



Bonnie Fogdall
09/05/2001 10:34 AM

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550121

To: SER@CRWMS
cc:

Subject: Fw: Comments on Possible Site Recommendation for Yucca Mountain

Part of Records Package / Supplement / Correction

----- Forwarded by Bonnie Fogdall/YM/RWDOE on 09/05/2001 10:34 AM -----



Naomi Lewis
09/05/2001 07:55 AM

To: Bonnie Fogdall/YM/RWDOE@CRWMS
cc:

Subject: Fw: Comments on Possible Site Recommendation for Yucca Mountain

QA:N/A Inclusionary

----- Forwarded by Naomi Lewis/YM/RWDOE on 09/05/2001 07:55 AM -----



clintonbastin <clintonbastin@email.msn.com> on 08/31/2001 09:23:14 AM

To: YMP_SR@ymp.gov
cc: (bcc: YMP_SR)

Subject: Fw: Comments on Possible Site Recommendation for Yucca Mountain

Federal Record Status Not Determined

Ms. Hanlon, the note below explains why these comments are being sent to others.

Clinton Bastin
----- Original Message -----
From: clintonbastin
To: the.secretary@hq.doe.gov
Cc: gail.marcus@hq.doe.gov ; Mal McKibben/Tina Frazier - CNTA
Sent: Friday, August 31, 2001 12:18 PM
Subject: Comments on Possible Site Recommendation for Yucca Mountain

Because of the importance of this issue and past experiences with major flaws in the USDOE environmental review process, I am sending copies of my comments to you, The President, Leaders of The Congress, and the President of the American Nuclear Society.

Experiences with flaws in the USDOE environmental review process and other relevant experiences are discussed in the comments, which are attached. Letters in Science and

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Issues in Science and Technology are also attached.

The essence of my comments in that disposal of unprocessed used nuclear fuel in a geologic repository would not be a responsible action. Used nuclear fuel must be reprocessed for recycle of all fissionable into existing and advance nuclear power plants that have a fast neutron spectrum. Fissionable materials must be maintained as inaccessible (intimately mixed with intensely radioactive fission products in fuel assemblies) until needed for recycle.

A new approach is needed for all uses of nuclear technology in the US, similar to the new approach advocated by Senators Pete Domenici and Frank Murkowski.



- att1.htm



- yuccamtnaug01.wpd



- IS&Tsum94.wpd



- SCIENCE.wpd

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August 31, 2001

Carol Hanlon, USDOE
Yucca Mountain Site Characterization Office
M/S 025 - PO Box 30307
North Las Vegas, Nevada 89036-0307

Dear Ms. Hanlon:

Comments on "Possible Site Recommendation for Yucca Mountain"

I am pleased to submit comments on the possible recommendation by the Secretary of Energy to the President of the Yucca Mountain Site in Nevada for development as a spent nuclear fuel and high-level nuclear waste geologic repository. Because of the importance of this possible recommendation and my past experiences with the USDOE environmental review process, I am providing copies of these comments to The President, the Secretary of Energy, Leaders of The Congress, and the President of the American Nuclear Society. The past experiences include:

1. The USDOE ignoring comments that substantive environmental issues were not considered in the environmental review process for the New Production Reactor, a major initiative of former Energy Secretary James D. Watkins for production of tritium needed for strategic nuclear deterrence and plutonium-238 needed for space exploration. The comments were provided later to Secretary Watkins at his request and used to support his non-decision on the major initiative¹ - after expenditure of several hundred million dollars. Subsequent expenditures and flawed review processes by the USDOE led ultimately to a decision that tritium for weapons would have to be produced in commercial nuclear power plants, a major compromise of an important nuclear nonproliferation principle. The US has no capability for production of plutonium-238 and no responsible plan for such production.
2. The USDOE Yucca Mountain Site Characterization Office response that concerns about lack of safeguards for and the virtually permanent proliferation threat of nuclear weapons materials in used nuclear fuel in a geologic repository were beyond the scope of its environmental review process. In fact, used nuclear fuel could be easily retrieved from the repository after a few hundred years decay of intensely radioactive fission products. Plutonium could be recovered with very simple chemical processes in unshielded equipment and used to make a nuclear explosive which could be detonated for destructive purposes. The adverse environmental consequences would be many orders of magnitude beyond the slight increase in radiation exposure to humans from materials stored in the repository.

¹This was subsequently reviewed and documented in a report by the USDOE Office of Inspector General.

Other experiences should also help in evaluating the comments:

- As a participant in a seminar for chemical engineering faculty of US colleges and universities on nuclear fuel processing at USDOE's Hanford site during the summer of 1958, I conducted studies that supported decisions of local managers and staff to create this nation's first geologic repository for high level nuclear wastes². Although I did not agree with the decision to create the repository without more thorough review and later successfully opposed a similar repository at the USDOE's Savannah River Site, I am not aware of any information that indicates significant danger to humans now or later from radioactive material permanently disposed of in the Hanford repository provided reasonable surveillance is maintained.
- I provided leadership for US Atomic Energy Commission (USAEC) programs at the Savannah River Site for management of nuclear waste, including studies for long term isolation from the biosphere of nuclear wastes in a geologic repository in bedrock underlying the Savannah River Site. The plan for isolation had been endorsed as feasible by a committee appointed by the Governor of South Carolina for detailed review under the leadership of Leonard Baker, Chairman of the Department of Chemical Engineering at the University of South Carolina; a committee of the National Academy of Sciences appointed specifically for detailed review; staff of the US Geological Survey appointed for detailed review; and the USAEC, including its Chairman James Schlesinger. It also was under environmental review in accordance with the National Environmental Policy Act. The plan was rejected by Senator Ernest Hollings because he did not want nuclear waste stored in his state. Senator Holling's rejection may have stemmed from earlier rejection by the USAEC of his (excellent) proposal while Governor of South Carolina for reprocessing of US Navy nuclear fuels at the SRS.

Following are my comments on the possible recommendation:

1. Neither Yucca Mountain nor any other site is suitable for permanent disposal of used nuclear fuel or nuclear waste canisters that contain weapons material, unless safeguards can be assured for ten half-lives of any such materials. For plutonium-239, this would be about 240,000 years; for neptunium-237, which has been used by USDOE for a nuclear explosive, 20 million years. Since safeguards for these time periods cannot be assured, permanent disposal of unreprocessed used nuclear fuel or "immobilized" plutonium in waste canisters would not be a responsible action. Please consider the following from my letter in the November 1997 issue of *Nuclear News*:

"The environmental aspects of radioactive waste disposal are interesting - but what about the virtually permanent nuclear proliferation threat that would result from creating geologic deposits of enough unsafeguarded plutonium to produce 100,000 nuclear weapons?"

"Protection from intensely radioactive fission products would disappear after 300 years, i.e., ten half-lives of cesium-137 and strontium-90. After that, the nuclear "waste" could be easily mined, and the plutonium recovered with relatively simple, conventional chemical processing technology.

"I have discussed my concern about creating geologic deposits of plutonium in unreprocessed spent fuel with former Energy Secretary Hazel O'Leary, former Deputy Energy Secretaries Bill White and Charles Curtis, NRC Chairman Shirley Jackson, Senate Energy Committee Chairman Frank Murkowski, former AEC Chairmen Glenn Seaborg and the late Dixy Lee Ray, many colleagues in

² The repository was needed because Hanford reprocessing plants using solvent extraction processes could not be operated effectively without continuous disposal of large quantities of nuclear wastes to soil.

DOE and the nuclear community, Members of Congress and staff, and many others. Many share my concern; no one has ever presented a credible argument to alleviate this concern.

“Any threat or reasonable concern about nuclear proliferation from nuclear materials in spent fuel could be eliminated by recovering all of the fissile and fissionable materials in well engineered facilities and destroying them (or rendering them inaccessible) in “fast flux” reactors like Hanford’s Fast Flux Test Facility (and GE’s PRISM). This action would result in the production of electricity equivalent to the needs of the U.S. for the next several hundred years, without the greenhouse gases and other pollutants released from burning of coal, oil and natural gas.”

Also please consider letters in the National Academy of Sciences publication *Issues in Science and Technology*, Summer 1994 (Enclosure 1) and *Science*, August 18, 2000 (Enclosure 2).

2. Yucca Mountain seems to be an appropriate site for long term isolation of high-level nuclear waste in a geologic repository, provided that at least 99.8% of all fissionable materials and all desired fission products have been removed from the waste and that Nevadans agree with the plans. However, well-engineered repositories could provide greater assurances of nuclear waste isolation and would be much less expensive. Also, site selection for such a facility might be easier.

3. The US should discontinue wasteful expenditure of funds on plans to create geologic deposits of weapons usable materials which become accessible with time, develop a new vision and new approach for all uses of nuclear technology, and implement reprocessing and recycle in existing and advanced nuclear power plants (i.e., those with a fast neutron spectrum) by competent US corporations of all fissionable materials in used nuclear fuel and all excess weapons material and weapons source material by-products of uranium enrichment. Specifically, the US should:

- restart the Fast Flux Test Facility at Hanford and conduct experiments, including those to ensure passive safety features and good safety and performance, high burnup of fast reactor fuels, good heat transfer, efficient generation of electricity, and full burnup of all fissionable materials;
- retrieve 1978 design studies of the DuPont Company for “Spent LWR Fuel Recycle Complex,” carry out well focused development and design for update of these studies by a competent corporation to ensure use of best technology for nuclear materials management;
- select sites for fuel recycle facilities co-located with engineered repositories for isolation of nuclear wastes until full decay (i.e., 10 to 20 half-lives) of intensely radioactive fission products;
- upon completion of the experiments, studies and site selections, begin design, construction and operation of facilities for management for beneficial use of all fissionable material by-products of nuclear power, including keeping fissionable materials intimately mixed with intensely radioactive fission products in fuel assemblies until ready for recycle;
- begin interactions with other nations to ensure that best technology is used for efficient use of nuclear resources, prevention of weapons proliferation and isolation of nuclear wastes;
- create the United States Nuclear Technology Policy Board whose members would be appointed by The President with the advice and consent of The Congress for staggering terms of up to ten years and who would meet periodically to review government nuclear programs and policies and propose long term nuclear strategies for the United States; and
- begin providing full and accurate information to Americans about nuclear technology and quickly correcting misinformation - particularly fal.

I appreciate your consideration of these comments.

Sincerely

Clinton Bastin

List of recipients and enclosures: See next page

**Lists of recipients of Comments on and Enclosures for
“Possible Site Recommendations for Yucca Mountain”**

The President, The White House

Honorable Spencer Abraham, The Secretary of Energy

Honorable Dennis Hastert, The Speaker of The House of Representatives

Honorable Tom Daschle, The Senate Majority Leader

Dr. Gail Marcus, President, American Nuclear Society

- Enclosures:
1. *Issues in Science and Technology*, Summer 1994, “Nuclear Waste”
 2. *Science*, 18 August 2000, “Nuclear Power and Climate without Proliferation”

(Letter in *Issues in Science and Technology*, Summer 1994, pages 12-13)

Luther Carter is right ("Ending the Gridlock in Nuclear Waste Storage," *Issues*, Fall, 1993). It is time to take another look at the Nuclear Waste Policy Act (NWPA) of 1982. But the reevaluation should go far beyond that proposed by Mr. Carter. We should reconsider the plan to release to the environment - at Yucca Mountain or elsewhere - the huge amounts of long lived radioactive material in spent nuclear fuel. We should also give up the idea that it is responsible to abandon to future generations, without any controls, excess plutonium from weapons programs and plutonium in spent fuel that could be used to produce up to 100,000 nuclear weapons.

The alternative to indefinite storage or abandonment of plutonium and other actinide elements is their use to produce electricity in nuclear reactors, eventually in reactors with a "fast" neutron spectrum, in which all of the long-lived actinide elements will be fissioned and destroyed. Breeder reactors are an excellent "sink" for excess plutonium, which becomes intimately mixed with intensely radioactive fission products.

Spent fuel reprocessing plants are the focus of proliferation concern. But co-located fuel reprocessing and refabrication plants can be designed and operated that would preclude access to and accumulation of separated plutonium. The DuPont Company, former operating contractor for the Department of Energy (DOE) Savannah River Plant, prepared designs for such a fuel recycle complex. Unfortunately, leadership of DOE and its predecessor agencies set aside this design concept and removed key personnel with good management experience in reprocessing. When Presidents Gerald Ford and Jimmy Carter and the Congress conducted assessments of reprocessing, there was no one in a position of authority who could provide good information. As a result, demonstration of reprocessing and the breeder reactor concept were deferred. The NWPA grew out of this bureaucratic folly and a belief that we must solve the nuclear waste problem in a manner that does not require management by future generations.

The intense, penetrating radiation associated with spent fuel and high level radioactive waste from reprocessing will provide protection of the plutonium from diversion to weapons use - but only for a limited time. Plutonium, with a half-life of 24,000 years, will be available for weapons use for hundreds of thousands of years. The penetrating radiation in spent fuel and high level radioactive waste is almost totally from fission products with maximum half-lives of about 30 years, and these will provide protection for only a few hundred years.

I hope we will soon accept the responsibility to future generations and restart a process for appropriate management of spent fuel from nuclear power plants, and for excess plutonium from DOE stockpiles. We can do this for less money than is being wasted on present DOE programs to "cleanup" and "dispose" of nuclear wastes. With breeder reactors, we can manage the waste with less risk, less adverse environmental impact, and less radiation exposure to humans while supplying energy for America's needs for millennia to come.

Clinton Bastin

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(Clinton Bastin was program manager for the Atomic Energy Commissions spent fuel receipt program from 1959 until 1962 and managed plutonium reprocessing activities at the Savannah River Plant from 1962 until 1972.)

Nuclear Power and Climate without Proliferation

(Letter in *SCIENCE*, Vol 289, 18 August 2000 Page 1141)

The analysis in the Policy Forum "A Nuclear Solution to Climate Change?" by W.C. Sailor, D. Bodansky, C. Braun, S. Fetter, and B. Van der Zwaan (*Science's* Compass, 19 May, p. 1177) is diminished by inclusion of the myth - popular in the United States - that efficient use of nuclear resources is a proliferation threat. Quite the contrary, destruction of weapons materials in spent nuclear fuel by their use for production of electricity in fast, so-called breeder reactors is an essential component of good non-proliferation practice. Depleted uranium at U.S. enrichment plants, which was used by the United States Department of Energy (DOE) to produce plutonium for weapons, would also be destroyed in fast reactors. The electricity produced from existing nuclear by-products would be equivalent to that needed by the United States, at present use rates, for hundreds of years.

The nuclear solution presented by Sailor *et al.* would recover less than 1% of the energy from uranium. Spent fuel would be disposed of in a geologic repository. Depleted uranium - millions of tons of weapons source material - would accumulate indefinitely.

International Atomic Energy Agency (IAEA) safeguards are required for plutonium-239 in spent fuel in a geologic repository. However, virtually no one accepts the IAEA contention that planned satellite surveillance can be reasonably assured for 10,000 years. Moreover, the time required for significant decay of plutonium-239 is not 10,000 but 240,000 years.

Since safeguards for these periods of time are not credible, spent fuel must be reprocessed to permit permanent disposal of unwanted fission products, i.e., high level radioactive waste. Disposal of this waste is essential for viability of nuclear power and is a requirement of virtually all nations. Reprocessing only in well-designed, well-managed and safeguarded facilities operated by nations with large nuclear power programs, and immediate fabrication of weapons materials into fuel assemblies for their destruction through production of electricity, provide the greatest assurances against a proliferation threat from nuclear power.

The DuPont Company completed designs for such facilities in 1978, based on its experience in reprocessing at the DOE Savannah River Plant and on the experience of others. Among many important features of these designs was the elimination of accumulations of separated plutonium. Unfortunately, these designs were rejected by leaders of DOE in order to support national laboratory reprocessing concepts that had led to earlier problems (failures and proliferation) and poorly focused research on "proliferation-resistant" fuel cycles. During this same time period, political decisions were made that led ultimately to cancellation of US fast reactor development.

US nuclear policies based on best science and best applications of science will result in nuclear power being used as the solution for climate change and other energy and environmental problems.

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