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Rules and Directives Branch
USNRC

9 May 2003

Dear Nuclear Regulatory Commissioners,

Concerning: NUREG 1767, MOX Fuel Fabrication Facility, PDCF and WSF.

I formally request that you deny the construction and operating license for the mixed oxide fuel fabrication facility and its' supporting facilities, that has been requested by the Duke-Cogema-Stone & Webster Consortium. I request this action for the following five enumerated reasons which can be summarized as Cost, Safety, Speed, Nuclear Proliferation and NEPA Intellectual Honesty.

Reason # 1. Cost. If there is a cheaper disposition method, should you not choose it? American taxpayers want to know why:

Immobilization $ 2.1 Billion

MOX Fuel $ 3.8 Billion (after fuel rebates)

DOE admitted to greater cost certainty in the immobilization plan, because it was a simpler and more straightforward plan.

MOX Plan $ 3.8 Billion approx. = $ 38. Per taxpayer
100 Million U.S. Taxpayers approx.

By the above calculations, the average taxpayer will shell out an average approximate thirty-eight dollars for the MOX fuel program. If you Nuclear Regulatory Commissioners went into a store and bought an item for $ 38., would you not examine that item to make sure you were getting your moneys worth? Of course you would.

Actually (page 2-25, line 8 of the DEIS) the cost is $ 48. Per taxpayer with a mail in rebate from DCS coming later. Actually that $ 4.8 Billion is just an estimate, which is way too low. DOE has never brought in any project for less that twice the initial estimate. The REAL REASON immobilization was killed; DCS and DOE needed to set

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the hook on Uncle Sam's wallet. Immobilization provided Uncle Sam a means of slipping that hook if costs went stratospheric. So immobilization was killed off, for the laughable reason that they couldn't afford it (page 1-2, line 22).

Ultimately it all comes down to money. Russia is blamed for killing immobilization, which is unfair because they just want the money. The lack of isotopic degradation is not credible because the plutonium could have been mixed with a.) spent nuclear fuel, b.) reactor grade plutonium, c.) mixed nuclear waste, or d.) all of the above, and the result would have been immobilization with isotopic degradation and a radioactive proliferation resistant barrier. What is the difference if we end up with plutonium in glass (or ceramic) logs or in spent fuel rods? Billions $. Nobody cares about the poor U.S. taxpayer. Please note that the cost-benefit analysis totally ignores those taxpayers!

The Russians would have accepted immobilization if we had stuck to our convictions. Instead we offered them a choice: $ 2 Billion for immobilization or $ 5 Billion for MOX fuel. The Russians don't care about U.S. taxpayers, they chose the choice with the more money. They aren't stupid.

There is a cost versus safety trade-off. The $ 4.8 Billion estimate is the minimum estimated to accomplish the task. For $ 10 Billion we could have gotten robotic glove-boxes instead of manual and three foot thick concrete walls throughout instead of the metal shacks described on page 2-7, line 40. Cost is a safety issue. More money can buy better equipment, facilities and personnel. More money can also strongly motivate greed.

Nuclear Regulatory Commissioners, presumably well paid enough to be above this greed, should say NO right now. This MOX plan will end up costing not less than $ 20 Billion (my estimate) by the time decommissioning is completed, and that assumes no

major accidents. Please save U.S. taxpayers those billions and many sleepless nights worrying about loose plutonium processing, and reject the license now.

Reason # 2. Safety. On page 2-36, line 39, NRC staff say, "...unless safety issues mandate otherwise," they recommend approval for the license. Please understand how difficult it is to say something is unsafe when plans are still changing (sand filters, silver recycling, etc.), much of the information needed to prove the unsafeness is classified and unavailable, and the facility is a one of a kind with no precedent for guidance.

You probably already know this, but repetition can't hurt. Blair and Thompson induced cancer in beagle dogs with plutonium inhalers, to estimate what the toxicity of plutonium really is. At .049 micrograms per gram of lung tissue, the smallest amount tested, all the dogs got cancer and died.

<u>.049 micrograms = 20 million lethal doses per gram = 600 million lethal doses/ounce</u>

The exact number could be argued, but really the true toxicity is not known because we've never done controlled tests on humans. Very small amounts, when inhaled, are lethal, which is an honest description of what we know. Safety in dealing with this stuff *is imperative!*

NRC staff recommends approving the license unless it can be proven that the proposed action is not safe. I ask, can you prove it will be safe? This is not the first plant in the U.S. to try to make plutonium fuel. There have been four others, and that track record does <u>not</u> give me any confidence that it can be done safely by anyone at any price.

Karen Silkwood worked at the Kerr-McGee plant near Cimarron, Oklahoma. Shall we rehash those events? Plutonium was found in her refrigerator at her home. Gloves in the glove boxes were tearing. Detectors were turned off because they kept going off.

Nuclear Fuel Services in West Valley, New York operated from 1966 to 1975. It reprocessed 625 tons of spent fuel to make plutonium fuel. There were leaks and spills, including into Cattaraugus Creek, which threatened Buffalo's water supply. The laundry room was a mess, with numerous incidents and even the employee lunchroom had contamination (11 June 1968). The owners cut and ran, leaving a mess of nuclear waste behind for the taxpayers to clean up.

There was also the Midwest Fuel Recovery Plant near Morris, Illinois that never opened due to cost overruns. Then there was the Allied General Nuclear Services plant at the Savannah River Site (called Agnes). After $ 300 million spent, it fell apart after Jimmy Carter ordered a halt to U.S. reprocessing.

The U.S. nuclear industry has tried reprocessing and plutonium fuel, and their track record is not encouraging. So, instead of using one of the U.S. experiences as a comparable example, DCS uses the MELOX plant near Marcoule, France (page E-16, line 30). Neither LaHague nor Sellafield can be used, because their track records are terrible too. The record of these facilities is awful, yet DCS claims a ridiculously small chance of accident and/or contamination to workers and public. A real and true assessment of the risk from this proposed project would include every facility worldwide that has processed plutonium, instead of the cherry-picked best.

The radiation exposure pathways fail to identify the Homer Simpson pathway (page 3-46 & 47). In the TV show The Simpson's, Homer works at the local nuclear facility. The show opens with his apparently working with some lime-green radioactive material in a glove box. The end of shift whistle blows and Homer drops what he is doing and yells "Yoo-Hoo". The radioactive chunk bounces out of the glove box and lands on

Homers' back/shoulder. Homer is next seen driving home with the glowing radioactive chunk on his back/shoulder. He brushes off his shoulder knocking the material out of his car window, where it bounces and lands on Bart Simpson skateboard as he rides home from school. What happens to it next is unclear. What is clear, is that workers with radioactive materials on their shoes, clothing, hair or skin can take it with them when they leave work, thus contaminating bars, restaurants, stores, cars and homes.

The Homer Simpson pathway is the dominant means of public exposure during routine operations. I therefore must insist that showers be specified in both MOX FFF and PDCF as they are not mentioned in the DEIS (page 2-4, lines 6-11 and 2-7, lines 1&2). This is a standard safety precaution. Why is it not mentioned in the DEIS?

As I already mentioned, plutonium was found in Karen Silkwood's refrigerator. Please specify that the necessary precautions are being taken to prevent a public relation disaster reoccurrence.

Cancer is not the only risk from radiation and plutonium. (page 3-51, line 36) Birth defects and mental retardation (genetic damages) are more prevalent than cancer, but because they occur in the children of the workers they are often overlooked. Please correct this oversight.

The radiation from plutonium is rather low due to long half life (24,600 years) and it being primarily an alpha emitter. Thus, when we compare radiation from plutonium with expected latent cancer fatalities (pages 4-7 to 4-11) we end up with .00002 annual LCF at the MOX FFF (page 4-10, line 45). However, a lethal dose to your lung is about a millionth of an ounce, which is a speck of dust floating around in the air so small you can't see it. Considering that you are planning to process 38 tons, which must be:

a.) weighed b.) inspected c.) hydrated d.) nitrided e.) oxidated f.) welded (caution!) g.) Leak-tested h.) weighed again i.) dissolved in nitric acid with silver catalyst j.) electrified k.) organic solvent separated l.) nitric acid washed m.) hydroxylamine nitrated n.) hydrazine nitrated o.) uranium separation stripping column p.) nitrous fumed in columns q.) reacted with oxalate acid r.) collected on filters s.) Calciner-dried t.) blended u.) stored v.) master blended w.) mixed with depleted uranium x.) ground y.) mixed again z.) homogenized and lubricated aa.) pressed bb.) sintered at 3100 F cc.) ground again dd.) loaded into rods ee.) welded again and ff.) finally inspected, and that you expect one latent cancer fatality every 50,000 years (.00002) from an amount so small you can't see it when you are dealing with some 38 tons total, which all stretches credibility a bit.

I only mention these 30+ process steps, many of which involve high temperatures, dangerous acids, grinding producing many small particles, powders which are dangerously pyrophoric and can become explosively supercritical around neutron reflectors and in confined spaces, because I don't believe it can be done as safely as you describe doing it in this DEIS.

Plutonium is not the same as uranium. No mention in this DEIS is made for control of humidity, despite plutonium being much more reactive in a humid environment. Plutonium metal is also a concern in the PDCF. From 6-1.3 of the Plutonium Handbook, "When a container is opened spontaneous ignition may then occur, usually resulting in destruction of the container and the scattering of metallic oxide (Pu) through the glove-box train and the exhaust system." The DEIS mentions no precautions to prevent this.

DOE has sworn up and down that when the weapons plutonium disposition mission is completed, that the MOX FFF will be decommissioned. This promise is easily broken fifteen years from now. Then, proximity to the recently refurbished H canyon reprocessing facility will be convenient for the nuclear industry. The MOX FFF will then be perfect for making reactor grade plutonium fuel from reprocessed spent nuclear fuel. I ask what guarantees the public has that this is not true?

DOE promised the citizens of Amarillo and of Panhandle County that the storage bunkers holding most of this weapons grade plutonium would be upgraded from the decrepit old unsafe facilities they are now in. I see (page 4-2, line 27) that the promise has been broken. How can we trust your word when you break your promises so often?

It is no secret that the nuclear industry has wanted to implement the same reprocessing that has been going on in Britain and France, here in the U.S. The weapons plutonium disposition program is a means to that end, and has been part of their plan all along. They want to overturn Jimmy Carter's ban on fuel reprocessing. President Carter, being a navy nuke like myself, banned reprocessing for good reasons, including cost, reducing nuclear waste production, and lessening nuclear proliferation pressures.

There are those who believe that plutonium fuel use is more risky (pages 4-67 to 69). The DEIS glosses over the problems, so please allow me to explain why MOX use is not safe.

a.) Delayed neutron fraction of plutonium is .2% compared to .65% for uranium. Delayed neutrons are necessary, and the value of the reactivity "dollar" is determined by the difference between exactly critical and prompt critical. By reducing the fraction of delayed neutrons, the distance the control rods must move

to reach prompt critical is reduced. This is a significant safety reduction, totally unmentioned in the DEIS, and a valid reason to reject the whole MOX idea, in my opinion. Even with a 40% MOX core, the average delayed neutron fraction starts out around .45% and declines from there as uranium in the regular (non-MOX) rods is converted to plutonium through capture. This is a 30% reduction. Please explain in the final EIS why this is not of concern to you.

b.) Control rod effectiveness is reduced as the average neutron speed is increased. The higher capture cross section of plutonium, 269 barns, of the thermal neutrons leaves faster neutrons in the core. The control rods are best at absorbing neutrons at the slower energy. I have heard that there is a plan to add more control rods to the MOX use reactors, however this should be stated and specified in the EIS, and it isn't. These faster average neutrons have other attributes. Faster neutrons go through more shielding, causing slightly higher neutron embitterment and worker exposures. Faster neutrons also mean more generations per second, which can increase the slope and severity in power transients. Again, the literature is clear about this, and it should be incumbent on you to explain to us why these are not safety concerns. Put another way, I shouldn't have to point these facts out to you. Please explain your analysis and planned countermeasures.

c.) Moderator (delayed) Temperature Coefficient of Reactivity is positive, as stated in Nuclear Reactor Engineering, Gladstone & Sesonske, section 5.103. It gives a large positive change in fission per change in temperature. NRC rules specifically state that no reactor can operate with a combined positive temperature coefficient. The risk is clear. If a rise in temperature causes more reactivity (fissions) then a

positive feedback loop occurs leading to rapid reactor disassembly. The literature also says that reactor grade plutonium, due to Pu-240, is less of a concern. Thus, this is an instance where European MOX fuel experience doesn't apply. I request that the NRC reveal its' analysis of this important safety concern in the final EIS, with, if possible, prompt and delayed coefficients, graphed, formulas and explanations and countermeasures.

While few citizens might understand such an analysis, it is important to us to know for sure that you have looked at this very carefully. To further underscore my concern on this point, I must take us back to the Chernobyl accident, at 1:23 AM on April 26, 1986.

Grigori Medvedev in his book, "The Truth About Chernobyl", 1989, page 59, "...the RBMK reactor, which has a positive reactivity void coefficient of 2 beta and a positive reactivity temperature coefficient..." and page 70, "However...3 factors inimical to the reactor core all came together at the same time." Those three were the positive void coefficient which caused an increase in power when water became steam creating voids, a positive reactivity temperature coefficient, and the tips of the control rods which when the scram button was pushed actually added reactivity to the core momentarily. In addition, Medvedev mentions that the core was near the end of its burnup, which meant that the concentration of plutonium had reached its maximum amount, adding to the positive coefficients.

Those three factors look suspiciously similar to the three I have just mentioned, namely fewer delayed neutrons, reduced control rod worth and positive moderator temperature coefficient of reactivity.

d.) The synergy between the three just mentioned factors significantly reduces safety of the nuclear power plant operation, to a degree such that the Nuclear Regulatory Commissioners have just cause to reject the application for construction and operation of the MOX fuel Fabrication facility and its' attendant support facilities. Isn't it up to you guys to prove this is not true?

e.) Plutonium fission increases fission product gas production threatening fuel rod ruptures and increased radioactive gas releases to the environment, including twice the level of tritium production when compared to uranium.

f.) Plutonium fuel melts at a lower temperature, reducing safety margins.

g.) Reactor cores will not be homogenous threatening to create dangerous hot spots in the core or seriously complicating core-loading strategies.

Reason # 3 Speed of Disposition is greater compared to Immobilization

Faster disposition leaves less time for diversions, thefts or accidents. DOE did mention this as being an advantage for immobilization as compared to MOX fuel.

However, immobilization is no longer a choice. Left on the table are only MOX fuel and No Action. As such, MOX fuel is faster than doing nothing! I still say MOX is not safe, and favor immobilization as being faster, safer and cheaper.

If I were given the choice (as a Nuclear Regulatory Commissioner) between No Action and MOX fuel, I would have to choose No Action. Contaminating people and land with plutonium, as I believe MOX will do, is not worth the disposition benefits.

Reason # 4 Nuclear Proliferation risk is greater with MOX fuel.

Britain, France, Russia, India, Japan and North Korea all have reprocessing programs. The current issue of Bulletin of the Atomic Scientists details Iran's current attempts to join the club. The U.S. MOX program will a.) set an example for civilian plutonium use b.) advance the technology and c.) undercut arguments against reprocessing. The current trend is towards a future with many countries separating plutonium and using it for fuel, weapons or both.

Such a future is dangerous due to terrorism, diversions, accidents and nuclear weapons brinksmanship. At the same time, there is an alternative for this plutonium, which is faster, safer and cheaper which does not promote proliferation and plutonium use. That the United States has not chosen this alternative sends a strong signal to other countries and can only be attributed to greed among the nuclear industry. The Russians, U.S. nuclear industry, DOE, nuclear scientists and others are all competing for money.

Who is going to stand up and speak some common sense? I ask the Nuclear Regulatory Commissioners to be that somebody, and say no to the construction and operating license for the MOX FFF, PDCF and WSF, please.

Reason # 5 Dishonest NEPA Analysis

On page 4-83, line 30 & 31, of the MOX DEIS it is stated that, "Therefore, continued storage would result in higher annual impacts." Storing the plutonium in hardened bunkers without touching or processing it would result in MORE damage than all that plutonium transportation, processing, reactor use and removal to Yucca Mountain? This is not intellectually honest, a farce really.

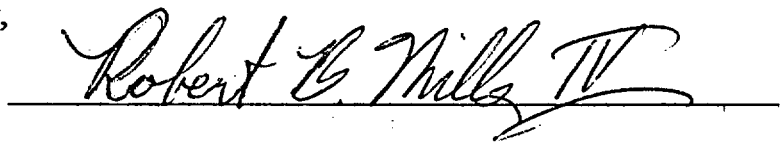
On page 1-2, lines 12 & 13 and lines 21 & 22 the DOE stated the purpose of the stated action, "To better insure that weapons usable material does not fall into the hands of rogue states or terrorist groups." And the reason for killing immobilization, "The DOE determined that in order to make progress with available funds, that only one approach could be supported." Another intellectually dishonest bait and switch routine. Not only would immobilization have accomplished the goal faster, safer and cheaper without promoting nuclear proliferation, but their blame the Russians reason vanishes when you realize that it would have been fine for the U.S. to immobilize its' plutonium while the Russians did MOX with theirs. There is no valid reason both countries must use the same path towards plutonium disposition. These statements fail to accurately and honestly fulfill NEPA requirements.

On page 4-8, lines 44 & 45 DCS uses data from the MELOX plant in Marcoule, France to estimate worker radiation dose at .009 LCF per year. Besides the cherry picking of sites to use, there is no way to confirm the data. Cogema promised to make the relevant data available when I attended the scooping hearing in Charlotte, N.C. back in 2001. They broke their promise. People who oppose the proposed action have no resort to substantiate their claims. The reading room near Pantex was stripped of all relevant documents, as were other sources nationwide following the events of September 11, 2001. The .009 estimated latent cancer fatality rate is dishonest, but opponents have been unfairly denied the means to prove it.

Those who are concerned (alarmed!) by the proposed actions are supposed to be protected by an impartial, unbiased and fair assessment performed by our government protectors (DOE, NRC, etc.). That this DEIS fails to do so in many more ways than I can

briefly mention is very clear. There is clear bias in favor of the proposed action at every turn. This is illegal, and fails the spirit of the laws meant to protect the citizens of this United States of America. In my opinion, the Nuclear Regulatory Commissioners have good reasons to reject the requested license.

Sincerely,



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