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November 26, 2008

Mr. Francis G. Schwartz
GNEP PEIS Document Manager
Office of Nuclear Energy
U.S. Department of Energy
1000 Independence Avenue, SW.
Washington, DC 20585

Re: State of Nevada Comments on the U.S. Department of Energy's Draft
Global Nuclear Energy Partnership Programmatic Environmental Impact
Statement (DOE/EIS-0396)

Dear Mr. Schwartz:

Attached please find Nevada's comments on the above-referenced Draft PEIS. If you have questions regarding the comments or would like additional information, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert R. Loux".

Robert R. Loux
Executive Director

RRL/
Attachment
cc Nevada State Clearinghouse

**STATE OF NEVADA COMMENTS
ON THE U. S. DEPARTMENT OF ENERGY'S
DRAFT GLOBAL NUCLEAR ENERGY PARTNERSHIP
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
(DOE/EIS-0396, OCTOBER 2008)**

GENERAL COMMENTS:

1. Nevada objects to GNEP's reliance on Yucca Mountain.

Nevada objects to the Global Nuclear Energy Partnership, as described in this programmatic environmental impact statement, because GNEP's linchpin is the proposed Yucca Mountain repository, which Nevada strongly opposes. Nevada will demonstrate in the upcoming Nuclear Regulatory Commission licensing hearing that the Department of Energy's repository design would far exceed the federal government's radiation dose limits if filled, as planned, with spent fuel from currently operating reactors. It would perform even worse under GNEP, which contemplates adding nuclear waste from a much-expanded nuclear program, possibly from foreign reactors, as well. That GNEP contemplates such an expanded radioactive load for the repository, markedly different from what it proposed in its Yucca Mountain license application to the Nuclear Regulatory Commission, smacks of a bait and switch licensing strategy.

2. False premise about what is holding up nuclear power.

To understand the role that Yucca Mountain plays in DOE's GNEP proposal one has to follow the Department's tortured argument. The starting point is the Department's interest in promoting the "expansion of nuclear energy, both domestically and internationally." It is at the next step that the Department departs from reality. DOE believes that the main obstacle to such an expansion is public concern over spent nuclear fuel disposal, while in fact it is the high cost of nuclear power plants. The Department correctly views public worries over proliferation—acquisition of nuclear weapons by additional countries, possibly by using nuclear energy facilities and materials—as the other important obstacle.

3. GNEP could lead to foreign waste in Yucca Mountain.

Nevada's interests in relation to Yucca Mountain dictate that its comments concentrate on the spent fuel issue and GNEP's technological options for processing, storing, and disposing of spent fuel and its components. However, a brief comment on the proliferation aspects of GNEP is in order because they potentially affect Nevada, as well. The first thing to say is that GNEP's anti-proliferation strategy has nothing to do with developing new technology and thus with any of the technological alternatives considered in the PEIS. A source of confusion on this point is the PEIS's sloppiness in distinguishing between

protection against proliferation (as a practical matter, countries using their nuclear programs to covertly make bombs), and protection against nuclear terrorism (individuals or small groups stealing nuclear explosive fuels from facilities in the United States and other nuclear supplier countries and using it to make bombs). The way GNEP is supposed to help with controlling proliferation is by offering a full range of “reliable” nuclear fuel services so that most countries using nuclear power would not have to develop such technologies. Of course, this option is already available now—international commercial contracts in these areas are perfectly reliable and there is no need for an additional government program. The idea is that GNEP would somehow give the consumer states additional incentives to just operate reactors and buy their services from the United States and other supplier countries. This means of course that the United States and other leading countries would take back the nuclear fuel they have sold to these countries after it has been irradiated for the normal commercial fuel cycle and removed from the reactors. The GNEP EIS is ambiguous on whether the United States actually contemplates accepting return of spent fuel, although it would be inconsistent with the objectives of the program if we did not. If we did, and DOE has its way, then the long-term waste components would end up in Yucca Mountain, and this is on major concern to Nevada.

4. DOE misreads its experience at Yucca Mountain.

OCRWM Director Edward Sproat recently made clear that Yucca Mountain is indeed the only repository that DOE has in mind. He announced that DOE would not recommend to Congress a search for another repository. It will instead recommend an expansion of the legal limit on Yucca Mountain’s capacity. DOE says its painful experience with getting Yucca Mountain approved has convinced it that it is essentially impossible to site a repository elsewhere. Here DOE is again misreading experience. The fundamental problem with getting Yucca Mountain approved is not Nevada’s opposition but the basic geologic deficiency of the site. DOE played fast and loose in selecting it. When it found the site failed the Department’s own geologic criteria—there was too much water and it was moving too fast—it tossed the criteria and kept the site. It was that corruption of the federal site selection process that guaranteed strong State opposition.

5. GNEP driven by a Yucca Mountain-only approach.

In any case, the conclusion that there will only be one U.S. repository plays heavily into the design of GNEP’s technological side and its expressly preferred option for a “closed” fuel cycle, one that involves reprocessing of spent fuel. DOE argues that to overcome the capacity limitations of a repository at Yucca Mountain it is necessary to reprocess the spent fuel, ideally using yet-to-be-developed technology that would permit separating the spent fuel into individual constituents. This would then allow treating the various radioactive waste components differently with only some of the longer lasting isotopes going to Yucca Mountain. For technical reasons—because of the existence of certain

isotopes—the existing spent fuel from today’s reactors would be disposed of in its original form, as would be done according to the present plan.

6. EIS biased in favor of maximizing DOE’s role.

The GNEP program appears to reflect the Department’s and its laboratories’ interests in designing a nuclear future that maximizes DOE activities and budget and the interests of major reprocessing vendors in shifting the United States to a reprocessing mode. While this would be highly uneconomical, the vendors would count on multi-billion dollar government subsidies, some of which would, of course, be paid by Nevada’s taxpayers.

7. The GNEP Draft PEIS fails to consider cost.

One of the major deficiencies of the EIS is that in evaluating the various options it does not consider costs at all. While it may not be a legal requirement for DOE to compare costs, it is not in keeping with the purpose of environmental impact statements not to do so. The PEIS should contain cost estimates for the proposed action and alternatives and a comparative analysis of GNEP costs with the cost of the No-Action Alternative.

8. The GNEP Draft PEIS fails to take account of industrial realities.

The discussion of alternatives and the related modeling contained in the draft PEIS are sterile exercises lacking realistic considerations and time scales related to the introduction of major new technologies. An October 2007 National Academies report (Review of DOE’s Nuclear Energy Research & Development Program) discusses these issues in detail.

9. The GNEP Draft PEIS leaves out the most important alternative.

The various alternatives considered in the EIS, aside from the No Action Alternative, involve different ways of reprocessing spent fuel and dealing with the radioactive waste or introducing new reactor technology. But the EIS leaves out the most obvious and undoubtedly cheapest alternative—so-called interim storage. While termed “interim” storage, such an approach could in fact be a long-term solution. DOE rejects such interim storage by asserting that it is not a “reasonable” alternative (the law requires DOE to consider reasonable alternatives), even though it is certainly a great deal more reasonable than alternatives DOE does consider. In fact, it is more reasonable and more realistic than any of the alternatives DOE considers. Interim storage of spent fuel is simple, cheap and would not require massively expensive R&D in the national laboratories.

PARAGRAPH-SPECIFIC COMMENTS (EMPHASIS ADDED):

S.1.1 DOE's underlying purpose and need . . . reducing the impacts associated with the disposal of spent nuclear fuel (e.g., by *reducing the volume, thermal output, and/or radiotoxicity of waste requiring geologic disposal*).

Nevada comment: By fixing on physical parameters but ignoring costs the EIS skews the comparisons.

S.1.1 To meet its *nonproliferation* goals with regard to spent nuclear fuel recycling, DOE will assess, as reasonable alternatives, only those technologies that do not separate or use pure plutonium.

Nevada Comment: In contrast with the GNEP Strategic plan (January 2008), which is very clear on the point, the EIS confuses what nonproliferation is about. Mixing plutonium with (in most cases) uranium in the output of a US reprocessing plant is intended to protect against theft and misuse by individuals and groups operating in the United States, not to protect against countries abroad, which is what nonproliferation is about. In fact, the level of protection is very low, which affects all states. The best protection is not to separate the plutonium from the radioactive spent fuel in the first place, as is the practice today.

S.1.1.2 Reducing the volume, thermal output, and/or radiotoxicity could expand the number of acceptable sites *for future geologic repositories*, and could reduce both the cost and difficulty of siting and operating a geologic repository.

Nevada Comment: DOE has already decided not to look beyond Yucca Mountain.

S.2.2 Fast Reactor Recycle Alternative - [Box on] Advanced Separations: This PEIS considers the use of technologies that could separate spent nuclear fuel into usable and non-usable constituents. The objective of advanced separations is to allow options for management of particular elements in the spent fuel and reduce the wastes requiring geologic disposal. Advanced separations technologies could provide the capability to selectively remove certain fission products (e.g., technetium, cesium, and strontium) and minor actinides (e.g., neptunium, americium and curium) from the high-level radioactive waste stream. *The minor actinides could be recycled in reactors, while the fission products could be managed and disposed appropriate to their hazard.* Variations to existing separations technologies that have been developed and could be implemented in the near term would target the *co-extraction of uranium and plutonium (and possibly neptunium)* but would leave the other minor actinides and fission products in the high-level radioactive waste. *Existing separations technology with variations could be deployed at commercial scale with confidence in its readiness.* However, advanced separations technologies require research, development and demonstration prior to deploying at commercial scale. Separating out minor actinides (and destroying them in a reactor) and select fission products would allow tailored management of the wastes

streams and could significantly reduce the heat load and radiotoxicity of wastes requiring disposal in a geologic repository.

Nevada Comment: As this is evidently the direction DOE and its laboratories want to head it is necessary to make several points. First, DOE has no more than an idea about how to recycle minor actinides, especially in fast reactors, its favorite. No one has ever developed fuel of this type and it isn't clear it can be done. It would also affect the operating characteristics of the fast reactors so one cannot just adopt existing fast reactor designs. The whole notion is more or less in the category of pie in the sky.

Second, when it comes to the fission products strontium and cesium, which are the main source of heat for nearly the first hundred years, DOE plans to leave them on the surface in yet-to-be-defined condition. This is the principal way in which DOE proposes to reduce the early heat load on the repository. But if one is willing to leave the hottest, the most radioactive, and therefore the most dangerous, isotopes in surface storage, why not just leave the spent fuel on the surface and thereby avoid all the complications of reprocessing operations? The separation technology that underlies this approach is still in the early conceptual stage, so DOE proposes to get started with "existing separation technology," basically the PUREX reprocessing as used in France. As a sop to concerns about the weapons potential of separated plutonium, the draft PEIS proposes *co-extraction of uranium and plutonium (and possibly neptunium)*, thus supposedly avoiding the dangers of separated plutonium. In fact, the added protection is slight. The plutonium could be readily separated chemically from the mixture with uranium. The other suggestion is a mixture with neptunium, which is weakly radioactive. But neptunium has properties very similar to uranium 235, the fissile isotope that like plutonium is a nuclear explosive, so mixing plutonium with neptunium amounts to mixing two nuclear explosives. Not the best idea.

S.2.7.1 In certain respects, interim storage would be analogous to the No Action Alternative but would defer a decision about what to do with spent nuclear fuel to the future. Even if current law were modified and interim storage was authorized and pursued, there would be additional costs and risks associated with handling and transport of the spent fuel from the utilities to the interim storage sites, and then again to a repository for disposal or to a recycling facility for processing. For these reasons, DOE has concluded that interim storage does not satisfy DOE's purpose and the need to reduce impacts associated with the disposal of spent nuclear fuel and therefore is not considered to be a reasonable alternative.

Nevada Comment: Only in this case, to dispose of the most reasonable alternative, one that threatens DOE's R&D plans, does DOE allude to costs, without presenting any calculations or comparison. DOE should justify its argument with detailed analysis.

S.2.7.5 The draft PEIS asserts that, given the many uncertainties associated with the timing and the scope of the implementation of any action alternative that might be selected, the assumed pressing need for disposal capacity that the Yucca Mountain repository is intended to address, and current statutory mandates, it is reasonable and necessary to go forward with the Yucca Mountain repository as planned. Consequently, the GNEP PEIS does not address the recycling of the Inventory of spent nuclear fuel currently planned for disposal at the Yucca Mountain geologic repository (i.e., up to the statutory capacity limit).

Nevada Comment: This matter is somewhat ambiguous, but DOE seems to be saying it would fill Yucca Mountain to the present statutory limit with spent fuel. For technical reasons (the older spent fuel contains large amounts of americium 241) it would in any case not make sense to reprocess the existing stocks of spent fuel. Thus any new waste that GNEP adds to Yucca Mountain would be in addition to what is already slated to go there. In other words, GNEP would add to Yucca Mountain's radioactive inventory. That is of great concern to Nevada, since that inventory would already exceed federal (Environmental Protection Agency) dose limits, and thus, if fairly evaluated by NRC, would force denial of the license. The same result may obtain as a consequence of action by the new administration. Without Yucca Mountain there is no GNEP.

S.3.1 Research and Development Needs

Nevada Comment: This section wildly underestimates the times for developing the future, and in some cases futuristic, technologies required by the various GNEP alternatives.

S.3.3 Design and Operation of a Future Geologic Repository - The draft PEIS asserts that the GNEP programmatic alternatives could impact, beneficially, the design and/or operation of a future geologic repository by reducing the radiotoxicity, heat load, or the volume of spent nuclear fuel and high-level radioactive waste. These reductions have the potential to decrease the uncertainty in predicting long-term performance of such a repository, or increase the public acceptability of geologic disposal, so that adequate disposal capacity can be found for future commercial nuclear waste inventories.

Nevada Comment: DOE has now made clear that it will not recommend any additional repository other than Yucca Mountain, so these considerations are irrelevant.

S.3.3 Potential Reduction in Radiotoxicity . . . Potential Reduction in Thermal Load . . . Potential Reduction in Volume

Nevada Comment: The EIS fixes on physical parameters of the waste that are reduced by reprocessing, which is another way of biasing the argument in favor of GNEP's closed cycle alternatives. These are not the parameters that are relevant

for public safety and only the reduction in thermal load is even importantly relevant to repository design.

S.4 Based on cautious but reasonable assumptions, this draft PEIS considers that transition to, and *complete implementation* of any action alternative could be achieved in the 2060-2070 time frame.

Nevada Comment: It is a speculative exercise to plan technological options 50 or 60 years ahead. The uncertainties are too great. All sorts of new opportunities will develop that will make the current options look obsolete. One has only to look back 60 years to 1948—before solid-state computers, lasers, jet travel, space satellites, etc.

S.4.3 Human Health - The health effects identified in the draft PEIS analyses are for the operational period (2010 through approximately 2060–2070) only. The draft PEIS asserts that by reducing the volume, thermal output, and/or radiotoxicity of spent fuel and high-level radioactive wastes requiring geologic disposal, there is also *a potential* to reduce long-term health impacts from such disposal.

Nevada Comment: Since the choices are basically ranked in terms of their suitability, from DOE's point of view, for waste disposal, the ranking should have included long-term health impacts. It is, after all, precisely because of the long-term impacts that it is argued that the long-lived radioactive materials need to be placed in an underground repository. By only considering the health effects for about 50 years DOE is confirming that it views the underground repository not as a means of protecting the health of the population for the long term, but as a sop to allay public concerns over waste and to open the door to an expansion of nuclear energy. And since the only repository DOE has in mind is the proposed Yucca Mountain repository, it means this project is intended by the Department precisely as a way of encouraging nuclear power and therefore is not really needed for safety reasons even if it met EPA dose limits, which it doesn't.

S.4.3.2 Impacts to the Public - All domestic programmatic alternatives could affect public health through the release of radiological materials to the environment. The PEIS analyzes the impacts to both the maximally exposed individual, as well as the population within 50 miles (80 kilometers) of a facility.

Nevada Comment: A 50-mile circle is not nearly large enough for considering the effects of nuclear accidents. The Chernobyl accident produced health impacts hundreds of miles from the source.

S.4.4 Facility Accidents - The highest consequence and highest risk internally-initiated accident involving light water reactors using mixed oxide fuel (or, similarly, low enriched uranium fuel) analyzed in the draft PEIS is a scenario in which there is a direct loss of coolant because the primary coolant system overpressurizes other systems, and

radionuclides are released to the atmosphere. DOE estimates that *this accident, which has a probability of occurrence of about 7 in 100 million per year* (i.e., frequency of about $7 \times 10^{-8}/\text{yr}$), would result in an estimated 40,000 additional latent cancer fatalities to the surrounding population of 8.2 million.

Nevada Comment: One should not take these probability numbers too literally, as DOE appears to do. The probabilistic calculations can be a useful guide to thinking, but nearly every time there is a major accident it involves sequences that were left out of the calculations. Nor is it obvious that probability-times-consequences is the right figure of merit. It is also preposterous to think that one can assign reliable accident frequency numbers, as the EIS does, for reactor accidents for reactor types, such as fast reactors, with which there is little commercial experience and which have failure modes inherently different from LWRs.

S.4.5 Intentional Destructive Acts

Nevada Comment: The PEIS examines a number of sabotage scenarios but ignores the most worrisome destructive scenario—that someone or some group would steal nuclear explosives such as plutonium (or, in the thorium cycle case, uranium 233) and make and use an explosive device. A theft of such material would put the entire country at risk, not only the area surrounding a facility. The possibility does not arise in once-through fuel cycles, such as the one we employ now, because the plutonium is never separated from the highly radioactive waste and thus is protected in the spent fuel. Yet DOE is eager to move to a closed fuel cycle in which the concern does arise. DOE's solution—to keep plutonium mixed with uranium—provides very little protection.

S.4.10 Preferred Alternative - DOE's preference is to close the fuel cycle . . . The closed fuel cycle also *supports expansion of nuclear energy* by making better use of uranium resources.

Nevada Comment: One could also say, probably more accurately, that the closed fuel cycle would undermine nuclear energy expansion by increasing nuclear generation costs. So far as we know, no responsible entity, not even any of the commercial reprocessors, makes the claim that reprocessing and recycling is worth doing on resource grounds.

S.7.3 Issues to be Resolved - The draft PEIS states that the implementation of any programmatic alternative would require these primary issues to be resolved [including]: The nature and extent of Government involvement or encouragement in the implementation of any alternative, including providing financial and other incentives, continuing R&D and *conducting demonstrations of technologies* would need to be determined.

Nevada Comment: The whole GNEP program is unlikely to go anywhere in the current political and economic environment, but whether it does or not, an operational role for DOE and its laboratories should be ruled out immediately. Nevada's experience with over two decades of DOE's operation at Yucca Mountain and its serious and chronic managerial and quality assurance problems make clear that DOE is not fitted for this role.