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Comments
on
Final Environmental Impact Statement for Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling Naval Reactors Facility Department of Energy Idaho National Laboratory

DOE/EIS-0453-F

Submitted by
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November 22, 2016

EDI-Com-NNPP-Final-EIS.Rev.R

Summary

The Environmental Defense Institute (EDI) comments on the Department of Energy (DOE) Draft Environmental Impact Statement DOE/EIS-0453-D, submitted previously for the record, are available on EDI's website. [1] EDI's comments on the draft have more background contamination and radioactive waste information needed to fully understand all the environmental impacts. EDI's comments on NRF CERCLA review is also available. [2] Tami Thatcher's DOE comments on DEIS that cover other crucial issues are available. [3] The comments below focus on the final FEIS issues that were not covered and therefore make it deficient for the following reasons:

* The FEIS fails to comply with all National Environmental Policy Act (NEPA) requirements;
* The FEIS fails to fully evaluate keeping the existing Expanded Core Facility (ECF) spent (used) nuclear fuel (SNF) cooling pool in operation for "over 33 years" as an integral part of NRF operation;
* The FEIS incorrectly says NNPP will not generate high-level-waste, greater-than-class waste or transuranic waste;
* The FEIS failed to adequately assess the ECF's seismic vulnerabilities.

"The Naval Nuclear Propulsion Program (NNPP), also known as the Naval Reactors Program, is a joint United States (U.S.) Navy and Department of Energy (DOE) organization with responsibility for all matters pertaining to naval nuclear propulsion from design through disposal (cradle-to-grave)." [FEIS pg. Vol. I Abstract]

The Naval Reactors Facility (NRF) located on DOE's Idaho National Laboratory (INL) is the waste end of the used reactor fuel (spent nuclear fuel or SNF) from the NNPP's nuclear fleet. DOE's role is designated to manage the Navy's waste.

EDI finds this EIS a clever effort to slip in major expansion of the Navy's SNF waste management without acknowledging 50+ years of massive radioactive contamination at INL by claiming previous NRF environmental studies. [4] DOE/NAVY claim these CERCLA reports are beyond the scope of this EIS. The Navy's previous radioactive contamination will remain for manila putting Idahoans at risk. This is an unconscionable and avoidable assault on Idaho's most valuable Snake River Aquifer that we depend on.

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[1] http://www.environmental-defense-institute.org/publications/EDINRFcomments.pdf

2 http://www.environmental-defense-institute.org/publications/NNPP-Report7A.pdf

[3] http://environmental-defense-institute.org/publications/CommentsECF.pdf

[4] Remedial Investigation/Feasibility Study (RI/FS) studies required by CERCLA to characterize the nature and extent of contamination because of past releases of hazardous and radioactive substances to the environment, to assess risks to human health and the environment from potential exposure to contaminates, and to evaluate cleanup actions.

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I. NEPA Requirements Violated

A. The FEIS fails to comply with all NEPA requirements.

The FEIS correctly states: "NEPA, Sec. 1502.1 Purpose Environmental Impact Statement. The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the Federal Government. **It shall provide full and fair discussion of significant environmental impacts and shall inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment… Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses. An environmental impact statement is more than a disclosure document.** It shall be used by Federal officials **in conjunction with other relevant material** to plan actions and make decisions." [5] [emphasis added]

FEIS states: "Per NEPA requirements (10 C.F.R. § 1021 and 40 C.F.R. § 1500–1508), consideration must be given to whether actions performed under the alternatives could result in a violation of any federal, state, or local law or requirements, or require a federal permit, license, or other entitlements. Federal environmental laws that affect environmental protection, health, safety, and compliance were considered in the EIS scope development. In addition, environmental requirements that have been delegated to the state of Idaho and local requirements were considered to ensure compliance." [FEIS pg. 1-13]

The Yale Law Journal Review notes: "To comply with existing law and achieve NEPA's normative goals, agencies should expand EIS discussions of how applicable regulatory regimes will shape project impacts. Impact discussions are not 'full and fair' without this information because they fail to allow the public and other agencies to comment on—and more importantly, to challenge—this crucial aspect of project planning. Such an approach would further NEPA's aim to '[r]igorously explore and objectively evaluate' [178] the full scope of project impacts that 'significantly affect the quality of the human environment.'"[179] [6]

Due to public and Federal court pressure, DOE has in the recent past conducted numerous "Programmatic" EISs that comprehensively analyze all relevant aspects of a projects

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[5] Authority: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 et seq.), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977). Source: 43 FR 55994, Nov. 29, 1978, unless otherwise noted.

[6] *A 'Full and Fair' Discussion of Environmental Impacts in NEPA EISs: The Case for Addressing the Impact of Substantive Regulatory Regimes*, Sarah Langberg, foot notes 178 & 179 citing 40 C.F.R. § 1502.14(a) (2014). U.S.C. § 4332(C) (2012). http://www.yalelawjournal.org/note/nepa-eiss-and-substantive-regulatory-regimes.

environmental impact. [7] DOE/NNPP must be pressured to fulfill NEPA requirements by reissuing this FEIS as a comprehensive "Programmatic EIS."

The DOE/Navy is trying to avoid NEPA requirements to provide a comprehensive environmental impact statement of the proposed actions. Failure to provide NRF past-present-future waste characterization/disposition means the DEIS/FEIS are deficient. Absent this crucial waste data, Commenters' must rely on previous reports to ascertain how these operations effect the environment. [8] The public cannot rely on this document to provide the information needed to make an informed decision.

II. DOE/Navy fails to issue a Comprehensive Programmatic EIS

A. The FEIS inadequately evaluates keeping the Expanded Core Facility (ECF) in operation; for "over 33 years" as an integral part of NNPP operation.

FEIS states: "**Overhaul Alternative time period. The first 33 years of the 45 years (i.e., the [ECF] refurbishment period), refurbishment and operations activities would be conducted in parallel.**" [Pg. S-8] [emphasis added]
"[T]he NNPP will continue to operate ECF during new facility construction, during a transition period, and **after the new facility is operational for examination work**. **To keep the ECF infrastructure in safe working order during these time periods, some limited upgrades and refurbishments may be necessary. Details are not currently available regarding which specific actions will be taken; therefore, they are not explicitly analyzed as part of the New Facility Alternative**." [9] [emphasis added]

The above FEIS statement: "Details are not currently available regarding which specific actions will be taken." **This documents the fundamental inadequacy of the FEIS.** DOE/Navy cannot legitimately claim compliance with NEPA when the most degraded part of this operation is not fully evaluated in explicit detail. More troubling is the Environmental Protection Agency (EPA) and Idaho Department of Environmental Quality's defining silence as regulators. This is a crucial issue given that the public's environmental defenders are politically compromised on enforcement of laws they have authority over.

The FEIS correctly states: "Per NEPA requirements (10 C.F.R. § 1021 and 40 C.F.R. § 1500–1508), consideration must be given to whether actions performed under the alternatives could result in a violation of any federal, state, or local law or requirements, or require a federal permit, license, or other entitlements. Federal environmental laws that

[7] See, Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the U.S. Including the Role of the Fast Flux Test Facility, DOE/EIS-0310, December 2000.

[8] See EDI's NRF CERCLA comments and for more detailed information on NRF's waste characterization not provided in this EIS. http://www.environmental-defense-institute.org/publications/NNPP-Report7A.pdf

[9] Final Environmental Impact Statement for the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling, October 2016, DOE/EIS-0453-F, Pg. S-9, herein after referred to as FEIS.

affect environmental protection, health, safety, and compliance were considered in the EIS scope development." [FEIS Pg. 1-13]

Yes, environmental laws were considered but never acknowledged to be violated. In addition the FEIS fails to include soil and ground water contamination from ECF leaks and discharges that **do** violate environmental laws. [10] These issues will be discussed later.

1. ECF Degraded Condition

DOE/NRF's statements confirm the degraded condition of the ECF. Again documents the fundamental inadequacy of the FEIS to exclude specific actions required to mitigate continued significant ECF leaks. "Not a matter of urgency" discloses the Navy's previous decades of disregard for environmental degradation.

"Major portions of the ECF infrastructure have been in service for over 50 years. **The ECF water pools have never undergone a complete refurbishment and have not been upgraded to current seismic standards. Although water pool surfaces are covered with a fiberglass or epoxy coating, the water pool does not have a liner, creating the potential for water infiltration into the reinforced concrete structure and the potential for corrosion damage of the reinforcing bar within the structure. The capability to detect and collect small leaks, a common feature in modern water pools, is not present for the ECF water pool. Consequently, while the replacement or overhaul of the current water pool is not a matter of urgency that must be done in a very short period, it is something that needs to be planned and started soon."** [FEIS Pg. S-6][emphasis added]

2. ECF Leaks ?

"**Alternative methods would be to discharge the water from leak testing the pools (up to 18,927,000 liters (5 million gallons)) to the sewage lagoons or to the [Industrial Waste Ditch] IWD during the last year of construction.** This discharge would occur over a short period of time (about 6 days) but is not expected to exceed the infiltration capacity or the maximum flow distance (2.9 kilometers (1.8 miles)) previously recorded for the IWD. **The permitted annual discharge rate for the IWD of 113,600,000 liters (30,000,000 gallons) would not be exceeded. Section 4.4.3 reflects this potential discharge of water for pool leak testing."** [FEIS Pg. 1-21]

[10] See EDI's NNPP Report that offers a Review of NRF CERCLA issues not addressed in this EIS. And Final NRF Comprehensive Feasibility Study Waste Group 8 Naval reactor Facility. And "Supplement to Evaluation of Naval Reactors Facility Radioactive Waste Disposed of at the Radioactive Waste Management Complex from 1953 to 1999", J. Giles et.al., April 2005, ICP/EXT-05-00833, pg. 18.

Table 4.4-5: Discharge to the IWD for the Construction Period of the New Facility Alternative [FEIS Pg. 4-44]

Source	Volume[1]	
	liters per year	gallons per year
Construction Period Increase **(leak test water)**	18,927,000	5,000,000
NRF Baseline [including ECF] [2]	43,190,000	11,410,000
Total[3]	62,117,000	16,410,000
Wastewater Reuse Permit Discharge Limit[4]	113,600,000	30,000,000
Percent Increase Over the NRF Baseline[5]	**43.8**	
Percent of Discharge Limit[6]	**54.7**	

[1]Numbers have been rounded; therefore, unit conversions are not exact.
[2]Total volume of discharge to the IWD from all NRF sources **(including ECF) for 2009.**
[3]Total of Construction Period Increase and NRF Baseline.
[4]Based on the Industrial Reuse Permit Renewal Application for the Naval Reactors Facility pending approval, dated January 26, 2012.
[5]Percent increase from construction period over the NRF Baseline.
[6]Percentage of total discharges for NRF (62,115,000 liters) compared to the wastewater reuse permit discharge limit.

The NRF Industrial Waste Ditch (IWD) is just that; an open ditch where huge volumes of radioactive liquid process waste from the ECF is allowed to sink down into the aquifer below flushing previous contaminates down further into groundwater. DOE/Navy claims "CERCLA remedial action plan are outside the scope of this EIS" and thereby attempts to censure NRF groundwater and soil reports showing significant contamination above EPA/MCL limits. This FEIS facilitates continued contamination of Idaho's most precious resource that thousands of INL workers and all Idahoans rely on for drinking and crop irrigation.

Again, leak testing (in the above 4.4-5 table) is not defined, however the reader is left to assume that this represents the volume of water that continues to leak into concrete structure surrounding the ECF and that must be pumped out and discharged to the Industrial Waste Ditch (IWD) or other unlined percolation ponds at the NRF. These radioactive waste discharges eventually migrate to the aquifer and the Snake River via Thousand Springs near Hagerman, ID.

The above ECF "water tight" is not possible with planned epoxy/fiberglass coatings as previous use demonstrates, but only with the NRC required stainless liner which is not planned. FEIS fails to characterize/quantify what the above waste discharges will be and how these additional discharges will add to existing NRF soil/groundwater contamination described in CERCLA RI/FS. [11]

FEIS states: "The ECF water pool does not leak 16,000 gallons per day as alleged by the [EDI] commenter, and there is no known leak to the environment." "Appendix F,

[11] Remedial Investigation/Feasibility Study (RI/FS) studies required by CERCLA to characterize the nature and extent of contamination because of past releases of hazardous and radioactive substances to the environment, to assess risks to human health and the environment from potential exposure to contaminates, and to evaluate cleanup actions.

Section F.5.4.12 states that additions to the water pool are about 150 gallons of water per day to compensate for evaporation. The 150 gallons per day of make-up water is consistent with expected losses due to evaporation based on the surface area of the pool and facility humidity levels." [FEIS Pg. G-102]

The above statement is misleading at best. The Navy's own earlier CERCLA report states: "The ECF water level is monitored frequently and recorded in water level logs. Water is routinely added to the pits to compensate for evaporation loss. **For the past four years, the average water loss has been 3500 gallons per month.** To determine if any leakage has occurred, the actual water loss per month is compared to theoretical and experimental evaporation data. **Between December 8, 1991 and February 6, 1992, significantly more water was added to the water pits than anticipated. The detailed investigation of this event identified that an unexplained water loss of 62,500 gallons occurred between December 8, 1991 and February 21, 1992.** A leak from one water pit was the expected cause of the water loss." [12]

The above documented ECF 62,500 gal.30 day leak = 2,083 gal. /day. Obviously, the DOE/Navy is not offering true or credible information in this FEIS. The above cited document was obtained through an EDI FOIA request and not radially available to public. Clearly, this is why the DOE/Navy does not include NRF CERCLA data in this FEIS. [13]

ECF leaks and discharges to the Industrial Waste Ditch (IWD) are not fully evaluated in the FEIS especially when ECF projects will be heavily regulated under substantive environmental law regimes such as the Clean Air Act (CAA) [14] or Clean Water Act (CWA). [15]

B. The FEIS fails to include the Advanced Test Reactor as an integral part of NNPP operation

Currently, the Advanced Test Reactor at INL that tests NRF fuel is a crucial part of NRF operations and itself produces SNF. This sleight of hand that the ATR is not an integral part of the NNPP/NRF is ridiculous and challenges the credibility of this FEIS.

C. The FEIS fails to include Idaho Nuclear Technology and Environmental Center (INTEC) as an integral part of NNPP operation

"In addition to DOE owned fuel INL/INTEC CPP-666 stores spent fuel from the Naval Reactors Program." [16] "The Idaho [CPP-666] inventory includes SNF from the Naval

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[12] Final NRF Comprehensive Feasibility Study Report Waste Area group 8 Naval Reactors Facility, Idaho Falls Idaho, Pittsburgh Naval Reactors Office, and pg. 5-1.

[13] FEIS, Pg. G-102

[14] Clean Air Act (CAA)[10] Yale citing 42 U.S.C. ss 7401q(2012)

[15] Clean Water Act (CWA) Yale citing 33 U.S.C. ss 1251-1387 [11]

[16] Energy and Environment, Storage of DOE SNF at the Idaho National Laboratory, U.S. DOE.

Nuclear Propulsion Program (i.e., submarines and aircraft carriers), which is different from commercial SNF in many ways, including enrichment level and design. From about 1952 to 1992 this Navy SNF was reprocessed in Idaho to extract high-enriched uranium for use in driver fuel rods at weapons material production reactors elsewhere." [17]

Chemical reprocessing at INL/INTEC generated millions of gallons of high-level waste – 900,000 gallons of which remains in underground tanks today. Leaks from this INTEC high-level waste tank farm and aquifer waste injection wells continue to contaminate the soil and groundwater. [18]

The FEIS states: "The Naval Nuclear Propulsion Program (NNPP), also known as the Naval Reactors Program, is a joint United States (U.S.) Navy and Department of Energy (DOE) organization with responsibility for **all matters pertaining to naval nuclear propulsion from design through disposal (cradle-to-grave)."** [FEIS pg. Vol. I Abstract] [emphasis added]

II. Incomplete Environmental Impacts

A. The FEIS fails to include previous environmental contamination identified in CERCLA investigations in cumulative environmental impact;

DOE/Navy use a classical bait and switch ostensibly initially appearing to follow the legal requirements of NEPA, while later buried in the FEIS claim's the NRF has no obligation to include the full waste stream disposition and environmental contamination resulting from NRF/ECF operations. What is critical in any EIS is to review all environmental the impacts of any subject operation. That literally means the past, present and anticipated impacts as NEPA requires. By ignoring history, we are bound to repeat it.

B. FEIS states: "Comments on the NRF Waste Area Group 8 CERCLA remedial action plan are outside the scope of this EIS." [19] [FEIS Pg.G-104]

Again, it is essential to review previous CERCLA analysis to get an accurate assessment of what current and future operations will be since the basic operations have not changed. Moreover, new waste discharges MUST be added to previous contamination to fully assess environmental impacts. An earlier NRF Environmental Report states: "Overall, less than an estimated 1500 curies of radioactivity have been released to the atmosphere during the period of 1953 through 1991, with the majority of the releases occurring in the 1950s. During the past 10 years, releases have been less than 10 curies per year…. In Addition to the annual releases, a single release occurred in 1955 during the performance of an engineering test to obtain information on the effects of boiling conditions in naval reactors.

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[17] U.S. Spent Nuclear Fuel Storage, James Warner, Section Research Manager, Pg. 27, Citing T. Cochran, et.al., Nuclear Weapons Databook, Vol. II, May 24, 2012, Congressional Research Service, 7-5700, R42513, www.crs.gov

[18] Engineering Design File, Groundwater Pathway Risk Assessment for CPP-601, CPP-602, CPP-627, and CPP-640 Fuel Reprocessing Complex Non-Time-Critical Removal Action**,** Document ID: EDF-10195, Revision ID: 1, Effective Date: 02/08/12.

[19] Proposed Plan Waste Area Group 8, and Removal Actions Considered for Naval Reactors Facility Idaho National Laboratory, issued by DOE, EPA, and Idaho Department of Environmental Quality.

… A conservative estimate of the amount of radioactivity released from the site was 870 curies. [20]

Review of the historical deep well sampling data at NRF does not support the Navy's conclusion of no impact. NRF CERCLA report shows Table III Deep Well Sample Results for Wells # 1, # 2, and # 3 at 60, 69, and 44 pico curies per liter respectively for gross beta. [21] The federal drinking water standard for gross beta is 8 pico curies per liter. This deep well sample data confirm that contaminates in fact migrate, contrary to the Navy's claims that contaminates are bound up in the soil.

Vegetation at NRF CERCLA Unit 8-08-14 radioactivity (pCi/gm) Sampling Results (Pre-1971) Sample # 68-1 was 144,522; Sample 6-82 was 687,447 pCi/gm. [22] DOE/NRF understandability is blocking this shocking data. Like a used house salesman showing a prospective buyer a fancy color brochure that does not show the failing foundation, leaking heating oil tank and water leaks, DOE fits perfectly by vehemently objecting to independent environmental review.

D. The FEIS Inadequately Characterize Groundwater Contamination

FEIS states: "Groundwater monitoring has generally shown long-term trends of decreasing concentrations for radionuclides, and **current concentrations are near or below EPA MCLs for drinking water and the sites where there is historic contamination are not used as sources for drinking water.**" [Pg. G-99][emphasis added]

The above statement "current concentrations are "near" EPA MCLs for drinking water and the sites where there is historic contamination are not used as sources for drinking water" completely disregards NRF staff, visitors and thousands of INL workers at other facilities who drink water drawn from facility wells. What about adjacent Atomic City residents? What kind of credibility can the public put on the Navy's assurance that groundwater is "NEAR" regulatory EPA MCL limits? None! Every INL/NRF potable water source should have a notice DO NOT USE FOR DRINKING.

The FEIS states: "During the construction period of the New Facility Alternative, there would be **small impacts on the amount of water seeping into the perched water zone at the IWD outfall**." [4-44][emphasis added] "The increased water discharge volume at Location 3/4 or Location 6 during the transition period could result in **additional seepage of water to the perched water zone located beneath the IWD outfall. When the areal extent of this**

[20] Naval Reactors Facility Environmental Summary Report NRF-EC-1046, Pg.18. And Naval Reactors Facility Environmental Summary Report NRF-EC-1007, Calendar Year 1991, Pg. 18.

[21] NRF October 1995 Remedial Investigation / Feasibility Study (RI/FS) Appendix K.

[22] Final NRF Comprehensive Feasibility Study Waste Group 8 Naval Reactor Facility Appendix H, October 1995, Pg. H6-13, Table H6—5.

perched water zone was greatest, annual discharge volume to the IWD was 650,000,000 liters (172,000,000 gallons) and was not regulated by a permit. [FEIS Pg. 5-40]

To characterize waste discharges as having "small impacts" to the ground water is ridiculous. Why? Because these huge contaminated waste water discharges will flush existing waste into the aquifer. Nuclear Regulatory Commission (NRC) would otherwise require leak-proof stainless steel liner in all commercial spent nuclear fuel (SNF) storage pools because leaks contaminate the groundwater. Epoxy/fiberglass coatings are not allowed at NRC regulated SNF facilities because they leak and the pool cannot be accurately leak tested. Moreover, applying more epoxy to acknowledged failing concrete pool walls adds to the absurdity. Below EDI discusses ECF significant leaks and what DOE/Navy euphemistically calls "Leak Testing" that is apparently when they measure the amount of ongoing ECF leaks into this pool substructure. Leaks to the soil cannot be measured except by water required to maintain pool water volume.

The FEIS states: "Water pool refurbishment would include correcting deteriorating conditions. These actions would be necessary to ensure that the water pools support long-term use by, to the extent practicable, **bringing the water pools up to current design and construction standards.** [Pg. S-8]

The "current design and construction standards" DOE/NRF refers to above are not the standards NRC requires of all regulated SNF storage pools. DOE/NRF makes no apparent reference what standards are being applied to this ECF. There is no intent to replace the degraded/leaking ECF SNF water storage pool. What will NRF do with the 400 SNF assemblies in the ECF while "The water pools [are] drained, decontaminated, and emptied of some equipment" with degraded pool gate seals? We discuss this major issue below in seismic vulnerabilities.

1. No Discharge of Radioactive Liquid?

The FEIS states: "Liquid LLW: Refurbishment Period: There would be **no impact from liquid** LLW since waste generation volumes would not change. Post-Refurbishment Operational Period: There would be **no impact from liquid LLW** since waste generation volumes would not change." [Pg. S-69] [emphasis added]
"Groundwater: There would be **negligible impacts to groundwater** under the No Action Alternative and the refurbishment period of Overhaul Alternative from radiological constituents **if** preventive and corrective maintenance is not sufficient to prevent a **minor** water pool leak. There could be **small impacts to groundwater** during the transition period and new facility operational period under the New Facility Alternative from potential increases in non-hazardous salts in wastewater discharge." [Pg. S-73] [emphasis added]

No reasonable person can read these repeated statements of "no impact" "negligible impacts to groundwater" knowing the huge leak volumes in question and knowing this operation has been doing this for 50 years, without cringing. Again, the Navy intends to

keep this leaking ECF in operation for decades. The FEIS offers no accurate characterization of the ECF water discharged/leaked. See below NRF CERCLA report EDI gained through FOIA that documents this crucial data.

The FEIS states: "Radiological Effluent: There would be **no impact from radiological effluent since none** would be discharged to surface water or the Snake River Plain Aquifer (SRPA). "NRF does **not discharge radiological liquid effluent to the environment**." [FEIS Pg.S-16] [emphasis added]
However FEIS states: "Radiological Liquid Effluent Parameters for NRF [Industrial Waste Ditch] IWD maximum discharge for Co-60, Cs-137, Sr-90, and tritium (H3) at 20, 20, 1.9 and 0.7 pCi/l respectively. "Actual minimums and maximums over 5-yr. **or** 2 yr. period are reported." [FEIS Pg. 3-32] [23]

These two above FEIS statements are contradictory and challenge the veracity of the document. Additionally, why 5 yr. **OR** 2yr. periods recorded? Is there data in 5-yr. monitoring data showing higher numbers that DOE/Navy is withholding like 10 yr. monitoring data? See below CERCLA data showing significant radioactive contamination intentionally excluded.

The above FEIS table 4.4-5 showing tens of millions of gallons of water used for direct contact cooling of extremely radioactive used reactor fuel (SNF) and dumped in the open IWD ditch, belies DOE/NRF's statement: "**NRF does not discharge radiological liquid effluent to the environment." The coolant water is radioactive and hazardous due to corrosive activated material on extremely radioactive used fuel surfaces and must be treated as such.**

NRF CERCLA reports prove FEIS false by showing S1W Leaching Bed Area Radioactivity Soil Sampling for Cs-137 at 310,000 pCi/g; Co-60 at 1,300,000 pCi/g. [24] The NRF Retention Basin where highly radioactive process waste water is sent to allow short-lived isotopes to decay before discharging it to IWD showed sludge samples of Cs-137 at 192,700 pCi/gm; [25] Strontium-90 at 5,118 pCi/gm. NRF Vegetation sampling results at location 68-1 and 68-2 at 144,522 and 687,447 pCi/gm respectively. [26]

These FEIS statements of "no impact" are categorically false. Absence of recent CERCLA Remedial Investigations/Feasibility (RIFS) showing significant environmental contamination documents how this FEIS attempts to ignore fundamental NEPA policy. For instance, NRF CERCLA Unit 8-08-12 sample results show chromium at 2,090 mg/kg (MCL = 50 mg/kg); Cesium-137 at 149,759 pCi/gm (risk-based soil level = 0.003). [27]

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[23] FEIS Pg. 3-32

[24] Final NRF Comprehensive Feasibility Study Report Waste Area group 8 Naval Reactors Facility, Idaho Falls Idaho, Pittsburgh Naval Reactors Office, Appendix I, October 1995, Table 1-3a, Pg. I-59.

[25] Ibid. Appendix H, Table H8-4, Unit 8-08-17, Pg. H8-8.

[26] Ibid. Appendix H, Table H8-5, Pg. H8-9.

[27] Ibid. Appendix H, Table H4-13, Unit 8-08-12, Pg. H4-22.

Below Table H6-6 lists the radioactive isotopes found in the ECF process water Leaching Bed sediments. This CERCLA data contradicts FEIS statement: "NRF does not discharge radiological liquid effluent to the environment." These sample results show extremely high radioactive mud that will eventually percolate into the aquifer.

1971 Samples NRF Leaching Bed Mud [28]

Table H6-6- Unit 8-08-14 Radioactivity (pc/gm) Sample Results (pre-1971)

Sample Number	Soil				
	Cs-137	Cs-134	Co-60	Hf-181	Sb-124
1	310,000	42,000	450,000	4,900	190,000
2	190,000	42,000	42,000	6,200	37,000
3	210,000	7,600	1,300,000	8,700	43,000
4	80,000	14,000	640,000	9,100	ND
5	95,000	20,000	1,000,000	15,000	55,000
6	140,000	42,000	1,000,000	19,000	ND
7	150,000	40,000	1,100,000	20,000	ND
8	140,000	31,000	440,000	8,200	33,000

NRF-RI/FS Table H6-6 Pg. H-6-14

NRF CERCLA report continues: "The release of 62,500 gallons is a conservative maximum estimate. Based on the results of periodic NRF Chemistry analyses of the low level of radio nuclides present in ECF water pool water, the estimated quantities of radionuclides released are as follows: 5.2 x 10-2 curies of tritium, 9.7 x 10-6 curies of carbon-14, 7.1 x 10-6 curies of manganese-54, 1.9 x 10-5 curies of cobalt-58, 4 x 10-4 curies of cobalt-60, 6.6 x 10-5 curies of nickel-63, 1.2 x 10-6 curies of strontium-90, 1.2 x 10-6 curies of yttrium, and 1.1 x 10-5 curies of cesium-137. Thus, a total of 5.25 X 10-2 curies of radioactivity were estimated to have been released. The estimate is considered to be conservative, because previous leaks from the water pit into observation rooms within the ECF building rarely indicated the presence of radioactive contamination. The release occurred about 30 feet below ground surface." [29] [5-1]

"Tritium is the only radionuclide expected to migrate with the water. The COPCs as identified in the Work Plan (WEC, 1995) were tritium, carbon-14, cobalt-60, manganese-54,

[28] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Prepared for the U.S. DOE Pittsburgh Naval Reactors Office, Pg.H-6-14.

[29] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Pg. 5-2

nickel-63, strontium-90 and cesium-137. The concentration terms for each radionuclide are given in Table 5-1. [30] [Pg. 5-2]

The below table 2-1 is found in a NRF CERCLA report and documents soil contamination. [31]

Table 2-1 OU 8-08 COCs and Risk-based Soil Concentrations

COC	Exposure Route	Risk-based Soil Concentration(1) (pci/gm unless specified)	Max. Soil Concentration (pci/gm unless specified) Detected at OU 8-08
Lead	Direct Contact	400 ppm(2)	1,140 ppm
Americium-241	External Exposure	895	20
	Ingestion of Soil	283	–
	Food Crop Ingestion	301	–
Cesium-137	External Exposure	16.7	7,323
	Ingestion of Soil	24,860	–
	Food Crop Ingestion	164	–
Neptunium-237	Food Crop Ingestion	19.8	0.79
Nickel-63	Food Crop Ingestion	15,846	730
Plutonium-238	Ingestion of Soil	590	20
	Food Crop Ingestion	1,153	–
Plutonium-244	External Exposure	3.3	0.24
Strontium-90	Ingestion of Soil	15,418	750
	Food Crop Ingestion	45.6	–
Uranium-235	External Exposure	13.2	0.18

(1) Concentration which corresponds to a 1 x 10^{-4} carcinogenic risk.
(2) EPA recommended cleanup level (EPA, 1994)

[30] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Pg. 5-2.

[31] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Prepared for the U.S. DOE Pittsburgh Naval Reactors Office, Pg. 7.

Summary of NRF Drinking Water Radioactivity Results [32]

Table 4 Well Number	Gross Alpha (based on Am-241) pCi/l	Gross Beta (Based on 137-Cs pCi/l)
#1 Maximum	5.0	2.0
#2 Maximum	3.0	2.0
#3 Maximum	1.0	3.0
#4 Maximum	1.5	2.0
EPA MCL	15	8

Summary of NRF Ground Water Radioactivity Results [33]

Maximum	Gross Alpha (based on Th-230) pCi/l	Gross Beta (Based on Sr-90 pCi/l)
Up Gradient	3.0	3.1
System	5.3	3.7
On site	3.1	3.9
Down Gradient	4.1	5.1
EPA MCL	15	8

EPA Maximum Concentration Level (MCL) for Drinking Water for Gross Alpha radioactivity is 15 pCi/L; Gross Beta is 8 pCi/L

Table 5-1 COPCs and Concentration Terms for Unit 8-08-79

Constituent	Estimated Amount Released (Curies)	Concentration (pci/l) of pit water (1992)	Concentration Term (pci/l) - Decay-Corrected to 1996
Carbon-14	9.7×10^{-6}	41	41
Cesium-137	1.1×10^{-5}	46.5	42.3
Cobalt-60	4×10^{-4}	1691	930
Manganese-54	7.1×10^{-6}	30	0.8
Nickel-63	6.6×10^{-5}	279	270
Strontium-90	1.2×10^{-6}	5.1	4.6
Tritium	5.2×10^{-2}	219791	170761

[32] Naval Reactors Facility, Environmental Monitoring Report, Calendar Year 1991, NRFRC-EC-1007, Table 4, Pg. 21.

[33] Ibid, NRFRC-EC-1007, Table 5, Pg. 22. Derived concentration Guide 2 of 15E-9.
EPA Maximum Concentration Level (MCL) for Drinking Water for Gross Alpha radioactivity is 15 pCi/L; Gross Beta is 8 pCi/L

NRF CERCLA report: "5.5.2 Risk Characterization: Table 5-2 summarizes the risks associated with Unit 8-08-79. The carcinogenic risk for the 30 year future residential scenario is with cesium-137 being the risk driver through the groundwater ingestion pathway. The carcinogenic risk factor the 100 year future residential scenario is 7E-6 with cesium-137 and nickel-63 being the risk drivers through the groundwater ingestion pathway." [34]

"The specific activities of the water released are known, the volume of water can be accurately calculated, and a conservative assumption is made that the specific activity of the water released remains the same until it reached the aquifer." [35]

Table 5-2 Summary of Risks Associated with Unit 8-08-79, Water Pit Release
Residential Groundwater Ingestion

	Concentration (pci/l)	30 Year Rad. Risk	100 Year Rad. Risk
Carbon-14	41	9E-07	9E-07
Cesium-137	42.3	1E-05	3E-06
Cobalt-60	930	7E-06	7E-10
Tritium	170761	5E-05	9E-07
Manganese-54	0.8	1E-18	3E-43
Nickel-63	270	3E-06	2E-06
Strontium-90	4.6	3E-06	5E-07
Total Risk		8E-05	8E-06

Source: Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Pg. 5-4

[34] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Pg. 5-3.
[35] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Pg. 5-3.

NRF CERCLA report: "The release is estimated to have occurred approximately 30 feet below ground surface. The COPCs were identified as carbon-14, cesium-137, cobalt-60, manganese-54, nickel-63, strontium-90, and tritium." [36]

Why are these earlier NRF CERCLA reports important? The basic NRF operations are expanding but there is no commitment to stop contamination to the environment or even be honest about it. By reviewing previous CERCLA reports, we get clearer picture of what the current/future will do to Idaho's environment.

B. FEIS fails to include Worker Exposures

NRF non-military employees are excluded from EEOICPA coverage with a faulty rationale and this egregious exclusion must be removed.

DEIS states: The Energy Employees Occupational Illness Compensation Program Act (EEOICPA) is outside the scope of this EIS. [DEIS Pg. G-117]

"The historically high allowable doses at NRF, the variety and complexity of operations at NRF, the problems of adequately monitoring internal dose and transient conditions, and the evolving science of radiation health [3] and epidemiology of radiation workers [4] showing elevated cancer risks at annual doses less than 2 rem per year point to the unsupportable rationale for excluding NRF workers from compensation. Although it would in many cases be decades late, and the compensation will never compensate for the early deaths of fine people, this exclusion must be removed. **By any measure of fairness and honest assessment, the exclusion of NRF workers from EEOICPA act compensation must be removed."** [37]

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[36] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility, Pg. 5-4

[37] Tami Thatcher http://environmental-defense-institute.org/publications/CommentsECF.pdf Pg. 1. Citing:

[2] Naval Nuclear Propulsion Program, Office of Naval Reactors, "Occupational Radiation Exposure from Naval Reactors' Exposure from Naval Reactors' Department of Energy Facilities," Report NT-113, Mary 2011. http://nnsa.energy.gov/sites/default/files/nnsa/02-12-multiplefiles/NT-11-3%20FINAL.pdf

[3] Kohnlein,W, PhD., and Nussbaum, R. H., Ph.D., "False Alarm or Public Health Hazard?: Chronic Low-Dose External Radiation Exposure, Medicine & Global Survival, January 1998, Vol. 5, No. 1. http://www.ippnw.org/pdf/mgs/5-1-kohnlein-nussbaum.pdf

[4] "An Epidemiology Study of Mortality and Radiation-Related Risk of Cancer Among Workers at the Idaho National Engineering and Environmental Laboratory, a U.S. Department of Energy Facility, January 2005. http://www.cdc.gov/niosh/docs/2005-131/pdfs/2005-131.pdf and http://www.cdc.gov/niosh/oerp/ineel.htm and Savannah River Site Mortality Study, 2007. http://www.cdc.gov/niosh/oerp/savannah-mortality/

III. Incomplete Waste Disposition

A. FEIS Fails to Include NEPA Requirements of Cumulative Radioactive Waste Disposition.

"Comments on the history of disposal at the RWMC are outside the scope of this EIS." [FEIS Pg. G-99]
Despite the above statutory statements the FEIS states: "Historic disposal at the RWMC including the subsurface disposal area of the RWMC were previously evaluated and addressed through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process which included opportunities for public comment.

The FEIS fails to acknowledge the NRF's waste stream to INL burial landfill that would not qualify as a municipal dump under EPA Subtitle D regulations. Since the NRF/ECF basic operations will increase but not change the process and the nature of waste generation, inclusion of waste is crucial. Thus, it is essential to review previous years to get an accurate assessment of what current and future operations will be. The DOE/NRF makes their position clear as the above statement shows – waste deposition is absolutely not part of this EIS thus violating basin NEPA rules.

EDI is obliged to offer the Summary of Naval Reactors Facility best-estimate radionuclide inventories in waste sent to the INL RWMC Subsurface Disposal Area from 1953 through 1999. When added the total curie content is 952,986.86. [38]

NRF plans to ship its highly radioactive remote handled waste to R-H LLW Facility yet FEIS claims: **"Comments on the location of the new Remote-Handled Low-Level Radioactive Waste disposal facility at the INL are outside the scope of this EIS."** [FEIS Pg. G-99]

DOE/Navy use a classical bait and switch ostensibly initially appearing to follow the legal requirements of NEPA, while later buried in the FEIS claim's the NRF has no obligation to include the full waste stream disposition and environmental contamination resulting from NRF/ECF operations. What is critical in any EIS is to review all environmental the impacts of any subject operation. That literally means the past, present and anticipated impacts as NEPA requires. By ignoring history, we are bound to repeat it.

B. FEIS says NNPP will not generate high-level-waste (HLW)

"High-Level Radioactive Waste: NRF **does not currently generate any high-level radioactive waste.** Transuranic Waste: NRF does **not currently generate any transuranic waste** from naval spent nuclear fuel handling operations." [Pg. S-19] [emphasis added]

[38] "Supplement to Evaluation of Naval Reactors Facility Radioactive Waste Disposed of at the Radioactive Waste Management Complex from 1953 to 1999", J. Giles. et.al, April 2005, ICP/EXT-05-00833, table 5 pg. 18.

Clearly NRF does not consider irradiated spent nuclear fuel (SNF) produced by NNPP as high-level waste as it is classified in statutes. In the recent past, the NRF had 5 propulsion prototype reactors several are defueled but operable. [39] Currently, the Advanced Test Reactor at INL that tests NRF fuel is a crucial part of NRF operations and itself produces SNF. This sleight of hand that the ATR is not an integral part of the NNPP/NRF is ridiculous and challenges the credibility of this FEIS. See EDI comments on Draft EIS for listing of NRF transuranic waste and GTCC waste dumped at RWMC. [40]

"In addition to DOE owned fuel INL/INTEC CPP-666 stores spent fuel from the Naval Reactors Program." [41] "The Idaho [CPP-666] inventory includes SNF from the Naval Nuclear Propulsion Program (i.e., submarines and aircraft carriers), which is different from commercial SNF in many ways, including enrichment level and design. From about 1952 to 1992 this Navy SNF was reprocessed in Idaho to extract high-enriched uranium for use in driver fuel rods at weapons material production reactors elsewhere." [42]

Chemical reprocessing at INL/INTEC generated millions of gallons of high-level waste – 900,000 gallons of which remains in underground tanks today. Leaks from this INTEC high-level waste tank farm and aquifer waste injection wells continue to contaminate the soil and groundwater. [43]

The FEIS states: "The Naval Nuclear Propulsion Program (NNPP), also known as the Naval Reactors Program, is a joint United States (U.S.) Navy and Department of Energy (DOE) organization with responsibility for **all matters pertaining to naval nuclear propulsion from design through disposal (cradle-to-grave)."** [FEIS pg. Vol. I Abstract] [emphasis added]

C. The FEIS inaccurately characterizes transuranic waste

EDI comments on the DEIS (Page 18): "Navy Waste Characterization Partial listing of isotopes found in Navy waste dumped at INL" table shows clearly how Navy waste dumped in the RWMC burial grounds contains Transuranic waste. [44] One of the reasons for this is the lack of precision in cutting off the structural parts of the fuel element in preparation for reprocessing or storage. Destructive tests of fuel assemblies additionally add to the fissile content of the waste stream. In recent DOE documents characterizing the Navy waste streams going to the RWMC they acknowledge presence of, "Irradiated fuel element

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[39] NRF Reactors: Large Ship Reactor A, Large Ship Reactor B, Natural Circulation Reactor, Submarine Thermal Reactor, High-Temperature Propulsion Reactor.

[40] http://www.environmental-defense-institute.org/publications/NNPP-Report7A.pdf Page 17 through 18

[41] Energy and Environment, Storage of DOE SNF at the Idaho National Laboratory, U.S. DOE.

[42] U.S. Spent Nuclear Fuel Storage, James Warner, Section Research Manager, Pg. 27, Citing T. Cochran, et.al., Nuclear Weapons Databook, Vol. II, May 24, 2012, Congressional Research Service, 7-5700, R42513, www.crs.gov

[43] Engineering Design File, Groundwater Pathway Risk Assessment for CPP-601, CPP-602, CPP-627, and CPP-640 Fuel Reprocessing Complex Non-Time-Critical Removal Action, Document ID: EDF-10195, Revision ID: 1, Effective Date: 02/08/12.

[44] Transuranic (TRU) waste is "radioactive waste that is not classified as high-level radioactive waste contains more than 100 nanocuries (3700 Becquerel's) per gram of alpha-emitting transuranic isotopes with half-lives greater than 20 years.

end boxes that were cut off of the fuel plates in the hot cells. The end boxes may contain some fuel, but **generally** only activation products". [45] [emphasis added] Independent characterization of this waste must be made before more is dumped at the RWMC.

EDI's comments (Page 19) on DEIS table "Spent Reactor Fuel Dumped at INL's RWMC Subsurface Disposal Area Burial Grounds 1952 to 1980 [RWMIS] [46] shows:

Naval Reactors Facility (NRF)	27,707,700 Mass in grams or 27,707.7 kilograms

NRF Environmental Report states: "During 1991, approximately 776 cubic meters of solid radioactive waste containing 102, 706 curies of radioactivity were shipped to RWMC disposal facilities." [47]

DOE/NRF legitimately cannot deny its own waste data by claiming it is "beyond the scope of this FEIS. A legitimate assessment of any operation (absent FEIS disclosure or current publically available data) is to look at past waste streams. The above preliminary numbers, compiled by the Environmental Defense Institute, are drawn from Freedom of Information Act from DOE's Radioactive Waste Management Information System Database (P61SH090, and P61SH070, Run Date 10/24/89) and represent about 57 shipments specifically identified as "irradiated fuel". Not included in the above listing are even more numerous shipments called "un-irradiated fuel", "fuel rods", "control rods", and other reactor fuel not identified specifically as "irradiated". The curie content of these shipments identified as "fuel rods" (>7,000 curies) suggests that they are also irradiated reactor fuel. The above listing also does not include 7 shipments of "irradiated fuel" during the same period to the RWMC Transuranic Storage Area amounting to 621.549 kilograms, and which also were not included in the Spent Nuclear Fuel EIS.

DOE/NAVY gets to call waste whatever they want – HLW should equal either SNF or chemically separated material from reactor fuel reprocessing. But the activated metals and the bits of SNF on the chopped off end caps of the fuel/ECF canal trash --- these are going to a "low level radiation waste facility --- specifically, RWMC and the remote handled LLW facility at INL that has no permit to accept HLW. They don't even like to admit when its greater-than-class C material, let alone that it should be considered HLW.

Proper comprehensive evaluation – required by NEPA- looks at all cumulative environmental impacts – past, present and future. DOE/NRF cannot legally exclude complete characterization of its entire waste stream.

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[45] EG&G-WM-10903; A Comprehensive Inventory of Radiological and Non Radiological Contaminates in Waste Buried In the Subsurface Disposal Area of the INEL RWMC During the Years 1952-1983,June 1994, Lockheed, Pg. 2-30.

[46] Radioactive Waste Management Information Data Base Solid Master Data Base (P61SH090), List for 1954 to 1970, Run Date 3/29/89, pages 517, 518, 519 and 520 (RWMIS).

[47] Naval Reactors Facility, Environmental Monitoring Report, Calendar Year 1991, NRFRC-EC-1007, Pg. 37.

D. The FEIS inaccurately characterizes greater-than-class C waste;

FEIS states: "Solid Low-Level Radioactive Waste (LLW): Operations at ECF result in generation of solid LLW primarily consisting of filters, resin, contaminated components, pieces of insulation, rags, sheet plastic, paper, and filter paper and towels resulting from radiochemistry and radiation monitoring operations. The annual average of LLW waste generated at NRF is 740 cubic meters (960 cubic yards) from routine activities and 1200 cubic meters (1600 cubic yards) from decontamination and decommissioning (D&D) activities. There are 38 shipments of LLW from NRF annually." [pg. S-20]

1. No complete characterization (isotope content/activity rate) of this highly radioactive remote handled waste is offered in this FEIS. Again a violation of NEPA.

EDI's comments on DEIS (Page 8) notes; "Since this NRF reactor core waste going to the RWMC burial grounds contains long-lived radioactive isotopes due to many years of exposure in the reactor core, it should be classified as high-level waste and treated according to Nuclear Regulatory Commission (NRC) disposal standards. At the very least this waste must be put in NRC Greater than Class C (GTCC) waste category. NRC disposal criteria require that "waste that will not decay to levels which present an acceptable hazard to an intruder within 100 years is designated as Class C waste." [10 CFR 61.7] Class C waste, must, for this reason, be disposed at a greater depth than other classes, or, if that is not possible, under an intruder barrier with an effective life of 500 years. "At the end of the 500 year period," according to NRC regulations, "remaining radioactivity will be at a level that does not pose an unacceptable hazard to an intruder or public health and safety." [Ibid.] The adequacy of the EPA, NRC, IDEQ regulations is discussed more fully in the waste dumping in this paper, for instance there is considerable debate over these **regulators non-enforcement that allows greater than class-C waste to be dumped in shallow land burial at INL in a flood zone.**

FEIS states: "Mixed Low-Level Radioactive Waste (MLLW) and TSCA MLLW: NRF generates a **small** amount of MLLW and TSCA MLLW, primarily from D&D activities at ECF. The annual average of MLLW and TSCA MLLW generated at NRF is 20 cubic meters (26 cubic yards). There are 12 shipments of MLLW (including TSCA MLLW) from NRF annually." [Pg.S-20]

The above DOE/NRF statement is a grossly inadequate and inaccurate waste characterization that does not meet NEPA requirements.

IV. Incomplete Seismic Vulnerabilities

A. The EIS failed to adequately assess the ECF's seismic vulnerabilities.

The FEIS states: "**The ECF water pools have never undergone a complete refurbishment and have not been upgraded to current seismic standards."** [Pg. S-6]

Despite this statement, NRF intends to continued use of the ECF for decades and does not specify exactly what modifications will be made and what independent seismic assessment will be made to demonstrate compliance.

FEIS states: "Seismic Hazards Refurbishment Period: There would be **moderate** impacts from seismic hazards until refurbishment activities are complete. Activities during the refurbishment period would improve the building's ability to withstand vibratory ground motions from seismic activity. Post-Refurbishment Operational Period: There would be small impacts from seismic hazards since the refurbishment actions would improve the building's ability to withstand vibratory ground motions from seismic activity." [Pg. S-33]

FEIS states: "Seismic Hazards: Differences in impacts from seismic hazards from the alternatives are related to the ability to withstand vibratory ground motions under each alternative. Since there would be no additional refurbishment or upgrades to ECF for the No Action Alternative, the facility and supporting infrastructure **would continue to degrade for a period of 45 years**. During the refurbishment period of the Overhaul Alternative, **to the extent practicable,** infrastructure and equipment would be refurbished or designed to the appropriate natural phenomena hazard category to withstand vibratory ground motions. "During the **construction and transition periods** of the New Facility Alternative, **there may be upgrades or refurbishments to ECF,** to ensure operations continue in a safe and environmentally responsible manner**.** [Pg.S-72]

What do the above statements: "to the extent **practicable**" and "there **may be** upgrades or refurbishments to ECF" mean? Obviously this is slippery non-committal language that has no business in this FEIS and must raise RED flags to EPA/IDEQ regulators.

The above FEIS statement contradicts the fact that NRF intends to continue ECF operations for over 3 additional decades. Additionally, the FEIS fails to offer requisite detail on what exactly these ECF "upgrades" will be.

"During the **refurbishment period** of the Overhaul Alternative**, to the extent practicable**, infrastructure and equipment would be refurbished or designed to the appropriate natural phenomena hazard category to withstand vibratory ground motions."

Again, What do the above statements: "to the extent **practicable**" and "there **may be** upgrades or refurbishments to ECF" mean? Obviously this is slippery non-committal

language that has no business in this FEIS and must raise RED flags to regulators. Repeating a false statement over and over does not make it true.

FEIS states: "During the construction and transition periods of the New Facility Alternative, there may be upgrades or refurbishments to ECF, to ensure operations continue in a safe and environmentally responsible manner. During the transition and new facility operational periods, the structures, systems, and components in the new facility would be designed to the **appropriate natural phenomena hazard category to withstand vibratory ground motions."** [FEIS Pg. S-72]

Only careful reading reveals that only the NEW Facility portion covered in this EIS will be built to "appropriate natural phenomena hazard category to withstand vibratory ground motions" cleverly giving the impression that the ECF is included.

B. Seismic Vulnerability of Storing Highly Enriched SNF in ECF

The FEIS states: "Naval nuclear fuel is highly enriched (approximately 93 weight percent to 97 weight percent) in the isotope uranium-235 (235U). As a result of the high initial uranium enrichment, very small amounts of transuranic radionuclides are generated by end of life when compared to commercial spent nuclear fuel." [Pg.1-3]

This Navy high burnup SNF ECF is the most hazardous material in the world requiring deep geological disposal for hundreds of thousands of years due to the long-lived radio-isotopes produced in nuclear reactors. The current ECF inventory of ~400 assemblies constitutes a significant unregulated hazard in the event of accidental loss of canal coolant water.

"Since the 1990's, U.S. reactor operators are permitted by the U.S. Nuclear Regulatory Commission (NRC) to effectively double the amount of time nuclear fuel can be irradiated in a reactor, by approving an increase in the percentage of uranium-235, the key fissionable material that generates energy. In doing so, NRC has bowed to the wishes of nuclear reactor operators, motivated more by economics than spent nuclear fuel storage and disposal. Known as increased "burnup" this practice is described in terms of the amount of electricity in gigawatts (GW) produced per day with a ton of uranium." [48]

"Given these uncertainties the U.S. Department of Energy (DOE) and the NRC have provided general estimates of the radionuclide content of spent nuclear fuel based on current and previous burnup assumptions. According to DOE the estimated average long-lived radioactivity for a typical PWR and BWR assembly having lower burnup at the time of geological disposal are 88,173.69 curies and 30,181.63 curies respectively. [29] For current burnups the NRC estimates that the post discharge radioactive inventory of spent fuel for a typical PWR and BWR

[48] Robert Alvarez, Memorandum: High Burnup Spent Power Reactor Fuel, : December 17, 2013, citing : Foot Note 29: U.S. Department of Energy, Final Environmental Impact Statement, for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, 2002, Appendix A, Tables A-7, A-8, A-9, A-10, (PWR/ Burn up = 41,200 MWd/MTHM, enrichment = 3.75 percent, decay time = 23 years. BWR/ Burn up = 36,600 MWd/MTHM, enrichment = 3.03 percent, decay time = 23 years.)

assemblies are 270,348.26 curies and 127,056.67 curies respectively.[49] **Approximately 40 percent of the total estimated radioactivity for lower and high burnup is Cs-137**." [50] [emphasis added]

The FEIS ECF accident source terms do not list Cs-137.[51] This represents another significant deficiency in this FEIS. The Navy uses zirconium clad fuel that adds to storage hazards.

"Zirconium cladding of spent fuel is chemically very reactive in the presence of uncontrolled decay heat. According to the National Research Council of the National Academy of Sciences the buildup of decay heat in spent fuel in the presence of air and steam: " is strongly exothermic – that is, the reaction releases large quantities of heat, which can further raise cladding temperatures… if a supply of oxygen and or steam is available to sustain the reactions.. The result could be a runaway oxidation – referred to as *a zirconium cladding fire* – that proceeds as a burn front (e.g., as seen in a forest fire or fireworks sparkler)...As fuel rod temperatures increase, the gas pressure inside the fuel rod increases and eventually can cause the cladding to balloon out and rupture.[original emphasis]" [52]

The FEIS states: "Naval spent nuclear fuel consists of solid metal and metallic components that are nonflammable, highly corrosion-resistant, and neither pyrophoric, explosive, combustible, chemically reactive, nor subject to gas generation by chemical reaction or off-gassing. Naval spent nuclear fuel is primarily from pressurized water reactors (PWRs)." [FEIS Pg. 1-3]

C. Seismic Vulnerabilities of ECF Degraded Concrete Basin

There are some crucial unknowns the FEIS failed to assess.

1. Is the ECF basin concrete already to degraded to allow continued operation?
2. What radiation cumulative level has the ECF basin been exposed to now and in 10 years? 10 x E 10 rad? More? Less?
3. Will the fuel in the ECF (or some fraction of fuel) melt/burn if water is removed and the fuel is uncovered?
4. Will the concrete or structural materials above the ECF actually fail if temperatures rise because of fuel heat up? Interesting that it has not been brought up as an issue before, but perhaps that is because the fuel melting temperature of fresher fuel assured fuel melt before such structural damage.

Defense Nuclear Facility Safety Board conducted a review of the newer INL/INTEC CPP-666 SNF Basin concrete foundation. This review is relevant because the Navy's ECF

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[49] Alvarez citing: U.S. Nuclear Regulatory Commission, Characteristics for the Representative Commercial Spent Fuel Assembly for Pre-closure Normal Operations, May 2007, Table 16, p.44-45. http://pbadupws.nrc.gov/docs/ML0907/ML090770390.pdf

[50] Robert Alvarez, Memorandum: High Burnup Spent Power Reactor Fuel, : December 17, 2013, Pg. 5

[51] FEIS Pg. F-35

[52] Robert Alvarez, Memorandum: High Burnup Spent Power Reactor Fuel, December 17, 2013, pg. 8.

"refurbishment" will entail draining portions of the basin so epoxy leak-proofing can be applied potentially putting similar stresses on the ECF concrete foundation.

"The [Fuel Storage Area] FSA Pool Structures is a passive design feature of the FAST facility. **Additional calculations performed to increase the allowable floor loading to support the FSA Reracking Project indicated that the original design objective to allow an empty pool to be adjacent to a water filled pool resulted in overstresses during the [Design Basis Earthquake] DBE."** [53] [DFNSB Pg. A-4]

FEIS fails to fully analyze the ECF refurbishing part that includes empting sections so epoxy leak prevention remediation can proceed. Calculations of shifting ECF SNF on the degraded concrete basin foundations ability to withstand the "overstress" concurrently with a DBE are absent.

1. Radiation degradation of concrete ECF SNF basin

It is highly likely that the ECF concrete walls have received an aggregate gamma ray dosage far in excess of that necessary to severely degrade the concrete, thus increasing seismic vulnerabilities. Maintaining ECF water levels should a significant seismic event (earthquake) occur are problematic. The FEIS fails to fully analyze these fundamental issues in the Hypothetical Accident 4.13.2.2.

For continuously wetted concrete (no stainless steel liner) an aggregate dose of 10 x E10 rad (10 x E8 gray) is the limit. For dry concrete the limit is not known. The few pieces of data available from the X10 reactor in Oak Ridge, Tennessee and the Temelin reactor in the Czech Republic suggest that the allowable dose to avoid structural degradation and failure is 500 to 2,000 times lower than for wetted concrete (i.e., 5 x 10E6 rad).

The catastrophe hazard from an ECF basin drain down event is more than extreme. Such an event must be prevented at any cost. Once a drain down begins it cannot be stopped. Once the fuel is exposed no human or robotic response is possible - of any kind. A current example is Japan's Fukushima reactor/SNF storage disaster.

The accident will then proceed to its ultimate termination independent of human intervention. Temperatures inside the ECF structure will likely rise to levels sufficient to cause the concrete to fail and the building to crumble in on itself. The human exclusion zone for direct radiation exposure will likely be 1-2 km in all directions. No access will be possible in this zone for decades. Once fuel fails and radioactive atmospheric releases that zone will be pushed farther out (likely much farther out). Access to respond to the event may not be possible in or through that zone for centuries.

[53] DNFSB Recommendation 2000-2 INEEL Priority Facility Phase I Safety Class, Ventilation and Fire Protection Systems Assessment Report, Pg. A-4.

FEIS must provide independent engineering assessments of ECF basin concrete. Alternatively, using civilian fuel (since Navy fuel details are classified) as a surrogate; what is the concrete heat profile and rad profile of used civilian fuel? How far is it from the walls and floors of the basin? Then do some estimates of shielding and you have estimates of dose. Doing that correctly requires details about the fuel, and a complex set of radiation calculations that have a lot in common with optics problems. Gamma rays are light after all. The fuel is opaque to it, as are the water and concrete. Some of it is absorbed and heats the fuel, water and concrete. Several different interactions occur that shift the energy spectrum and generate secondary radiation. The most accurate way to assess all of this is to actually measure it.

What the ECF review will likely find is the surface of the concrete probably exceeded 10 x E10 rad after 10-20 years. It is likely now that the concrete 6-10 inches in has exceeded that same dose. The concrete 'paste' likely has little to no strength in 6-10 inches from the surface.

The temperature issue is different. So long as there is some cooling and the fuel is over 20 years old, there is not much heat to remove. If the basin water is lost, during an earthquake or severe leak, the rad field can be extreme. That prevents human entry. Lacking human entry the systems fail. When ventilation is lost heat then builds up having only convective and radiative cooling to keep things under control. [54] With limited ventilation, the temperatures inside the structure will rise substantially. If newer fuel is present, this could get out of hand quite quickly creating a second barrier (after the lethal rad fields) to human entry. The potential then is that following a basin drain down that uncovers the fuel that the accident progresses of its own accord to complete loss of control of the basin and failure of the fuel. It is likely that no recovery will ever be possible at that point. The accident proceeds to final completion (whatever that is) entirely outside of human ability to influence it.

The concrete dose serves to heat the concrete failing it prematurely. This is well known. And it served to hide the insidious damage to the concrete, as that is waived away as being all thermal damage, and then assessing that the concrete in the basin hasn't seen high heat, so it will not fail. For instance, the rad dose damage gets ignored. There are also an equally large but still handful of data points for dry concrete exposed to radiation. That

[54] A DNFSB review of the newer INL/INTEC CPP-666 Fuel Storage Area (FAST) water basin found "[T]he Confinement Ventilation System is degrading due to facility aging. This degradation could result in future operational downtime, radiological contamination and personnel exposure." DNFSB Recommendation 2000-2 INEEL Priority Facility Phase I Safety Class, Ventilation and Fire Protection Systems Assessment Report, Executive Summary.

data was thrown out in developing the standards for what radiation dose concrete can withstand. The data was discarded on the presumption that the early weakening was attributable to heat. The experience at Temelin and X-10 show that to be wrong. The concrete wasn't heated.

At a microscopic scale, absorbed radiation heats the concrete at nearly the atomic level. The heat damage is then limited to a small volume. But continue doing this over 50 years in a large SNF ECF basin and the problem becomes a stochastic one of adding up all of the random little damages into one large failure. This can lead to a large uncontrollable leak and extended loss-of-coolant.

Yet another way to consider it is that the radiation serves to boil out the water from the cement paste that forms the backbone of concrete. When the concrete is moist there is water immediately available to cool the local heating and/or to replace the lost water. When the concrete is dry (< about 11% water) these effects are not enough and waters of hydration are lost from the paste to migrate out of the concrete. The paste then chemically changes and falls apart as damage accumulates.

One of the papers on this considered two different dose rates and times to accumulate the same aggregate dose or different doses. What they observed was very interesting. The time until the concrete was weakened remained the same despite the differing dose rates. In other words, the effect seemed to be caused by some critical radiation insult and then the passage of time. This is hugely concerning as it brings into question the entire safety basis and the possibility that the damage is essentially done in the first few days. It then just takes time for the basin concrete to fail. The FEIS acknowledges ECF basin concrete degradation.

IV. Congress' Role

A. Exemptions from Environmental Laws

Consequent to over a half century of Congressional exemptions to the NNPP from nuclear operations and waste management, the largest contamination of the human environment has resulted.

The 1985 Low Level Waste amendments require DOE to take ownership of a NRC licensee of GTCC waste. But as DOE manages its own LLW it is not required to classify it according to the laws for NRC licensed facilities. DOE does not have to classify its waste as A, B, C or Greater-Than-Class C except when it wants to send this waste to a another state or NRC-licensed facility. Below are exemptions to the Low-level waste law for NRC licensees like commercial power reactors.

TITLE 42 United States Code Annotated 6.427.§ 28.021c

" Disposal of low level radioactive waste; (a) State responsibilities, (1) Each State shall be responsible for providing, either by itself or in cooperation with other States, for the disposal of (A) low-level radioactive waste generated within the State (other than by the Federal government) that consists of or contains class A, B, or C radioactive waste as defined by section 61.55 of title 10, Code of Federal Regulations, as in effect on January 26, 1983;(B)low-level radioactive waste described in subparagraph (A) that is generated by the Federal Government **except** such waste that is (i) owned or generated by the Department of Energy; (ii) owned or generated by the United States Navy as a result of the decommissioning of vessels of the United States result of the decommissioning of vessels of the United States Navy; or (iii) owned or generated as a result of any research, development, testing, or production of any atomic weapons…." [55]

B. Exemptions from Regulatory Oversight

In the early 1990s Clinton Administration, Congress established the Defense Facility Nuclear Safety Board (DFNSB) to conduct safety assessments of DOE operations. Congress however did not grant the Board with enforcement authority similar to NRC.

Defense Facility Nuclear Safety Board enabling legislation states in pertinent part:

"SEC. 318. DEFINITION. [42 USC 2286g] "As used in this chapter, the term 'Department of Energy defense nuclear facility' means any of the following:

"(1) A production facility or utilization facility (as defined in section 11 of this Act) that is under the control or jurisdiction of the Secretary of Energy and that is operated for national security purposes, **but the term does not include__**

"(A) any facility or activity covered by Executive Order No. 12344, dated February 1, 1982, pertaining to the Naval nuclear propulsion program;"

The bottom line is NNPP is unregulated by any federal agency – even the Nuclear Regulatory Commission charged with regulating commercial nuclear operations or Defense Nuclear Facility Safety Board charged with monitoring DOE nuclear facilities. Attorney Mark Sullivan representing EDI petitioned the Defense Nuclear Facility Safety Board (DFNSB) to conduct a safety analysis of DOE's 60 year old Advanced Test Reactor at the INL. DFNSB chairman Winokur's reply states: "It is the Board's understanding that currently the primary defense-related mission of ATR is research and testing of components in support of naval nuclear propulsion program. **Navy nuclear propulsion activities are excluded from the Board's jurisdiction by 42 U.S.C. ss 2286g(1)(A)."** [56]

[55] 42 United States Code Annotated 6.427. § 28.021c**.**

[56] DNFSB Chair, Peter Winokur letter to Mark Sullivan, 9/23/10. Also see EDI's Unacceptable Risk at INL's Advanced Test Reactor.

EDI's *Unacceptable Risk at INL's Advanced Test Reactor* details significant safety problems that neither DOE, the Navy or DFNSB are willing to address. As a fundimental part (as stated above) the ATR must be included in this FEIS but it is not!

VI. Conclusion

EDI's comments are by no means a complete analysis of this lengthy 3 Volume document because the NRF operations are classified and there are no regulatory agency reports on it. For instance, the NNPP SNF coolant time, fuel cladding needed to properly determine ECF basin loss-of-coolant source terms are classified.

This DOE/NRF/NNPP FEIS is deficient and EPA and IDEQ are complicitious if they do not also reject its findings that contain innumerable fundamental false statements. This EIS should be detailing how NRF is going to completely replace the ECF basin as a SNF wet storage facility. Many casual EIS readers mistakenly assumed ECF replacement. Instead, DOE/Navy intends to keep this high-hazard heavily degraded ECF operating for 3-4 decades far beyond its design life that has already expired. The Navy is only willing to spend money to expand capacity for new large ship reactor SNF assemblies.

The DNFSB noted, in Recommendation 2000-2, (now 14 years back) that "[I]t was concerned with the fact that many of the DOE's nuclear facilities were constructed years ago and are approaching end-of-life. The DNFSB expressed concern that some degradation of reliability and operability of systems designed to ensure safety can reasonably be expected and recommended specific actions to assess system condition and apply system expertise in managing the configuration of vital safety systems." [57] Lacking enforcement authority, DNFSB can only advise.

EDI finds this EIS a clever effort to slip in a deliberately narrow major expansion of the Navy's SNF waste management without acknowledging 50+ years of massive radioactive contamination at INL by claiming previous NRF environmental studies. DOE/NAVY claim these CERCLA reports are beyond the scope of this EIS. The Navy's previous radioactive contamination will remain for manila putting Idahoans at risk. This is an unconscionable and avoidable assault on Idaho's most valuable Snake River Aquifer that we depend on.

Congress bears the most responsibility for NRF's unregulated willful contamination of Idaho's environment via nuclear waste mismanagement and exposure to catastrophic accidents by granting exemptions to these rogue agencies compliance with the same regulations imposed on commercial nuclear operations.

[57] DNFSB Recommendation 2000-2 INEEL Priority Facility Phase I Safety Class, Ventilation and Fire Protection Systems Assessment Report, Pg.1.

Even when federal (EPA) and state (IDEQ) regulators can enforce NEPA regulations, or mixed-hazardous RCRA regulations, Clean Water Act regulations, they remain largely silent. We the public are left with little alternative than the Courts for redress. Even this process is blocked by the courts. [58] FOIA requests when approved are largely redacted and Appeals to DOE's office of Hearings and Appeals are denied. [59]

It is unconscionable that 3-4 additional decades of continued operation of the ECF represents a significant unregulated hazard of the most deadly radioactive material in the world and that high-level waste ultimately must be interred in a deep geologic repository yet to be established by Congress.

VII. References:

1. Final Comprehensive Remedial Investigation/Feasibility Study for the Naval Reactor Facility, Idaho National Engineering and Environmental Laboratory, Waste Area Group 8, October 1995, U.S. Department of Energy.

2. Industrial Waste Ditch (Operable Unit 8-07), and Landfill Areas (Operable Units 8-05 and 8-06) Idaho National Engineering Laboratory issued by DOE, EPA, and ID Department of Environmental Quality, April 1994.

3. Waste Area Group 9 – Naval Reactor Facility, Idaho National Engineering Laboratory issued by DOE, EPA, and ID Department of Environmental Quality, January 1998.

4. Removal Actions Considered for the Naval Reactor Facility, April 1993.

5. *Explanation of Significant Differences Between Models Used to Access Groundwater Impacts for Disposal of Greater-Than-Class C Low-Level Radioactive Waste Environmental Impact Statement* (DOE/EIS-0375-D and the Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project (INL/EXT-10-191768), Annett L. Schafer, et.al. August 2011, INL/EXT-11-23102.

6. *Comments on the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling at the Idaho National Laboratory*, draft DOE/EIS-0453D, Submitted August 10, 2015 by E-Mail: ecfrecapitalization@unnpp.gov Submitted by Tami Thatcher, former Idaho National Laboratory nuclear safety analyst and nuclear safety consultant, citizen of Idaho Falls, Idaho.http://environmental-defense-institute.org/publications/CommentsECF.pdf

7. DNFSB Recommendation 2000-2 INEEL Priority Facility Phase I Safety Class, Ventilation and Fire Protection Systems Assessment Report.

[58] KYNF and EDI filed a complaint in U.S. Federal Court asking for DOE to conduct an EIS on the Advanced Test Reactor, but the judge ruled in favor of DOE. See U.S District Court for Wyoming (06-CV-205-WFD).

[59] KYNF and EDI filed a FOIA 6/23/2010 that was denied. It was appealed 9/30/2010 (10-032) (OM-PA-10-063) resulting only a few documents released with most redacted. Second appeal 2/28/13 (TFC-009) (OM-PA-13-012) denied.

VIII. Attachments

Attachment 1

This attachment is the Summary of Naval Reactors Facility Best Estimate Radionuclide Inventories in waste sent to [RWMC] Subsurface Disposal Area from 1953 through 1999. Manual addition of the Total 1953 through 1999 of all amounts >10 = >952,989 curies.

Source: Supplement to Evaluation of Naval Reactors Facility Radioactive Waste Disposed of at the Radioactive Waste Management Complex from 1953 to 1999, John Giles K. Jean Holdren Arpad Lengyel, Conclusions and Recommendations, Table 5, Pg. 18, Table 5 Summary of Naval Reactors Facility Best Estimate Radionuclide Inventories in waste sent to [RWMC] Subsurface Disposal Area from 1953 through 1999, *ICP/EXT-05-00833.*

Attachment 2

This attachment shows inventory of radionuclides with half-lives greater than 5 years of activated metals generated at ATR Complex, Naval Reactors Facility, and from processing waste stored at Radioactive Scrap and Waste Facility at Materials and Fuels Complex Naval Reactors Facility waste characterization to be dumped at INL Remote-Handled Low-Level Waste Facility that should be in the FEIS but is not included. Manual addition of activated metals >10 = >1,712,146 curies.

Source: Explanation of Significant Differences Between Models Used to Access Groundwater Impacts for Disposal of Greater-Than-Class C Low-Level Radioactive Waste Environmental Impact Statement (DOE/EIS-0375-D and the Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project (INL/EXT-10-191768), Annett L. Schafer, et.al, Section 3.2, Table 3, Pg. 8 & 9, August 2011, INL/EXT-11-23102.