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Irradiated Fuel Policy (the only thing 'spent' is the money)

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Three attachments:

- Presentation slides (based on this paper)
- Principles for Safeguarding Nuclear Waste at Reactor Sites (with endorsements) [i]
- Letter to President Obama (May 2009) with cosigners[ii]

This document is informed by 19 + years of service to communities directly impacted by nuclear power reactor operations, existing and proposed radioactive waste dumps, shipments of nuclear materials and wastes to and from these sites as well as the prospective proposed radioactive waste generating sites (new mines, fuel cycle factories and reactors) during my work for Nuclear Information and Resource Service (NIRS). It is further informed by the National Grassroots Summit on Radioactive Waste, recently convened in Chicago. I do not "speak for" anyone except NIRS. The NIRS membership reflects more than 200 local grassroots activist groups and more than 14,000 individuals across all 50 states; with a disproportionate composition of people who share a deep concern about / are impacted directly by radioactive waste.

A recurrent concern in our community is how to demonstrate positive engagement with these enormously important policy issues without thereby colluding with those who are making the problems we seek to solve worse. Increasingly our society values "positive, proactive participation" and yet we are suffering from deeper and deeper conflicts of interest on the part of so-called public "servants" who are on the one hand representing a public policy process, and on the other hand have corporate interests in their own pocket – or worse still, appear to be **in** the pocket of those interests.

What is so wrong with that? Corporations that profit from contaminating communities, contaminating our bodies, the bodies of our children are not ever going to have credibility…until they stop making more radioactivity. Certainly this has been a recurrent theme in feedback over the years from the commercial-nuclear impacted communities to their legally mandated "protector," the US Nuclear Regulatory Commission (NRC).

Our community has recently sent specific feedback / objections to both the US NRC about the conflict of interest inherent in the agency conducting its own "cancer study" (since the study is an evaluation of the effectiveness of NRC licensing) and subsequently to the NAS about conflicts on the Board at NAS that is commissioned to oversee the same study. We have also objected to the dominance of nuclear industry representatives and others who are supported by the industry on the Department of Energy's Blue Ribbon Commission on America's Nuclear Future, charged to make new radioactive waste policy recommendations. The fact that neither body has chosen to

incorporate members who credibly represent non-industry people who are directly impacted by nuclear industry operations leaves them open to "marginalization" (in the words of Tom Cochran of the Natural Resources Defense Council addressing the BRC).

The views expressed here will, I believe, "frame the debate." Our bottom line is this: the only credible "solution" to the radioactive waste problem is to stop making more of it. Continued production of this material, predicated as it is on extraction and then a long chain of processing steps, each of which also produces collateral wastes results in worker exposures, routine releases of radioactivity by air, water, soil, community exposures and then transport of materials and wastes, resulting in more of the same – simply cannot be construed as a "solution." As has been said many times over the years: "when a pipe breaks run for the wrench, not the mop!"

It is true that an enormous mass is already dedicated as "future" waste when the eventual decommissioning of the 104 "operable" reactors comes – this is given. What is not given is building new reactors, operating the existing ones for decades longer, or power up-rates that result in more intensely radioactive wastes.

NO SAFE DOSE

The National Academy,[iii] independent researchers of great stature such as Dr Alice Stewart[iv] and Dr Rosalie Bertell,[v] and even the new "cutting edge" bio molecular research at DOE and NASA on radiation,[vi] confirm that radiation is destructive to living tissue, that its impact is to "randomize" DNA and that cancer is not the only outcome. There are impacts on DNA including heritable and non-heritable birth defects, as well as impacts so catastrophic that they are a barrier to reproduction (spontaneous abortion, miscarriage, still birth). It is also now established that heart muscle can be impacted, and survivors of Hiroshima and Nagasaki are being compensed for these effects.[vii] The Principle of Precaution[viii] dictates that when there is the opportunity to choose a path that is protective and lowers risk, we must do so.

- Since there is no safe dose of radiation, there is no "safe" radioactive waste
- Since there are other ways to generate electric power that do not produce waste
- It is our responsibility to LIMIT the total **source term** we insert into Earth's cycles…now, later…or "some day."

What is done is done – but dealing with the pile of existing waste becomes pretext – and in the case of the NRC, literally "license" for generating more.

• Forever More – radioactivity does not "go away" with burning, burying or boiling

There is no technology that "stabilizes" an unstable atom. Once an atom is unstable, it is never "peaceful." Irradiated fuel is famously a hazard for 11,000 human generations – but that is an under-estimate – NAS found that the peak doses from a Yucca Mt repository would start in the 100's of thousands of years into a million + years.

• Shell Game – since we can't "get rid of it" all we do is move it from pt A to pt B…And actually, in the case of centralized interim storage (formerly MRS, and AFR) or reprocessing, it is A → B → C and sometimes D or F!!! The only entity that can possibly call a waste shell game a "waste solution" is the corporation that made the stuff in the first place and is relieved of any further liability (if the DOE takes it). It is patently false that such moves "put all the waste in one place" – unless and until all new waste generation ceases, centralization of waste merely makes **one more place!** Triggering the shipment of this material ensures that it is in a multitude of locations "in transit." The problem with calling transport "safe" is that this waste is not safe sitting still!

• Moving the waste for the purpose of making more = making problem bigger -- the opposite of a "solution"

This is the fundamental issue. An individual or organization or agency that says the "Waste problem is solved" and then proceeds to generate more of this waste is denying the points above, is delusional, or has a depraved indifference to human life.

Policy decisions are often made by people who do not even understand the technical definition of "source term"[ix] and if they do understand that term, most often they are trained in physics or engineering – not biological science or medicine. The problem with nuclear energy is that it MAKES radioactivity (and plutonium). Radioactivity is mutagenic. Mutagenesis causes cancer, birth defects (both somatic and in the germ line) and some of these are catastrophic, meaning that the zygote or embryo is not viable (leading to spontaneous abortion, miscarriage, still birth or "infertility") as well as less defined impacts like "loss of immunity." Plutonium is of course the basis of nuclear weapons – another form of radiological hazard. No relocation of the waste in containers that will eventually fail can be construed as "a solution."

We never "had" a repository:

- Chlorine-36 data[x] from mid 90's showed Yucca was a bad site – should have dropped it then
- Chemistry of rock + containers + heat + water + oxygen = site a failure[xi]

The withdrawal of the license for Yucca Mountain by the Department of Energy is correct and long overdue. NIRS wrote the Petition for Disqualification of Yucca Mountain in 1998[xii] – signed by more than 200 allied organizations[xiii] – it stated that since the site, as demonstrated by the chlorine-36 finding, could not meet site suitability criteria contained in statute (specifically ground water travel time), it should be disqualified. Instead the rules were changed repeatedly[xiv], taking the national nuclear waste program out of the realm of science and putting it squarely in the realm of potential long term disaster. The subsequent revelations about the corrosive nature of the rock, action of the heat that would be intensified by industry goals to increase the waste burden at the site, and the fact that it is an oxidizing environment substantiated our 1998 assertion that Yucca was already a failed site.[xv]

- Many still reject burial at all[xvi]

It is worth noting that there is active discussion in the NGO community about the need for a new repository program vs the long-held view that it is safer to keep the waste where it can be monitored and where possible to recontainerize. Others view the proliferation risks as a reason to bury the waste[xvii] – and a recent suggestion is that instead of a remote location, the waste could be buried under a city where it would be much more difficult for future plutonium hunters to find.

One Congressional District?

Irradiated fuel is currently located at every reactor site plus several Department of Energy sites plus GE Morris and West Valley former reprocessing sites, in more than 30 states…and more than 70 Congressional Districts.

- Centralized "Interim" Storage (a.k.a. a "parking lot dump") would put a back-log of waste into one Congressional District, leaving 1 member of Congress and 2 Senators to advocate for any further federal appropriations for that waste[xviii]

For any plan that is to be truly "temporary," this is a very irresponsible strategy. There is nothing inherently better about one place – and unless or until all the radioactive waste production ceases, it is false to say that all the waste would be "in one site;" it would be in **one more site**.

• Transmutation reduces actinides while **increasing CURIES** – and therefore mutagenesis; 300 years hazard ≠ "short"

While NIRS concurs with our allies working to stop the spread of nuclear weapons that plutonium in reactor waste is a big problem – we do not agree that "burning up" plutonium or other transuranics is a "waste solution" – and we very much disagree that it would make the waste "safer." While it is true that fissile materials pose a unique threat associated with the making and potential use of nuclear weapons – however the fission product yield from the fission of transuranics is more radioactive ("hotter") than fission of uranium. There is ever more potential for cancers, birth defects, fertility impacts from the fission of plutonium than from the problematic reactors that we have today.

Dr. Edwin Lyman in analyzing the potential consequences of a major reactor accident where the core is using weapons grade plutonium (MOX) fuel found that the latent cancer fatalities double in direct proportion to the percentage of MOX fuel in use. No public servant should ever sign up for doubling what is already a major threat to public health, safety and security.[xix]

NRC will find, when talking with local communities that 300 years will not be viewed as "temporary" – 1776 was less that 300 years ago…it is true that our nation is young, but most of my country men and women do not see it that way! The geologic timeframes that this material invokes are irrelevant to local decision-makers.

• Reprocessing makes matters worse – no reduction in curies; even *partial* separation of plutonium → PROLIFERATION[xx] and smearing it around makes an enormous, costly, enduring mess -> like at WEST VALLEY[xxi]

One of the small moments of sanity in the nuclear era was when President Ford declared a halt on the exports of reprocessing technology and then President Carter declared an end to any federal funding for this dirty, nasty, dangerous, most polluting part of the nuclear fuel chain.

The West Valley site operated for parts of six years, while the production achieved was only about 1/3 of the output projected for that period. Meanwhile spill after spill, fires and a wild disregard for the realities of the site (this soil on hard rock that will erode into Lake Erie within a period shorter than the Source Term committed to the soil at the site today). The clean-up for this site far exceeds any possible gain from the material reprocessed during its short run: nearly all cost, no tangible benefit.[xxii]

It is not a rational moment in the history of this country or the world that the US Nuclear Regulatory Commission is considering writing regulations to support the reprocessing of irradiated fuel in the United States. In this era of malicious groups (terrorists) seeking fissile material, it is unthinkable that a nation like the United States would take the unprecedented step of announcing a plutonium economy. If it is not dangerous (and it is) it is definitely stupid, and if it is not dangerous or stupid (and it is) it is arrogant.

It is even less rational to hear policy pundits on the new Blue Ribbon Commission for America's Nuclear Future talk about bringing radioactive waste from all over the world to the US to prevent other countries from having the capacity to separate plutonium from reactor waste. The real experience with reprocessing in Europe has been under reported. The Irish Sea, the English Channel off Burgundy and several rivers in Russia are some of the most contaminated waters on Earth thanks to nuclear reprocessing sites. We do not need this legacy here!

Solution = Make More???

This round of Nuclear Commissioners has a rare opportunity – it could be the group that was remembered for ensuring a finite amount of radioactive waste from making electric power was generated in the United States. You could choose to oversee an orderly phase-out of the operating reactors and prevent any new licenses. The HERO status for such a commitment would be very large when looking back from a sustainable energy / sustainably healthy future. It is sad that there has been a lot of money poured into perpetrating the idea that nuclear is a panacea – it has been portrayed as such from the start of the Atoms for Peace program. Unfortunately the spread of "peaceful nuclear energy" has also been the spread of plutonium production. Plus, it is the destructive capacity of radiation that has been harnessed to kill cancer cells – there is nothing "peaceful" about radiation.

Once again nuclear is being promoted as THE "solution" – this time to the climate crisis – though any seasoned analyst knows it is physically impossible to use new reactor build to offset enough carbon as quickly as is needed -- as well as fiscally irresponsible.

SO once again NRC aides in the production of more waste – but why? This is certainly not a solution!

• Waste Contracts = waste leaves reactor site → property of US taxpayer – enormous (incalculable) corporate bail-out

The US Department of Energy has signed new contracts with energy corporations agreeing to take any newly generated irradiated fuel waste. Most of these contracts were signed in the waning hours of the Bush / Cheney administration – but several were signed during the transition between that administration and the current one. Key provisions ensure that the long-term disposition of the most concentrated radioactive waste (accounting for more than 95% of the total radioactivity in waste -- potential source term, in the USA[xxiii]) will be the responsibility of the US taxpayer. For a summary of these contracts and the implications of the taxpayer obligation associated with them, see:
http://www.beyondnuclear.org/radioactive-waste-whatsnew/2010/3/24/with-hasty-stroke-of-a-pen-bush-doe-transferred-billions-of.html

Few have tried to calculate the value to the nuclear industry of the "take title" provision. Clearly many fission products will exceed the 300 year study period that NRC Staff is proposing. Even at 300 years, the dog-food bill (for security) becomes very large.

• Plutonium on open market = bad

In addition to all the previous comments – there is wide agreement that plutonium generated in a commercial nuclear power reactor should not be sold on an 'open market' or otherwise "available." This is one of the biggest reasons in our view that NRC should get behind regulating the biggest reactor around – the one 93 million miles away – our Sun! No plutonium production from a solar panel!

• New 2008 / 2009 DOE contracts = swindle of the American People

Yup, that is how we see it. There was no notification, no vote in Congress approving this action by the White House and the Department of Energy, and yet the "value" to the nuclear industry is incalculable. "Cost recovery" by the waste fund does not include many real expenses, including any transport accidents (Price Anderson may cover) and any long-term problems with a repository (not clear).

• Waste problem gets BIGGER ≠ solution!

Repeat previous refrains…adding:

The Sun is the biggest source of power around – it also causes the winds to blow, and with a little help from the Moon, makes the tides… what more do we need? Power storage. Oh, yeah – that is where all the engineers and physics folks get jobs! Once base-load is redefined as supplying power 24 / 7 (instead of the false construct that one must make it 24 / 7) we will be fine.

NRC beginning to ask right questions

There has been substantial progress since fuel pools designed for 5 years of waste were thought to be sufficient. NRC is beginning to face the relevant questions – but seems to be lacking the integrity that would come from a realization that the only sane path forward is to limit and then END production of this material.

• BUT unless and until step out of role of facilitating more radioactive waste production, will not be credible

"…the first rule of holes…" [xxiv]

• Atomic Energy Act obligations have not been taken seriously – Homeland Security issues are enormous

How many MAJOR public health / security threats could be cut in half in 30 days? It was a back-of-the-envelope-calculation – but apparently a reactor core drops 50% in potential source term in only 30 days. It is not the case that another 50% subsides in another 30 days – and this calculation does not address waste in storage at the site. However if the reactor were attacked with conventional explosives or other means to cause a core breach – there would be ½ as many latent cancer fatalities than if the reactor had NOT been turned off for those 30 days. This is stunning; particularly when you see figures that 20% end-user efficiency across the US is obtainable from relatively simple shifts in things like lighting.[xxv]

Yes:

• Closed reactors are a driver

–But NOT for "centralized interim storage"

– "Stop making it" is basis for community cooperation and readiness to accept reality-based regulation

• Principles for Safeguarding Nuclear Waste at Reactor Sites (283 groups in 50 states):[xxvi]

– Establish hardened on-site storage (HOSS)

– Protect fuel pools

– Require periodic review of HOSS facilities and fuel pools

– Dedicate funding to local and state governments for independent monitoring

– Prohibit reprocessing

This statement of principles is the strongest point of agreement among impacted communities / the concerned community / NGOs that work on radioactive waste policy.

It is NOT however an affirmation that ALL reactor sites are all qualified for HOSS, nor is it the case that reactor communities are volunteering for permanent storage. The fact is, no matter what the "next step" that DOE / NRC or any other entity manages to institute, there will be storage at these sites for decades to come. Given this fact, this community

supports robust security, independent local monitoring and categorically opposes the movement of the waste for plutonium recovery (reprocessing).

The presentation slides end with the image of Corbin Harney, a leader of the Western Shoshone Nation; below are the words of Rufina Marie Laws, a leader of the Mescalero Apache People – both groups greatly impacted by radioactive waste policy of the dominant society that produced this waste.

> "As I met more people concerned with this issue, I realized that it takes on a much broader scope than just the Apache."
>
> "We are giving support to other Native American groups across the country that are facing this issue....This radioactive waste knows no boundaries, be they geographical, political or racial."
>
> -- Humans Against Nuclear Waste Dumps (HANDS)

One of my most difficult challenges as a representative of a non-government organization (NGO) has been finding an appropriate response to a Tribal Government "volunteering" to take the nuclear industry's waste. Many NIRS members are Native Americans, we work in collaboration with Native NGOs who work very hard on behalf of Tribal Sovereignty and self determination.

I finally came to see that the Tribal Government as a Sovereign Nation has the right to decide to build a radioactive storage site or dump – but I as a leader in the dominant US civil society and defender of human rights, future generations and our environment had a responsibility to oppose the EXPORT of our most deadly, mutagenic waste to be "dumped on" a small nation within our boundaries…or to paraphrase my colleague Kevin Kamps – the final solution that the nuclear industry and its supporters have found for this "worst of all wastes" is to drag it down a dirt road and dump it on Native Americans.

We as a People better be better than this.

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[i] Attachments to this paper are also available on-line Principles for Safeguarding Nuclear Waste at Reactors is posted on the Blue Ribbon Commission for America's Nuclear Future at: http://brc.gov/pdfFiles/May2010_Meeting/Attachment%203_HOSS%20PRINCIPLES-1.pdf

[ii] Letter to President Obama is available: http://www.nirs.org/radwaste/hlw/obamaltrsigners.pdf

[iii] National Academy of Sciences Biological Effects of Ionizing Radiation, I – VII have affirmed the linear-no-threshold view of radiation dose – response. Some have held that this view is "over protective" – but as time goes by the international community has consistently lowered the levels of "permissible" exposure.

[iv] Dr. Alice Stewart is known for establishing that X-rays during pregnancy produced a 400% increase in childhood cancers. An annotated bibliography of this scientist's contributions by Michael Warren is available in: *J Epidemiol Community Health 1988;42:309 doi:10.1136/jech.42.3.309 and available (no cost, only registration) at: http://jech.bmj.com/content/42/3/309.full.pdf*

[v] Dr Rosalie Bertell, 1999. "Victims of the Nuclear Age," The Ecologist, November 1999, and "No Immediate Danger?" Summer Town Books, 1990.

[vi] For instance: the DOE's Low Dose Radiation Research Program: http://lowdose.energy.gov/faqs.aspx

[vii] Nuke Info Tokyo reports that myocardial infarction is currently being considered for worker compensation in Japan: http://cnic.jp/english/newsletter/nit135/nit135articles/umeda.html

Myocardial infarction is recognized for Hiroshima and Nagasaki hibakusha
http://cnic.jp/english/newsletter/nit131/nit131articles/abombdisease.html

[viii] A simple statement of the Precautionary Principle is posted: http://environmentalcommons.org/precaution.html

[ix] From NRC's glossary: Types and amounts of radioactive or hazardous material released to the environment following an accident; posted at: http://www.nrc.gov/reading-rm/basic-ref/glossary/source-term.html. The release of radioactivity over time from a waste disposal or storage site qualifies as "source term" even without a single "triggering event."

[x] See: http://www.state.nv.us/nucwaste/yucca/plut01.htm

[xi] See a simple overview from the Alliance for Nuclear Accountability:
http://www.ananuclear.org/Portals/0/documents/ANA%20Yucca%20final.pdf

[xii] Petition to Disqualify Yucca Mountain as submitted to the Department of Energy 12/12/1998
http://www.nirs.org/radwaste/yucca/disqualifyyuccapetitionfinal.htm

[xiii] Cover letter to Secretary of Energy Bill Richardson, with 219 groups supporting Petition for Disqualification of Yucca Mountain site from consideration as a national nuclear waste repository
http://www.nirs.org/radwaste/yucca/disqualifyyuccafinalletterwithsignatures.htm

[xiv] There are several summaries of the regulatory divergence from science-based reason in the case of the Yucca Mt site – this one was published by Dr. Arjun Makhijani in 2003 and is cited here:
http://www.ieer.org/comments/waste/yuccaitaly.html

[xv] Alison McFarlane, 2003. Underlying Yucca Mountain: the Interplay of Geology and Policy in Nuclear Waste Disposal. Social Studies of Science 33/5 (Oct 2003) 783-807.

[xvi] See for instance the Nuclear Guardianship project http://www.nonukes.org/r02ethic.htm

[xvii] Dr Makhijani is not alone in advocacy for a new repository program, but he is the easiest to cite:
http://www.ieer.org/comments/DOE_WasteContracts_IEERstatement2010.pdf

[xviii] It is important to remember that the Waste Fund has always been "on budget" and subject to annual appropriations.

[xix] Dr. Edwin S. Lyman, 1999. "The Impact of the Use of Mixed-Oxide Fuel on The Potential for Severe Nuclear Plant Accidents in Japan" http://www.nci.org/j/japanmox.htm and 2001 Science and Global Security Vol 9, pp 33-79.

[xx] Frank von Hippel, September 2005 – Is US Reprocessing Worth the Risk? Posted:
http://www.armscontrol.org/act/2005_09/Fetter-VonHippel

[xxi] For a wealth of information on West Valley former commercial reprocessing site see:
http://www.nirs.org/radwaste/decommissioning/decommissioninghome.htm

[xxii] For details, see the report December 2008. the Real Cost of Cleaning Up Radioactive Waste: A Full Cost Accounting of the Cleanup Options for West Valley Nuclear Waste.

[xxiii] See Integrated Spent Fuel Database DOE RW 0006 in many revisions – particularly 1992 which included pie charts by total volume and total radioactivity.

[xxiv] …is to stop digging!

[xxv] See www.carbonfreenuclearfree.org

[xxvi] See note # 1