and 2) how was the extrapolation done? We point out that the length of time of the experiments represents ~ 0.001 percent of the extrapolated results time. Is the DOE conducting a simple extrapolation method that does not account for non-linear processes that will ultimately dominate the process in the long term. There is also a discussion of the enormous improvement in the waste package lifetime as well:

> *In the Yucca Mountain FEIS, the mean waste package failure behavior resulted in waste package failure from stress corrosion cracking beginning around 15,000 years, and about 50 percent of the waste packages failed by stress corrosion cracking and general corrosion by 100,000 years. For this Repository SEIS, the waste package failure initiated by stress corrosion cracking is estimated to begin around 100,000 years and about 60 percent of the waste packages are estimated to fail by stress corrosion cracking by 1 million years. General corrosion failures are estimated to start at around 400,000 years and about 10 percent of the waste packages could experience a general corrosion breach within 1 million years. The increase in waste package lifetimes was also due in part to the increase in thickness of the Alloy 22 outer barrier for the commercial spent nuclear fuel waste packages from 20 millimeters (0.79 inch) in the FEIS to 25 millimeters (0.98 inch) in this SEIS to accommodate the TAD canister. - DOE/EIS-0250F-S1D, pg. 5-9.*

Here the DOE points to a ~24% increase in the Alloy 22 thickness for a 10 to 20 fold increase in the point in time of initial stress cracking and ultimate failure. Maybe the analysis is correct, but this looks like creative modeling as well. HOME questions the veracity of these numbers especially when the DOE presents no uncertainty figures on these numbers. All results presented in any NEPA document should be accompanied by the expected range of uncertainty. This is critical for people to fully grasp the state of understanding of the systems involved and weigh the various factors in order to render the best possible decision regarding the proposed action.

HOME submits that the TSPA contains so many adjustable variables, some of which guessed (albeit an educated one), and complex interacting model systems that the end result is likely to bear little resemblance to the actuality. We are not alone in this concern as prominence modelers as have pointed out.[i] We see the one to two order of magnitude variation of dose results in the DSEIS as compared to the same figures in the FEIS as an indication of the sensitivity of the TSPA calculation. In our view, the TSPA is a very mutable evaluation procedure that can allow a very wide range of results merely by making what the DOE calls "refinements."

Table 5-1 (*DOE/EIS-0250F-S1D, pg. 5-8*) in discussing the TSPA refers to "Additional confidence building (validation)." The DOE needs to explain what confidence building really means, and how validation is accomplished. Validation implies that there exists real data to confirm the models and overall calculation. The DOE needs to present that validation evidence and show how calculated results compare to the actual data. It is unclear to HOME what data there could be for such a validation, barring having a real world working repository from which to extract data.

Another large change from the FEIS analysis is the toxicity of dissolved chromium, and the DSEIS cites evidence that chromium +3 will be the dominant form of chromium, which is much less toxic than the chromium +6 form. Chromium +6 was previously assumed to be the dominant form, which would seem reasonable in terms of the inherently oxidizing environment inside of Yucca Mountain. The DOE should explain this evidence within the DSEIS, since it is a significant departure and has broad implications. The citation indicated in the document is not so easily found using the licensing support network or the technical information bridge either.

Uncertainty

The DOE has much more extensively discussed uncertainties as a matter of general information in the DSEIS. This discussion is good for the general public and worthwhile; however, it is not directly demonstrated in the results shown except for the "horsetail" probabilistic trajectory plots, where the DOE does not clarify that the "width" of the horsetail is a rough measure of the inherent uncertainty or variability within the context of the TSPA models, and HOME notes that the plot in Figure 5-4 (*DOE/EIS-0250F-S1D, pg. 5-27)* indicates an inherent uncertainty in dose on the order of a factor of 100 to 1,000. The DOE needs to explain these plots in greater detail, and delineate what kinds of uncertainties can be addressed or understood from such plots. For example, the calculated dose at 2,000 years could be reported as; from 0.0004 to 0.2 mrem with a median of 0.015 mrem, and since the vertical scale in logarithmic a simple ± is not as meaningful.

It is also important for the DOE to be upfront that there exist other uncertainties more fundamental that are not addressed in these plots. For example, it is stated in the DSEIS:

> *Uncertainty in model projections of repository performance comes from two major sources: (1) variability in what could happen in the future (aleatory uncertainty), and (2) lack of knowledge about quantities that have fixed values in the calculation of either the likelihood of future events at the proposed repository or impacts of these events (epistemic uncertainty). - DOE/EIS-0250F-S1D, pg. 5-17*

There is no mention here of fundamental model uncertainties due to incomplete and incorrect models and system assumptions. Such model errors could result in enormous uncertainties, and we will ultimately not know whether there was a model error of this type until many years after the repository has been built loaded and sealed. The DSEIS later stated (*DOE/EIS-0250F-S1D, pg. 5-18*) that, "It [TSPA] used alternative conceptual models to examine uncertainty in the understanding of a key physical-chemical process that controls system behavior," but the DOE does not present the results of this analysis. How did the calculated results vary? What were the calculated concentrations of contaminants over time for the various conceptual models? The public is not left with a full understanding of the results of this alternative conceptual model procedure; what specific uncertainties came from this procedure?

The DOE does indicate uncertainties around unavailable data:

> *Some uncertainties for input parameters or models result from a lack of data. Such data gaps can be due to the status of research (perhaps with more data expected later) or conditions that restrict or prevent collection of certain data (for example, data that would require tests over impractically long periods or the necessity for minimal disturbance of the emplacement site). Uncertainty in data is a subset of parameter and model uncertainty. - DOE/EIS-0250F-S1D, pg. 5-18*

It is good here that the DOE discusses this important source of uncertainty, and there should be a table listing data that is lacking and the consequence of this unavailable data on the analysis. Further, there should be a discussion of how the DOE it trying to compensate for the unavailable data.

Another uncertainty the DOE identifies is sensitivity to the repository design, but states:

> *System performance would be sensitive to the repository design, but models and parameters for these options do not have an assigned uncertainty. Therefore, although they can be important, uncertainty analysis does not identify them as key parameters. - DOE/EIS-0250F-S1D, pg. 5-20*

So, is the public to assume the DOE is effectively ignoring this source of uncertainty? There needs to be some accounting even if broad of how design impacts our understanding of the uncertainty.

In closing, HOME does not support the preferred action here.

Sincerely,

John Hadder

HOME Board of Directors Pesident

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[i] Ewing, Rodney, "Performance Assessments: Are They *Necessary or Sufficient," Uncertainty Underground Yucca Mountain and the nation's High Level Nuclear Waste,* 2006 MIT Press.