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Subject: Comment on PFS DEIS

PLEASE INCLUDE THIS COMMENT ON THE DEIS FOR PFS AT THE GOSHUTE INDIAN RESERVATION. IT IS AN EDITORIAL SUBMITTED (9/20/00) FOR POSSIBLE PUBLICATION IN THE SALT LAKE TRIBUNE.

12-27

QUESTIONS FOR SPENT NUCLEAR FUEL DIALOGUE

At the latest hearing on the Goshutes' plan to store spent nuclear fuel (SNF) some concerned citizens expressed the need for a panel discussion or debate to help settle the scientific issues. I applaud their willingness. The following questions, with my answers, might be a suitable starting point. The Hill Air Force question could also be raised. The more agreement we can come to on answers to these, the more we might have a clear answer regarding the safety of moving SNF and storing it at Private Fuel Storage (PFS) or at Pigeon Spur (near the ghost town of Lucin).

Transportation: How dangerous is it? A family living next to the train tracks and leaning against the back fence every time a shipping cask full of SNF came by would have to watch 19,000 of them to get the equivalent of one chest x-ray or a four-hour plane trip (each 10 milirems). Contrary to anti-nuke claims, normal operation is not harmful to any bystander, not even one. More details on this are in a Salt Lake Tribune editorial of 8/13/00.

Background radiation: How much do we get, on average? Each year Utahns get about 360 milirems or the equivalent of 36 chest x-rays of background radiation, which comes mostly from radon gas seeping into basements (180 milirems), about 60 from cosmic rays, 50 from medical treatments, 30 from rocks and soil, and 40 from inside our bodies (from food, such as carbon 14 and potassium 40). The pioneers got a little less.

Train wrecks: How many and how dangerous? In shipping 3,000 shipments of SNF over 30 years, there have been eight accidents, four with fuel and four empty. None increased radiation exposure. In moving SNF to the Goshute reservation, about 50 accidents are projected by Dr. Marvin Resnikoff, half with loaded canisters. If there were 1,000 accidents with loaded canisters, according to a study commissioned by the Nuclear Regulatory Commission (NRC), "Transporting Spent Fuel," by William R. Lahs, about six would be "severe" enough to cause minor structural damage, 2.6 of them being dented or burned bad enough to cause an increase in radiation due to damage to shielding or containment. These would be minor increases of two or three times allowed levels, and easily remedied. With only 25 accidents expected with SNF, the change of having even one accident with a slight increase in radiation while filling PFS would be about one in 15,000. A chance of one in 400,000 while PFS fills up may be assigned for an accident so severe that 20 to 30 times the allowed amount of radiation occurs.

The BIG FLAW in these odds for "severe" accidents is that they are too high, because instead of the usual rail speeds, SNF rail shipments would be limited to a speed of 30 mph, and move in dedicated trains that would not carry chemical fuel or other hazardous chemicals. A team of experts

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would also travel near the train to handle any emergency.

The fabled accident that requires $14 to $320 billion for cleanup is simply not credible. It would involve a cask colliding at over 75 mph with a direct hit to a hard surface (not a glancing blow), followed by a sustained fire hot enough to oxidize or burn the zirconium cladding on any exposed fuel rods. The small amount of radioactive waste on the inside surface of the cladding would thus go up in smoke and contaminate a large area with the equivalent of fallout. However, with 30 mph dedicated trains this extremely severe accident would not be possible. No radioactive dust cleanup would be needed in any credible accident.

Could a canister "leak"? No. The fuel inside the rods is solid pellets of ceramic (uranium dioxide), each about as large as two aspirin tablets or a small rock. These are inside stainless zirconium tubes called fuel rods, welded shut. The rods are arranged into bundles and sealed inside a stainless steel canister. We usually reserve the word "leak" for liquids, gases, or powders, which might escape through a small crack. In none of the credible "severe" accidents discussed above could any pellets escape. If any ever did escape, they could be located by Geiger counter and retrieved.

How safe is it for a worker near one storage cask? On the concrete storage pad, a worker within arm's length of one storage cask must get no more than 2.5 milirem/hour, according to regulations by the NRC. In eight hours he would get 20 milirem, his maximum safe amount for one day. Of course he would spend only the minimum time necessary, to keep his dose as low as reasonably achievable (ALARA).

How safe is it near a whole array of storage casks? The exposure is almost 7.5 milirems per hour, so the worker should limit his time inside the array to under 2.5 hours per day. Heavy lifting would of course be done by remote-handled cranes or cranes with the operator adequately shielded. Full-time residents in the Goshute village 4.5 miles away would get the equivalent of one chest x-ray every 20 years.

Could lightning or anything else cause a cask to melt down or explode? No. Nuclear fission reactions are not set off by heat, light, chemicals, electric sparks, lightning, or anything else except neutrons. The fuel rods are shipped with some neutron-absorbing materials built into the "basket" that holds the rods in place inside the canister. In addition to the fuel being partially used up ("spent") and there being no "moderator" to slow down the neutrons, this material stops more than enough neutrons to prevent and/or stop any chain reaction.

If a cask fell over in an earthquake, what could happen? The cask would lay there like a large boulder with a heat source inside. The air would not flow through naturally as it did, so it would heat up unless turned upright or fitted with a small fan to force cooling air through it. There would be at least seven days to stand it up or install a fan before any structural damage could begin.

Do SNF rods remain lethally radioactive for 10,000 years? No. The most radioactive isotopes decay quickly; others take longer. By 600 years or less, according to Max W. Carbon in Nuclear Power: Villain or Victim? the rods would be no more radioactive than uranium ore, which could be safely

picked up and handled.

Does reprocessing make the waste problem easier? Yes. The SNF is dissolved in acid, allowing separation of the uranium and plutonium, to be used in new fuel rods. The fission products, the real waste, can be melted into glass, making it very unlikely to ever contaminate water or soil. Even counting the glass, the volume of waste is less (about half), while storage for 600 years will render it harmless. Our allies now do reprocessing, having learned from us.

Is radiation from a SNF cask comparable to bomb test fallout? No. The radioactive materials in a SNF cask do not leak out. Once the cask has passed by, no radioactive material is left behind and the area is as clean as before. The gamma ray dosage received as the cask goes by is gone like the light from a flash bulb, with no residue. By comparison, an above-ground bomb test produces large quantities of dust mixed with radioactive isotopes, "fallout" which settles out over the countryside. We end up eating, breathing, and drinking this radioactive dust, where it can attack our tissues from inside our bodies. The intensity drops off as various isotopes decay, but the damage may already be done.

Global warming: How strong is the evidence? The people in Texas believe, with Spring 2000 the hottest on record in the U.S. The ice cap at the north pole has thinned as much as 40 percent in 30 years. Greenland ice is thinning. Over the last 150 years, 26 northern hemisphere lakes and rivers have been observed to freeze later in the fall and to break up earlier in the spring, now shortening the frozen period by 18 days. Scientific evidence continues to accumulate. What is surprising is that with the carbon dioxide we have added to the air, it hasn't happened faster; but some have found evidence that the delay is because the oceans have been soaking up the extra heat. Sea levels could eventually rise 20 feet as ice caps melt from Greenland and Antarctica. Globally, 1998 was the hottest year since records began in 1880; the next hottest were 1997, 1995, 1990, and in fifth place, 1999. What do you think?

Can global warming be reversed? No, not by man. But it can be limited by stopping all fossil fuel burning. Renewable energy sources like wind and solar are still several times as expensive as nuclear. Nuclear is the only source that can do the job without causing economic chaos.

If we can agree that the above answers are correct or even close, then we would have little reason to fear interim storage of SNF. It is to the credit of opposition leaders that they have agreed to a panel discussion to air differences and seek agreement. Assuming that agreement is within reach, perhaps we can agree that interim SNF storage would be good for our state, good for meeting U.S. electrical needs, and our country's best step to limit further global warming.

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