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Review
of
Naval Nuclear Propulsion Program
Naval Reactors Facility
Naval Spent Nuclear Fuel Handling
and
Radioactive Waste Management
at
U.S. Department of Energy
Idaho National Laboratory

Submitted by
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on behalf of
Environmental Defense Institute

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Naval Reactors Facility

U.S Department of Energy - Idaho National Laboratory
Photo

Forward

This report consolidates information the Environmental Defense Institute (EDI) gained over several decades from Freedom of Information Act (FOIA) requests, public access sources and interviews with Idaho National Laboratory (INL) workers concerning the Nuclear Navy and Department of Energy (DOE) operations. Due to ongoing information restrictions, EDI is blocked from offering a comprehensive and current review of Navy and DOE operations at INL because these facilities continue to be held behind a shroud of secrecy to "protect national security." EDI firmly believes – since only environmental information is requested - that all that is being protected is the reality of serious public, worker health and environmental threats from mismanagement of worker radioactive dose exposure, hazardous and nuclear waste that if made public, would compromise public support.

EDI further believes that the general public must be informed about these immediate threats to worker and public health, so they can make informed decisions about nuclear policy and its impact on future generations of Idahoans using the Snake River Aquifer as a sole source water supply; or, worst-case-scenario, a Fukushima like meltdown.

Congress continues a six decade long carving out of exemptions from federal laws (including FOIA and NEPA) for the Atomic Energy Commission (starting with the Manhattan Project that produced the atomic bomb) and continuing through to the present Department of Energy (DOE) and Nuclear Navy. Consequently, challenges are limited to litigation that brings the federal Court into arbitrage a resolution for access to environmental operating information. This litigation has been nearly continuous since 1992. EDI's report discusses the progression of lawsuits by the State of Idaho and other stakeholders. [1]

Despite the fact that Naval Nuclear Propulsion Program operations include INL's Advanced Test Reactor [2]*, four prototype reactors used for training in the states of New York and South Carolina, and numerous shipyards on both east and west coasts, this report only focuses on the INL Naval Reactor Facility in Idaho.*

There is no legitimate way to separate the Navy's Naval Reactor Facility (NRF) from DOE's INL operational management from an analysis; thus this report covers both simultaneously. The Nuclear Navy effectively disassociates its operations from DOE's other INL nuclear facilities by inaccurately claiming they run a clean – tight ship. The fact remains that both hiding their operations behind the fog of secrecy and Congressionally sponsored regulatory exemptions since day one at the expense of past, present and future Idahoans.

Naval Nuclear Propulsion Program (NNPP) Background

"The Naval Nuclear Propulsion Program (NNPP), also known as the Naval Reactors Program, is a joint U.S. Navy and Department of Energy (DOE) organization and responsibility for all matters pertaining to naval nuclear propulsion from design through disposal (cradle-to-grave)." [3] The Naval Reactors Facility at INL part of the NNPP is operated under contract by

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[1] EDI has been plaintiff in numerous lawsuits against DOE for failure to conduct an EIS or FOIA denial.

[2] EDI's website contains extensive reports on the INL Advanced Test Reactor's operating history. http://www.environmental-defense-institute.org

[3] Draft Environmental Impact Statement for the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling, June 2015, DOE/EIS-0453-D, pg. 1-3. Herein after called DOE/EIS-0453-D.

Westinghouse Electric Co. Pittsburg, PA, for the Naval Reactors of the U.S. DOE. [4] INL is operated under contract by Battelle Energy Alliance. [5]

The National Nuclear Security Administration (NNSA) was established by Congress in 2000 as a separately organized agency within the U.S. Department of Energy, responsible for the management and security of the nation's nuclear weapons, nuclear nonproliferation, and naval reactor programs. Basically, NNSA only adds another ineffective layer of bureaucracy much the same as Home Land Security provided ineffective coordination with the many national security and emergency response agencies.

The NNPP was born in Idaho in 1949 [6] because Idaho was nationally designated by the Atomic Energy Commission (AEC) as the National Reactor Testing Station (NRTS) where nuclear reactors could be tested for all manner of purposes ranging from electrical power generation, to power for submarines, to aircraft nuclear jet engines, to space nuclear rockets, to space nuclear auxiliary power. At this stage in post WW-II nuclear research and development, the AEC knew the risks and hazards of radiation, thus the choice of a remote unpopulated area with large water resources available via the underground aquifer. For a more complete background history of the INL; see EDI's Citizen's Guide to INL. [7]

During the Nuclear Navy's first decade in Idaho, only four major installations were located at the Naval Reactors Facility (NRF) co-located with other related nuclear reactors (i.e. Advanced Test Reactor [8]) at the Department of Energy's Idaho National Laboratory (then called the National Reactor Testing Station); these are; a.) Submarine Thermal Reactor Prototype (S1W), b.) Large Ship Reactor (A1W); c.) Natural Circulation Submarine Prototype (S5G); and d.) Expended Core Facility (ECF).

"The Submarine Thermal Reactor Prototype (S1W) was the first prototype of a submarine nuclear reactor and the first instillation in 1951 at the NRF. To support work on the nuclear reactor, a shielded cell, controlled water-shielded fuel handling area, and decontamination facility were constructed within the prototype structure. Use of the support facilities was discontinued in 1958, when the Expended Core Facility was constructed with an improved capability for work on irradiated reactor core components. The S1W Prototype was shut-down in 1989 and was in operation for 35 years. Extensive testing was performed on reactor core components, including a series of experiments in 1955 for studying the effects of boiling conditions in naval reactors. The tests, conducted according to pre-planned procedures and carefully controlled conditions yielded a large amount of core performance and survivability

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[4] This is called the GOCO system; government owned-contractor operated.

[5] Battelle Energy Alliance (BEA) is a limited liability company wholly owned by Battelle and manages overall functions and operates INL Site services, including; Materials and Fuels Complex [MFC]; Idaho Nuclear Technology Complex (INTEC); Advanced Test Reactor Center (ATRC); Test Area North (TAN).

[6] Admiral Hyman Rickover, generally considered the father of the Nuclear Navy, first test reactor was built at Shippingsport, PA. Rickover later decided to move his reactor program to the remote Idaho site on the new Atomic Energy Commission (AEC) site, National Reactor Testing Station now called the Idaho National Laboratory operated by Department of Energy.

[7] http://www.environmental-defense-institute.org

[8] Advanced Test Reactor at INL, mission is to test Navy fuel specimens and materials in high radiation fields.

data. During this period, NRTS (now INL) where running reactors deliberately to meltdown to determine the operating parameters of that design reactor. [9]

"The A1W Prototype Plant, constructed in 1958 had two nuclear reactor plants. The A1W prototype consisted of a dual pressurized water reactor plant representing a portion of the propulsion spaces for a large surface ship and shutdown in 1994.

"S5G Plant construction was initiated in 1961 and shutdown in 1995. This prototype was a pressurized water reactor having the capability to operate in either a forced circulation or a natural circulation mode, with cooling water flow through the reactor generated by thermal circulation rather than pumps." [10]

Currently, none of the NRF prototypes are operating. The Naval Nuclear Propulsion Program plans on major expansion Expended Core Facility and six new spent nuclear fuel (SNF) receiving and storage buildings discussed more below. [11] The current director of the program is Admiral Donald. He's the fifth director of the program.

History of Idaho's Litigation with DOE and Navy

Safety concerns over the long-term storage of large volumes of spent reactor fuel at INL reached a critical mass. Former Governor Andrus justifiably issued a unilateral ban on additional shipments to INL in 1992. Idaho's Department of Health and Welfare also filed a suit against DOE on the grounds that the shipments of nuclear waste from Fort St. Vrain into Idaho violated state air quality standards. [12] Public Service Co. (owner of Ft. St. Vrain) and the US Justice Department (on behalf of DOE) filed counter suits against Andrus. The Shoshone-Bannock Tribes also filed suit against DOE for National Environmental Policy Act (NEPA) violations related to the waste shipments. [13] The lower courts found in favor of the Tribes and the State and issued an injunction against DOE on additional waste shipments until a comprehensive Environmental Impact Statement (EIS) was conducted. DOE appealed this decision and the Ninth Circuit Court of Appeals vacated the injunction and remanded the case back to the US District Court. On June 28, 1993, after nearly two years of litigation, Judge Harold Ryan issued a summary judgment enjoining DOE from shipping waste to Idaho until a comprehensive EIS is conducted. Judge Ryan stated in his summary that:

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[9] INL has had 42 reactor meltdowns in its history; 16 of these meltdowns were accidental; the remaining 26 meltdowns were experimental/deliberate to test reactor design parameters, fuel design, and radiation releases. Citizens Guide to INL, page 17.

[10] Naval Reactors Facility, Environmental Summary Report, NRFRC-EC-1047, pg. 8.

[11] Navy's Bettis and Knolls Atomic Power Laboratories (KAPL) located in West Milton, NY that supports facilities for prototype reactor training/development plants. KAPL also has significant hazardous/radioactive contamination problems to INL's NRF; however these issues are beyond the scope of EDI's report. See Reference section below for the list of KAPL reactors. Also see FY 2013 Congressional Budget for Naval Reactors pages 480 to 486.

[12] ID v US; Idaho Department Health and Welfare v. United States, 959 F.2nd 149,153 (9th Cir. 1992)

[13] Shoshone-Bannock Tribes v U. S. Department of Energy, Civil No. 91-0436-E-EJL (D. Idaho, Nov. 1, 1991)

"DOE's strenuous opposition, and the tremendous efforts and taxpayer expense associated with such opposition, does not seem an appropriate course for an agency charged with overseeing such important, yet hazardous activities. DOE simply does not seem to understand that this nation is depending on it to protect the health and safety of all Americans from the dangers associated with its activities." [14] "In light of the fact that DOE wishes to bring in spent fuel from civilian reactors and from foreign reactors; it appears that DOE is quietly attempting to make INL the nuclear waste repository for the US and the rest of the world." [15] "Such callous disregard for the legitimate concerns raised on behalf of the citizens of Idaho is exactly the type of conduct which tarnishes the image of federal government agencies in the eyes of the people." [16]

In July 1993 the Navy attempted to gain Congressional exemption to the National Environmental Policy Act (NEPA), and thereby exclusion from the June 28, 1993 court order enjoining waste shipments to INL. The Navy is claiming national security priority and lack of storage facilities at its shipyards for its spent fuel. Proposed amendment to the 1994 Defense Authorization Bill under consideration by the Senate Armed Services Committee would provide a NEPA exemption that would circumvent the court injunction requiring an EIS. Senator Werner and Congressmen Norm Dicks whose districts include the Puget Sound shipyards were the major proponents of this amendment.

On August 9, 1993, then DOE Secretary O'Leary and former Idaho Governor Andrus announced that an agreement had been reached that will permit 19 more shipments of spent fuel to INL over the next two years, with additional shipments if the Secretary of Defense formally certifies that national security requires them. The Navy indicated in a statement that such a certification was likely before 1995 to prevent disruptions in refueling the USS Nimitz, a nuclear-powered aircraft carrier scheduled for refueling in 1996. Prior to the court order barring the spent fuel from being sent to Idaho, the Navy and DOE had anticipated 336 shipments between August 1993 and mid-1995.

Then Governor Andrus accepted the compromise after the DOE agreed to spend more money at INL to upgrade nuclear waste storage facilities and the Navy promised not to seek a congressional exemption from NEPA. Both the DOE and the Navy further pledged not to appeal the June 28 court ruling that instigated the confrontation over the Navy's nuclear waste. Both the DOE and Governor Andrus presented their agreement to Judge Ryan August 26 for his consideration of the proposed amendment to the courts' summary judgment.

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[14] Ryan; Harold Ryan, Senior US District Judge, summary judgment , 6/28/93, Public Services Co. of Colorado v. Cecil Andrus; United States of America v. Cecil Andrus , Civil No 91-0035-S-HLR & 91-0054-S-HLR, pg. 30.

[15] Ibid, Ryan; pg. 37.

[16] Ibid, Ryan; pg. 39.

According to the August 9 agreement, the other concessions that DOE agreed to include re-racking of fuel in existing storage facilities that have experienced extensive corrosion and failure of fuel support racks. Fuel is also to be moved by the end of the decade from the forty-two year old INL ICPP-603 storage facility that is unsafe compared to the newer ICPP-666 facility. Some fuel in ICPP-603 is apparently in such an advanced state of corrosion that it cannot be moved and represents a significant hazard. The Navy has also committed to conducting Environmental Assessments of its shipyard reactor fuel storage facilities on the Atlantic and Pacific coasts. DOE also agreed to accelerate calcining of 500,000 gallons of non-sodium high-level liquid wastes by 1/1/98, and decides on technology for dealing with 1.5 million gallons of sodium bearing high-level liquid waste by 11/15/93, and accelerates technology development to vitrify the calcine waste.

The Environmental Defense Institute (EDI) filed a motion to intervene in this case August 25, 1993 to apprise the court of the unique nature of Navy spent fuel processing at the Naval Reactors Facility at INL. EDI was very supportive of Governor Andrus in his original position to block the waste shipments. However, the conditions stipulated in the August 9 agreement to allow 19 more shipments contains no provisions prohibiting continued dumping of Navy spent fuel parts at the INL burial grounds. DOE and Andrus filed a Joint Memorandum Opposing EDI's Motion to Intervene. [17]

The fact that both the Governor and the Justice Department joined forces to prevent the facts about the Navy dumping to be presented before Judge Ryan seems suspect in light of the fact that Andrus litigated this to protect Idaho's citizens. The parties also opposed the Shoshone-Bannock Tribes' request to file an Amicus Brief. The radioactivity in this Navy waste poses an immediate threat to continued contamination of the Snake River Aquifer that lies below the INL.

Judge Ryan issued his summary judgment September 21, 1992 which contained minor changes to the Andrus, DOE, and Navy agreement. One change included giving the State full veto rights over any additional shipments beyond the 19 shipments stipulated. The Navy appealed Ryan's final Order Modifying Order of June 28, 1993 decision in the Ninth Circuit Court of Appeals on September 24. The concessions that DOE and the Navy had agreed to be required by law anyway however they were overturned by the US Court of Appeals which remanded back to Judge Ryan. Economic threats from the single largest employer in the state of Idaho have clearly influenced the Governor's decision to allow the 19 additional Navy waste shipments. According to Judge Ryan, the immediate threat to Idaho's environmental security far outweighs the unsubstantiated military security issues presented by the Navy. Idaho's then Republican Governor Batt announced that the State will allow the Navy to send 18 additional spent fuel shipments to INL.

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[17] EDI(b); Motion to Intervene or in the Alternative for an Order Granting Leave to File Amicus Curiae Brief, in US District Court of Idaho, August 25, 1993, in USA vs. Andrus

Holding DOE to Its Commitments

Short-term economic gain is not worth setting aside the leverage the Batt Agreement gives Idaho with the federal government, writes Cecil D. Andrus: "In the 40-plus years I have been observing and dealing directly with the U.S. Department of Energy (DOE), I have noticed two things that seem never to change.

"First, DOE makes promises that it does not keep and when called to account for those failures attempts to change the subject. Second, the agency - and the country for that matter - has never developed a realistic long-range plan for permanently and safely disposing of the most dangerous and long-lasting nuclear waste.

" Both of these consistent DOE characteristics, true in both Democratic and Republican administrations, go a long way toward explaining why former Gov. Phil Batt and I feel so strongly about making sure Idaho maintains what leverage it has over DOE when it comes to keeping promises and contractual agreements regarding environmental cleanup at the Idaho National Laboratory.

"DOE's recent decision to abandon a plan to bring highly radioactive spent fuel from a commercial power plant to INL is just the latest chapter in a long campaign to get the agency to keep its commitments to Idaho. There will be other chapters soon enough. In the meantime, I salute my old friend Phil Batt for doing the hard work 20 years ago to create a landmark agreement that provides Idaho with leverage over DOE and I applaud Idaho Attorney General Lawrence Wasden for standing firm in support of the integrity of Batt's agreement.

"A chorus of voices has recently called for "re-negotiation" of the Batt agreement in the interest of allowing commercial spent fuel to come to Idaho, but the calls are both short-sighted and self-defeating. As Wasden has repeatedly pointed out, DOE is currently in violation of Batt's agreement and DOE has apparently rebuffed the attorney general's recent efforts to address how the agency might cure those violations.

"A major violation of the agreement involves highly radioactive liquid waste that must be treated, solidified, and more safely stored. DOE committed in the Batt agreement to have liquid waste treatment facility operational months ago, but it has not happened. It is increasingly clear that it may not happen for some time to come. Failure by DOE to keep this commitment means that 900,000 gallons of liquid waste, some of the most dangerous material stored in Idaho, remains in 50-year tanks directly above the Snake River aquifer.

"Furthermore, DOE apparently has made little or no effort to consider alternative approaches that could allow it to begin to come into compliance with the Batt agreement. Wasden correctly sees the agreement as the state's only real leverage to force a better approach from DOE, an approach that would treat dangerous liquid waste and remove it as a threat to the aquifer.

"Meanwhile, I have brought suit in federal court questioning the adequacy of DOE's plans for commercial spent nuclear fuel shipments to INL and also to force the department to make public documents that relate to the proposed shipments. I continue to suspect that DOE's

reluctance to share its plans with Idahoans relates directly to how unacceptable most of us would find proposals to import significant new amounts of additional nuclear waste into our state.

"Supporters of DOE's plans to import more waste under the guise of "research" - many also want to re-negotiate the Batt agreement - say short-term economic benefits are worth turning a blind eye to the reality that any high-level waste entering Idaho will likely stay here forever. They also seem willing to accept DOE's failure to honor past commitments. Neither position is in Idaho's best interest.

"No short-term economic gain is worth setting aside the leverage contained in the Batt agreement, particularly if it means accepting yet more waste material for what will certainly be long-term storage. DOE needs to do what unfortunately it has been unwilling to do for 40 years: level with the public about all of its short- and long-term plans, keep written commitments to the cleanup at INL, and permanently solve the waste disposal problem.

"Trying to divert attention from DOE's own failures is not acceptable. Idaho must aggressively enforce the Batt agreement." [18]

Navy's Safety Record

"The [Naval Nuclear Propulsion Program] NNPP maintains a proven record of over 151 million miles (243 million kilometers) safely traveled on nuclear power and over 55 years of naval nuclear reactor operation **without a reactor accident** or release of radioactivity that has adversely affected human health or quality of the environment. The NNPP currently operates 97 nuclear reactors and has accumulated over 6500 reactor-years of operation of naval reactors (NNPP-2013)." [19] [Emphasis added]

Admiral Bruce DeMars' Statement to U.S House Armed Services Committee in 1993 on the Navy's environmental and safety record states: "U.S. nuclear powered warships have now steamed over 93 million miles ---4,100 reactor years of safe operation –**without a reactor accident** or release of radioactivity which has had a significant effect on the crews, the public, or the environment." [Emphasis added] [20]

More recent reporting in the Department of Defense Fiscal-Year 2013, U.S. Naval Nuclear Propulsion Budget: "Naval Reactors … achieved 148 million cumulative miles of **safely-steamed,** militarily-effective nuclear propulsion plant operation." [Emphasis added] [21]

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[18] Posted: November 1, 2015 *Post Register*, Cecil D. Andrus, Short-term economic gain is not worth setting aside the leverage the Batt Agreement gives Idaho with the federal government, writes Cecil D. Andrus.

[19] Draft Environmental Impact Statement for the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling, June 2015, DOE/EIS-0453-D, pg. 1-3. Herein after called DOE/EIS-0453-D.

[20] Statement of Admiral Bruce DeMars, U.S. Navy Director , Naval Nuclear Propulsion before the Military Applications of Nuclear Energy Panel of the House Armed Services Committee, 28 April 1993, pg. 4 & 5.

[21] FY-2013 Congressional Budget, Naval Reactors, Pgs. 480-489.

Safely Record Challenged

Two of the U.S. Navy's nuclear submarines' were lost at sea due to equipment failure accidents:

* The USS Thresher (Hull No. SSN-593) nuclear-powered attack submarine sunk in the North Atlantic during deep-diving tests approximately 220 miles east of Boston Massachusetts on 10 April 1963. Judging by the 129 crew members and shipyard personnel who were killed in the incident, historic context and significance, the sinking of Thresher was then, and remains today, the world's worst submarine disaster. This was the first acknowledged U.S. nuclear submarine lost at sea.

* The USS Scorpion (Hull No "SSN 589) was lost at sea on 22 May 1968 with 12 officers and 87 enlisted men -- one of the worst casualties in the Navy's history. Based on prior experience with such problems and an analysis of the acoustic [sic] signature of the Scorpion loss, the Navy initially concluded that the most probable cause of the loss of the Scorpion was the launch of an inadvertently activated torpedo, which turned and struck the submarine. A six-month search eventually located the Scorpion's wreckage some 400 miles southwest of the Azores. Investigation of the boat's wreckage on the ocean floor found no evidence of torpedo damage. A six-month expedition in 1969 by Trieste II found no direct evidence to support the theory that the Scorpion was destroyed by a torpedo. While some portions of the Scorpion's hull were never found, the wreckage that was examined did not exhibit the conditions expected from the hydrostatic implosion of a submarine hull structure.

"Bow section of the sunken Scorpion containing two nuclear torpedoes on the sea floor. Stern section of Scorpion, seen in 1986 by Woods Hole personnel show the wreck of Scorpion as resting on a sandy seabed at the bottom of the Atlantic Ocean in approximately 3,000 m (9,800 ft.) of water. The site is reported to be approximately 400 [nautical mile] nmi (740 km) southwest of the Azores, on the eastern edge of the Sargasso Sea. The actual position is 32°54.9'N, 33°08.89'W. The U.S. Navy has acknowledged that it periodically visits the site to conduct testing for the release of nuclear materials from the nuclear reactor or the two nuclear weapons aboard her, and to determine whether the wreckage has been disturbed. The Navy has not released any information about the status of the wreckage, except for a few photographs taken of the wreckage in 1968, and again in 1985 by deep water submersibles." [22]

"The Navy has also released information about the nuclear testing performed in and around the Scorpion site. The Navy reports no significant release of nuclear material from the sub. The 1985 photos were taken by a team of oceanographers working for the Woods Hole Oceanographic Institution in Woods Hole, Massachusetts.

"Malfunction of trash disposal unit; during the 1968 inquiry, Vice Admiral Arnold F. Shade testified that he believed that a malfunction of the trash disposal unit (TDU) was the trigger for the disaster. Shade theorized that the sub was flooded when the TDU was operated at periscope depth and those other subsequent failures of material or personnel while dealing with the TDU-induced flooding led to the sub's demise." [23]

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[22] Federation of Atomic Scientists. http://fas.org/man/dod-101/sys/ship/ssn-585.htm

[23] See: https://en.wikipedia.org/wiki/USS_Scorpion_%28SSN-589%29

Greenpeace reports that: "There have been several dramatic collisions between U.S. and Russian nuclear submarines since 1960's. In one case in June 1970 in the Pacific involving the U.S. submarine USS 639 Tautog and Russian Echo-class submarine K-877 submarines in both crews thought the other submarine had sunk after the collision." [24] [25]

An unreported nuclear fuel accident occurred at NRF Expended Core Facility (ECF) that caused evacuation of the building when a transfer cask was not properly positioned over alignment posts. The bottom door cask had holes in it that are designed to receive the alignment posts on the deck above the water pools so that a tight seal is created when the bottom door opened and the fuel dropped into the water pool. In this accident the posts and holes were not aligned and therefore there was no seal. Workers claim that when the fuel was lowered into the pool, a 25 rad per hour beam escaped between the cask and the pool exposing workers in the area. This 25 rad is considered to be understated by many orders of magnitude. The miss-alignment occurred on one shift and the fuel transfer to the pool occurred on the next shift; thus the exposure involver more workers over a longer period. This accident is discussed more fully below.

The accident record of the Navy's Advanced Test Reactor at INL is extensive, but beyond the scope of this report. EDI's reports on the ATR's operation history are available on EDI's website (http://environmental-defense-institute.org/publicatons).

It is illegal to lie to Congress (Contempt of Congress); however, representatives of the Nuclear Navy have no problem with giving glaringly false formal testimony and statements to Congress who apparently is not objecting. Then Idaho Governor Cecil Andrus said: "The federal government thinks it's larger than the people, Andrus said, accusing the head of the nuclear Navy of dishonesty. "They're going to be in for a fight if this [waste plan] gets through." [26] Andrus is referring to the Navy's unwillingness to take responsibility for the radioactive waste dumped at INL over Snake River sole source aquifer with the result of significant contaminate migration into the aquifer.

Navy's 2008 Addendum to 1995 Settlement Agreement

The Navy continues to exercise its undeserved national security veil of secrecy and classified military status to protect/cover up what otherwise is a major regional environmental hazard. Access to operational documentation is obstructed by blocking Freedom of Information Act requests along with federal Environmental Protection Agency and state Idaho agencies with oversight jurisdiction over INL operations. EDI continues to battle this information fire wall with limited success. Section V of this Addendum states in part:

"A. All Naval spent fuel shipped to Idaho after January l, 2035, must meet the national security requirements required by paragraph D.1.a of the 1995 Agreement.

"B. Notwithstanding the provisions of paragraph C. l of the 1995 Agreement, after January I , 2035, the **Navy may maintain a volume of Naval spent fuel at INL of not more than nine (9) metric tons heavy metal (MTHM)** for a timeframe reasonably necessary for examination, processing, and queuing for shipment to a repository or storage facility outside Idaho provided:

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[24] Testimony for the U.S. Senate Select Committee on Intelligence Hearing Held 15 August 1992 by Joshua Handler, Greenpeace Nuclear Free Seas Campaign, coordinator pg. 6; "So long as Russian, U.S. and U.K. submarines continue to play cat and mouse games under the water there will [be] the possibility of a fatal disaster taking nuclear reactors to the ocean floor."

[25] Wikipedia, SS Thrasher.

[26] Andrus wants Kemthorne to block Navy's waste plan," Associated Press, Daily News, 7/21/93.

" 1. No portion of said nine MTHM Naval spent fuel provided for in paragraph V.B of this Addendum, shall consist of or be from shipments of Naval spent fuel arriving at the lNL prior to January I , 2026; and,

" 2. After January I, 2035, the Navy may ship a running average of no more than twenty (20) shipments per year of Naval spent fuel to IN L. The term "running average" shall be defined as set forth in paragraph A. 16 of the 1995 Agreement."

"C. Notwithstanding the provisions of paragraph E.8 of the 1995 Agreement, Naval spent fuel arriving at the IN L after January I , 2017 may be kept in water pool storage for a timeframe reasonably necessary for examination and processing not to exceed six (6) years. All Naval spent fuel located in water pool storage prior to January 1, 2017 must be removed from water pool storage by not later than January 1, 2023.

"D. In addition to the volume of Naval spent fuel provided for in paragraph Y.B above, the **Navy may maintain a volume of not more than 750 kilograms heavy metal of Naval spent fuel** in archival wet or dry storage as necessary for comparison to support fuel designs under development or in use in the U.S. Navy fleet. The archival fuels provided for in this section are not subject to the limitation set forth above in paragraph V.C." [27] The whole text of this Addendum to 1995 Settlement Agreement is available foot note #28 below.

The Navy's spent nuclear fuel shipments to INL are not currently being challenged -- only the non-Navy DOE spent nuclear fuel. The Navy's limited shipments that are allowed (Previous 800 + Current 9 + 750 = 1,559 kilo-gams heavy metal) under this Addendum to the 1995 Settlement Agreement and are not blocked due to DOE's missed milestones articulated by former Governor Andrus. If Penalties can occur if the Navy does not keep its milestones, [28] under Section VI of the 2008 Addendum the Remedies includes the following:

A. "If the Navy fails to satisfy the substantive obligations or requirements it has agreed to in this Addendum or fails to meet deadlines for satisfying such substantive obligations or requirements, shipments of Naval spent fuel to INL shall be suspended unless and until the Parties agree or the Court determines that such substantive obligations or requirements have been satisfied.
B. "In addition to the remedy specified in paragraph VI.A above, in the event that the Navy fails to remove Naval spent fuel from pool storage as provided in paragraph V.C of this Addendum, then subject to the availability of the appropriations provided in advance for this purpose, the Navy shall pay to the State of Idaho $60,000 for each day such requirement has not been met." [29]

Smart for the Navy to get all these concessions so far into the future because its shipments to Idaho would otherwise have cease in 2035 if there was no repository – a high probability given the last several decades over establishing a high-level radioactive waste repository at Yucca Mt.

So, the issues are: (1) the Navy's insistence on burying its waste above Idaho's sole source

[27] Addendum to 1995 Settlement Agreement dated 4th day of June 2008, signed by Admiral K. Donald, C.L. "Butch" Otter, Lawrence Wasden, Frank Jimernez, and David Hill, page 1 & 2.

[28] https://www.deq.idaho.gov/inl-oversight/oversight-agreements/2008-navy-addendum/

[29] Addendum to 1995 Settlement Agreement dated 4th day of June 2008, page 2 & 3.

aquifer, not just in the past, but in the future; (2) The lack of a repository to send the Navy's spent nuclear fuel to when the Settlement Agreement says, starting in 2035;

Naval Reactor Facility Mission at INL

Outlying year Congressional funding supports Naval Reactors' core mission of providing proper maintenance and safety oversight, and addressing emergent operational issues and technology obsolescence for 168 reactor plants; this includes 72 submarines (54 attack, 14 ballistic missile, and 4 guided missile submarines), 11 aircraft carriers, 82 nuclear powered war ships, and four research and development and training platforms including land-based prototypes (2 at Bettis and Knolles Atomic Power Laboratories in New York State and 2 in South Carolina). There are 6 shipyards that construct and/or service nuclear powered ships; four of those shipyards do reactor servicing. "Those four shipyards are the Portsmouth Naval Shipyard in Kittery, Maine; Norfolk Naval Shipyard in Norfolk, Virginia; Norfolk Newport News and Newport News, Virginia; and Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Bremerton, Washington. The fuel removed from the reactors by those shipyards is all shipped by rail to the Naval Reactors facility here in Idaho." "Since the late 1950's we [NNPP] have shipped over **800** [reactor core] containers from shipyards around the country to Idaho. Currently, we're shipping about eight containers in a normal year." [30]

The Nuclear Navy represents 45% of the Navy's fleet and more nuclear reactors than are currently in the U.S. commercial nuclear electrical power generator fleet. Due to the veil of secrecy around this large Nuclear Navy military program, the public is not allowed to be appraised of its unregulated operations. The same hazard/public health/waste issues that accompany commercial nuclear power generation equally apply to the Nuclear Navy Propulsion Program (NNPP). Unlike commercial nuclear power reactors that are spread around the country, the Nuclear Navy Spent Nuclear Fuel operations are concentrated at the Naval Reactors Facility (NRF) at the Idaho National Laboratory (INL). NRF waste goes to INL's Radioactive Waste Management Complex, and soon to come online the Remote Handled Disposal Facility dump discussed below. Due to the Navy's significant waste volume and resulting environmental impact, Idahoans must get access to the details of its operations because of Navy's ½ century of contributing to contaminating the Snake River Plain Aquifer.

Idaho Senator Kemthorne stated: "No more quick fixes. That's what got us in this fix we are in today. The navy is not the villain and it may in fact be the innocent victim of the federal government's nuclear waste non-policy. The Navy can no longer give its waste to the Department of Energy, and say, 'We've done our job, and we have a great record,' while the Navy's waste sits in one facility plagued by corroding containers in unlined pools sitting above one of nation's largest underground aquifers. Even the contractor believes these pools should be shut down. Once the Navy's fuel arrives at INL, it's placed in pools with other nuclear waste.

[30] U.S. Nuclear Waste Technical Review Board, Summer Meeting, June 29, 2010, Hilton Garden, Idaho Falls ID, pages 100 and 102. Herein after, Nuclear Waste Board.

The Navy's name is still on it, you can't walk away ….just as the people of Idaho can't walk away. No more quick fixes." [Emphasis in original text] [31]

In August 2015, John McKenzie director of program regulatory affairs said project costs for building a new Naval Reactors Facility (NRF) "is actually the low-cost answer, and even that is $1.6 billion." More than $500 million would be spent on construction. The rest would be design, equipment costs and a "management reserve," McKenzie said. Nuclear Navy currently has 81 nuclear powered warships including submarines and aircraft carriers. [32] [33]

"Start of construction on the new Expanded Core Facility [at INL/NRF] M-290 Receiving/ Discharge line-item construction a necessary project for receipt and processing of aircraft carrier spent nuclear fuel." "Construction: Reflects an increase in funds for the Remote-handled low-level Waste Disposal Project [at INL], Prototype Radiological Work and Storage Building, staff building… FY-2012 ($39,900,000); FY-2013 ($49,590,000). " [34]

As discussed below, the Navy's dumping of radioactive waste currently at the INL Radioactive Waste Management Complex (RWMC), [35] will soon be dumped at the new Remote-Handled Low-Level Waste Disposal Project adjacent (south-east) of Advanced Test Reactor Complex (ATR-C) that is also in the Big Lost River flood zone. **See Attachment # 1** below that shows DOE's own assessment of the "Surface Water Features, Wetlands, and Flood Hazard Areas at INL." **Attachment # 1-B** is an aerial photo that shows the location of the new Remote-Handled Low-Level Waste Facility (RHWF) between ATR-C and INTEC. Comparing these two maps puts the RHWF in the flood zone which must disqualify it.

Also **Attachment # 1-A** shows DOE's own "Water table Contour Map for NRF" that clearly shows the topography of the NRF in relation to the Big Lost River. Specifically, the elevation contour # 4464 (black dash horizontal lines) runs right through the NRF that shows its

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[31] Opening Statement, Senator Dirk Kemthorne, July 28, 1993, Subcommittee on Nuclear Deterrence, Arms Control and Defense Intelligence, pages 2 & 3.

[32] "Navy officials pitch new $1.6 billion nuclear facility", reported in *Post Register*, August 4, 2015, by Luke Ramseth. As all things INL/Navy there is broad number information sources that conflict in every aspect. In this EDI report we cite all source data with the caveat that the prevailing secrecy blocks any definitive true characterization.

[33] Green Peace reported as of 1992, the Nuclear Navy has 126 vessels active and 63 in retirement. The 126 active vessels contain 147 reactors. The 63 retired vessels contain 65 reactors. The Navy has produced, over its history, a total of 600 reactor cores for its 189 commissioned vessel fleet. Within the next eight years, the Navy will retire an additional 85 submarines. Counting refueling and retired reactors, INL has received a total of 259 core assemblies. In eight years that number will jump to 359 core assemblies. The reactor shells are buried at DOE's Hanford site spent nuclear fuel are sent to INL's Naval Reactors Facility.

[34] DOE/EIS-0453-D.

[34] Navy officials pitch new $1.6 billion nuclear facility, Posted on Post Register, August 4, 2015, by Luke Ramseth.

[35] RWMC is located in a localized depression over 60 feet below the Big Lost River and has been flooded numerous times in recent INL history. For more information see EDI's Citizens Guide.

vulnerability to floods.

This new remote-handled dump will not solve the Navy's waste disposal problem; it only leaves one thoroughly contaminated site that CERCLA is forcing closed (RWMC Subsurface Disposal Area) and opening a new one further down the river.

Naval Nuclear Propulsion Program Cost (dollars in thousands**)** [36]

FY-2011	FY-2012	FY-2013	FY-2014	FY-2015	FY-2016	FY-2017
985,526	1,080,000	1,088,635	1,108,391	1,129,186	1,151,021	1,175,975

Current Litigation over Spent Nuclear Fuel Shipments

"On July 13, 2015, *Advocates for the West* submitted initial comments on behalf of former Governors Andrus and Batt to the Department of Energy on its draft Supplemental Analysis for two proposed commercial spent nuclear fuel shipments to INL. *Advocates for the West* Executive Director Laird Lucas slammed DOE for providing "false and misleading information to the public," including misrepresenting Idaho's willingness to waive the 1995 Batt Settlement Agreement, which prohibits the nuclear waste shipments to INL. Lucas' comments also faulted DOE for avoiding its duty to fully disclose its planned actions and evaluate alternatives under National Environmental Policy Act (NEPA).

"The Governors' comments also pointed out that DOE has failed to provide relevant documents under [Freedom of Information Act] FOIA, which Governor Andrus requested in January [2015]. The DOE has withheld or redacted dozens of pages of documents, effectively stonewalling the public." [37] The 1995 Federal Court Ordered Settlement Agreement with DOE and the Navy originated with Governor Andrus and later finalized by Governor Batt was over the DOE/Navy refusal to honor commitments over decades to clean-up the extensive radioactive waste dumped at INL. The Agreement stipulates date specific time lines for the removal of the waste to a permanent repository outside the State of Idaho. DOE and the Navy continue to renege on fulfilling their court ordered Settlement obligations; thus the Andrus/Batt litigation.

The State of Idaho has a major role in the waste management end of the Naval Nuclear Propulsion Program. The Addendum to the 1995 Settlement Agreement [38] outlines significant concessions by current Idaho Governor Otter in terms of the Navy's ability to maintain its nuclear program spent nuclear fuel (SNF) waste management needs. Previous Governors' Andrus and Batt (who negotiated the 1995 Settlement Agreement) are legally contesting Governor Otter's abrogation of the original 1995 Settlement Agreement and Consent Order. [39]

"The order by U.S. District Court Judge Harold Ryan prohibited any further shipments of nuclear waste to INL near Idaho Falls until a comprehensive assessment is made of their impact on the environment and public safety. The judge said the Energy Department was not honest with him and failed to keep their word to the state. He said a binding court order was the only way to cure that 'callous disregard for legitimate concrete concerns raised on behalf of the citizens of Idaho'. It appears that DOE is quietly attempting to make INL the nuclear waste

[36] FY-2013 Congressional Budget, Naval Reactors, Pgs. 480-489.

[37] Advocates West website, "Keeping Nuke Waste out of Idaho," 8/1/15.

[38] Addendum to the 1995 Settlement Agreement, signed by, Admiral Kirkland Donald, Director Naval Nuclear Propulsion Program; C.L. "Butch" Otter, Governor of Idaho; Lawrence Wasden, Idaho Attorney General; et.al.

[39] Laird Lucas legal director for Advocates for the West are representing Andrus and Batt. www.advocateswest.org.

repository for the United States and the rest of the world,' Ryan said." [40]

Former U.S Senator Larry Craig (R.-Idaho) Testimony to Congress stated: "We are here today because the Department of Energy in conjunction with the U.S. Navy made a decision not to reprocess Naval Fuel at the Idaho Chemical Processing Plant in April of 1992. At that point the Idaho National Laboratory (INL) became a nuclear waste storage facility. You will hear today that storage was temporary and that the Navy Fuels were to be disposed of in the geological repository. What you most likely will not hear is that such a disposal is intended for the second or third geological repository, not the first. I need not reiterate for this Committee the problems that been experienced in Nevada with evaluating a geological repository for mainly commercial fuels. But, let me tell you there are a few people here who don't plan on allow Idaho's concerns to go ahead. Those concerns are that our state is slowly and quietly becoming a nuclear waste dump because the federal government has shamelessly fallen down on the job. Let me speak for Idahoans here today –THAT IS NOT ACCEPTABLE. I ask that the committee carefully consider the testimony of two Senators and a Governor and a lot of Idahoans watching." [emphasis in original text] [41]

Admiral DeMars Testimony continues: "Over 500 shipments have been made to date [1993] without any accidents or adverse effects on the environment. We anticipate making about 10% more spent nuclear shipments in the next decade than we did in the previous one..." [Ibid Note 28 pg. 1] During the cold war highly enriched uranium was a precious resource, recovered through chemical reprocessing at the Idaho National Laboratory (INL) for subsequent use as fuel for the weapons production reactors. In that era, reprocessing made economic sense and supported the nation's strategic goals. However, reprocessing involves chemical dissolution of the spent fuel, release of fission products, and a seven fold increase in the amount of high level waste at INL. Reprocessing was discontinued in early 1990's, however the ~900,000 gallons of liquid high-level liquid waste remains in buried single shell tanks at INTEC without any treatment path forward. Navy SNF was always preferred in reprocessing due to its highly-enriched uranium fuel.

Environmental Concerns

Regardless the sweetheart deal the Navy got from Idaho for SNF shipments to 2035, more radioactive waste shipped to INL exacerbates the environmental contamination of the aquafer for manila. DOE continues renege on cleanup commitments for mismanagement of the most hazardous waste and missing court ordered stipulated mile-stones.

According to the Nuclear Waste Board; "A little background information…we [DOE/Navy] started the fuel processing in 1952, early Fifties, continued that reprocessing through 1991, which is a three step solvent extraction process. The solvents typically were nitric acid based and dissolved the fuel that way.

The first cycle, raffinates, were again processed in the Calciner, New Waste Calciner, and converted to the calcine that Ron is working with currently. They also talked about the tank farms, the 300,000 gallon tanks, of which there are eleven. The first seven were the ones that

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[40] Lewiston Morning Tribune, 7/1/93, "Andrus disputes Navy's claim of need for nuclear shipments", pg.13A.

[41] Testimony of U.S Senator Larry Craig (R.-Idaho) Before the Committee on Armed Services Subcommittee on Strategic Forces and Nuclear Deterrence, 222 Russell Senate Office Building, July 28, 1993.

contained the high-level first raffinates, first cycle raffinates, and those were calcined. Those tanks have been cleaned to a heal and both the tank and the vaults are now full of grout and closed. So, we have four tanks left. Those four tanks contain the 900,000 gallons of sodium bearing waste. There are three tanks that are in use, they've got approximately 300,000 gallons each, and one tank is empty. Calciner, New Waste Calciner, I think we've covered quite a bit now, and the [calcine] bin sets. Waste management; decon [sic] activities, cleaning up of these first seven tanks, plus cleanup of the reprocessing facilities. We've got a lot of decontamination solutions that are high in sodium and, hence, the sodium bearing waste name. [pg.91]

"Speaking of final disposition, as we discussed earlier, sodium bearing waste was determined to be not high-level waste in Idaho. It was other than or incidental to waste processing, and, so, our path forward was to ship these to WIPP in these removable canisters, in a 72-B container. But, for us to go to WIPP now, they will have to change the record permit, and there are talks there if that's the way we go or not. Of course, if it is determined at some later date that this is high-level waste, then we'll be dependent upon the [below regulatory concern] BRC to determine where we're going to send this, and what we'll do with it." [42]

On the surface, a member of the public likely will not appreciate what this all means to them and future generations that will be forced to deal with these current political decisions. The Navy, like commercial nuclear power generators, is ignoring the spent nuclear fuel waste issue. Even Congress ignores the problem of what to do with all of this highly radioactive and therefore hazardous waste. The attempt at a permanent deep geologic repository at Yucca Mt. failed after investing decades and billions of tax-payer money wasted. Still Congress cannot find the political will to initiate a search for a new repository. Neither commercial nuclear power generators nor the Nuclear Regulatory Commission have faced up to what to do with all the non-fuel parts (now called Greater-Than-Class-C low-level radioactive waste) of commercial spent nuclear fuel. **See Attachment # 2** below for the listing of this waste as an exemplar of NNPP's problem. [43] The Nuclear Navy has the same problem with this SNF processing waste, except they are largely unregulated.

Specifically, each Navy Spent Nuclear Fuel (SNF) shipment to Idaho National Laboratory (INL) undergoes a process (explained below) that separates the uranium fuel from non-fuel structural parts. The uranium is stored for eventual disposal in a high-level waste geologic repository yet to be established. The highly radioactive non-fuel structural parts end up being dumped above Idaho's sole source aquifer. DOE's Supplement to Evaluation of Naval Reactors Facility Radioactive Waste Disposed of at the Radioactive Waste Management Complex from 1953 to 1999, lists the 22 radionuclides in the Navy's waste that total 952,986.68 curies. [44] See **Attachment # 3** (Table 5, pg. 18) below for the list of individual nuclides.

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[42] Nuclear Waste Board, pg. 91

[43] Explanation of Significant Differences Between Models Used to Access Groundwater Impacts for Disposal of Greater-Than-Class-C-Like Waste Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project, page 1, INL/EXT-10-19168, Table 2 citing DOE-EIS-2011 shows the significant volume and curie content generated by reactors.

[44] 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.

Expended Core Facility Spent Nuclear Fuel Processing

"As part of the inspection process, [Expended Core Facility] ECF crops off the non-fuel bearing material for disposal as low-level waste, and ships the spent fuel itself to the Chemical Processing Plant where it has been stored in water pits, sometimes for years awaiting reprocessing. [pg. 2]

"Storing naval spent nuclear fuel in water pits eliminates the generation of extra high level waste. [pg.3] Shipyards that defuel nuclear warships are in six states; Washington, Hawaii, Maine, Virginia, California and South Carolina." [45]

Historically, before regulations prevented it, the NRF SNF was dumped in INL's Subsurface Disposal Area (SDA) in unlined pits and trenches. DOE records show that between 1952 and 1980, 27,707,700 grams or 27,707.700 kilo grams or 27.7 metric tons. [46] NRF is the largest contributor of SNF dumped at INL's dump. See list of SNF generators to the RWMC below. A fully loaded commercial spent fuel cask is about 20 metric tons. The environmental impact of this can perhaps be compared to the inventory acknowledged by the RWMC analyses --- with understanding that the migration of contaminates has been manipulated to understate the effects for the first 10,000 years by the selected of assumed migration characteristics.

INL's Explanation of Significant Differences Between Models Used to Access Groundwater Impacts for Disposal of Greater-Than-Class-C-Like Waste Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project "includes an ` evaluation of the radionuclides inventory, disposal facility configuration and transportation from the facility to a hypothetical receptor via the groundwater pathway." [47] **See Attachment # 1** below that shows the proximity to Big Lost River. When this picture is compared to **Attachment 4** aerial photo, it is clear this radioactive waste dump site is in a flood zone which must legally disqualify it in a "normally regulated environment" which tragically INL is NOT.

The Navy has been using Idaho as its dumping ground for over ½ century, with tragic impacts on contaminants migrating into the underlying Snake River Plain Aquifer. This EDI report offers details about the extent of the "known" contaminant in the Idaho's sole source aquifer. Currently, there is a significant deficiency in both air and ground water monitoring on the part of DOE, NRF, EPA and Idaho Department of Environmental Quality (IDEQ). The discontinuation of monitoring is by agreement between DOE/NRF and IDEQ.

The Naval Reactor Facility's (NRF) Expended Core Facility (ECF) at INL receives the whole reactor fuel assembly module. This facility has expanded to include a Dry Cell for cutting larger aircraft carrier reactor cores to accommodate the increased size, volume from refueling and decommissioning. The fuel rods are not easily removed from the rest of the assembly as are most conventional reactor cores. The steel structural core assemblies are designed to withstand combat shocks and maintain fuel rod configuration within the core during combat scenarios.

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[45] Statement of Admiral Bruce DeMars U.S Navy Director, Naval Nuclear Propulsion before Nuclear Deterrence, Arms Control and Defense Intelligence Subcommittee of the Senate Armed Services Committee on Nuclear Spent Fuel Shipments 28 July 1993.

[46] Radioactive Waste Management Information System Database (P61SH090, and P61SH070, Run Date 10/24/89)

[47] Explanation of Significant Differences Between Models Used to Access Groundwater Impacts for Disposal of Greater-Than-Class-C-Like Waste Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project, page 1, INL/EXT-10-19168, and Table 2 citing DOE-EIS-2011 shows the significant volume and curie content generated by reactors.

Naval spent nuclear fuel assemblies have non-fuel-bearing structural components above and below the fuel region to maintain proper support and spacing within the reactor. Generally, these upper and lower non-fuel-bearing structural components are removed in preparation for packaging. Non-fuel structural material is removed in the ECF water pools using an underwater cutting saw in a process known as resizing. This resizing can also occur in the Dry Cell. The non-fuel-bearing structural material removed from naval spent nuclear fuel assemblies is (in EDI's view incorrectly) classified as low-level radioactive waste (LLW). Based upon the radiation levels exhibited by this LLW, this waste should be designated either as high-level or remote-handled (RH) Greater-than-Class C Waste.

To minimize a criticality in the uranium parts of the fuel, "Neutron poison absorbs neutrons to ensure nuclear fission [criticality] does not occur. When necessary to reduce reactivity, neutron poison material is inserted into the naval spent nuclear fuel assembly." [48]

"The ECF water pool area contains various materials handling equipment to support operations, including cranes and transfer carts. This equipment is vital to supporting naval spent nuclear fuel handling operations. Walls and stainless steel gates divide the water pools into smaller work areas, or zones. This partitioning makes it possible to drain a small portion of the total water pool or isolate an individual volume when maintenance or repair is required. The water pool walls and floors are covered with a fiberglass or epoxy coating which is highly resistant to radiation damage, easy to decontaminate, and serves as an extra barrier to water leakage." [49]

According to Thereon Bradley [50], former Manager of the NRF, explained that the Expended Core Facility (ECF) cuts (or in some cases unbolts) the metal ends from the spent fuel elements in order to inspect fuel and cladding integrity and evaluate how the fuel survived service in the reactor. [Bradley] Other core structural components are also cut off the spent fuel assembly in hot (dry) cell. "All naval fuel modules have non-fuel bearing metal structures above and below the fuel region to facilitate coolant flow and maintain proper spacing within the reactor. These upper and lower non-fuel bearing structures must be removed to permit inspection of the modules. Removal reduces the storage space ultimately required for the fuel by approximately 50%." [51]

The core assembly components containing the uranium fuel sections were previously sent intact to the Idaho Chemical Processing Plant (ICPP) for reprocessing or storage in ICP-666 water canal. This procedure changed when reprocessing ended and NRF kept the uranium in ECF or dry cask storage. [52] The remaining reactor non-fuel element parts and structural components have always been sent to the INL Radioactive Waste Manage-Management Complex (RWMC) for shallow burial as "low-level" Class A or B waste. Until the mid-1970's this unregulated waste was dumped in the center of pits and trenches while less radioactive waste was dumped around it to provide additional shielding. Post-1970s practice is to use individual

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[48] DOE/EIS-0453-D, pg. 1-4

[49] DOE/EIS-0453-D pg. 1-6

[50] Thereon Bradley has since died of a brain tumor.

[51] Department of Energy Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Draft Environmental Impact statement June 1994, DOE/EIS-0203-D, @B-10

[52] Reprocessing involves the chemical or pyro-reprocessing to reclaim the enriched uranium/plutonium for nuclear bombs or new reactor fuel.

unlined holes or "soil vaults" at the RWMC Subsurface Disposal Area (SDA). See **Attachment # 5** below that shows (in color) where the Transuranic (TRU) and Soil Vaults are located and **Attachment # 6** Diagram of SDA shows the location of the numbered pits, trenches and soil vaults. Currently, NRF dumps this waste in an array of concrete lined vaults at the south end of Pit-20. **Attachment # 7.** SDA plot plan and list of Pits/Trenches opening/closing dates and the note for Trench 55 states; "Trench **55 still available on East end for High Level Waste.**" [Emphasis added]

On some select core assemblies, the Navy does a destructive examination in the water pool or hot cell by cutting the fuel elements for a detailed evaluation of the uranium fuel and its cladding. In the past this process of cutting away the structural components was routine when the fuel was being reprocessed at the ICPP (now called INTEC) and the structural parts had to be separated from the uranium fuel components prior to reprocessing, as was the practice prior to 1990. The ICPP and other spent fuel generating facilities also routinely cut off metal parts of fuel rods on non-Navy fuel that was slated for reprocessing or storage, and sent these metal components to the RWMC/SDA for shallow land burial as "low-level waste."

Navy Acknowledges Expended Core Facility (ECF) Problems

The Navy admits; "Outdated infrastructure designs and upgrades to ECF structures, systems, and components necessary to continue ECF operations in a safe and environmentally responsible manner present a challenge to the continuity of ongoing ECF naval spent nuclear fuel handling operations. Major portions of the ECF infrastructure have been in service for over 50 years. The maintenance and repair burden necessary to sustain ECF as a viable resource for long-term operations is increasing. The ECF water pools have never undergone a complete refurbishment and have not been upgraded to current seismic standards. The 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 absence of a liner also means the capability to detect and collect small leaks, a common feature in modern water pools, is not present for the ECF 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 (Section 2.3)." [53]

It's tragically ironic that the Navy is finally being honest after decades of denial that any of the above issues exist. This author lost count of the number of times Navy, DOE, Idaho Department of Environmental Quality representatives lied to my face that there were no problems at the ECF. Now when the Navy wants to spent $ on a new ECF they finally talk about the facilities deficiencies that have been contaminating the environment for decades.

Regulations on Nuclear Waste Classification

Title 42 United States Code Annotated 6.427.§ 28.021c states; "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

[53] DEIS Pg. 1-13

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 Unite 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…."

The Navy now acknowledges that "some of the structural material exceeds the 10 CFR 61 Class C concentration limits and is being stored in the water pools. Under the Low-Level Radioactive Waste Policy Amendments Act of 1985 (P.L. 99-240), DOE is responsible for ensuring safe disposal of all Greater than Class C waste in a facility licensed by the Nuclear Regulatory Commission." [54] This is a very recent policy shift by the Navy to even consider this waste Greater than Class C. Still, the Navy continues to ship this waste to the RWMC violating its own policy and DOE continues to receive and bury the waste in shallow holes. Extremely limited storage capacity in addition to DOE's inability to account for this waste in storage further challenges the Navy assertions that Greater than Class C waste is going anywhere but to the burial ground. As recently as 7/12/94 this writer observed a heavily shielded transport canister routinely used by the Navy at the RWMC beside a crane ready to unload. **See Attachment # 8** for a copy a sample of 4 NRF shipping records to the RWMC Subsurface Disposal Area (SDA).

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." [55] 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 over a sole source aquifer. **See Attachment # 1 below.**

DOE data shows that individual NRF waste shipments to the RWMC containing greater than 81,000 curies are not uncommon. **See Attachment # 8 below**. The reader must understand that Attachment 8 is only two pages of RWMIS that includes more than 12 ring (10 inch thick) ring binders of printouts. It also should be noted that this waste is currently dumped in shallow unlined holes (called "soil vaults") that would not qualify as a municipal garbage landfill, much less a RCRA Subtitle C hazardous waste disposal site, or a NRC high-level or Greater Than Class C radioactive waste repository. This dumping will continue until the new Remote-Handled Dump is built next to ATR at INL.

Another category of Navy waste is irradiated test specimens. "The irradiated materials program evaluates small specimens of materials for use in naval reactor systems. The specimens

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[54] Department of Energy Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Draft Environmental Impact statement June 1994, DOE/EIS-0203-D, @ B-10

[55] 10 CFR 61.7

are loaded in sample holders, and the holders are placed in test assemblies at ECF. The assemblies are irradiated at [Advanced Test Reactor] ATR, and returned to ECF for disassembly."... "After completion of the final examination, specimens are shipped to ICPP for storage or to the INL Radioactive Waste Management Complex for disposal." [56] Over 4,450 specimen shipments to and from the ECF have occurred to date. [57]

The below incomplete summary table (because it only goes to 1983) of radioactive content of waste dumped is considered understated. The Environmental Defense Institute analysis of the curie content of Navy shipments to the burial ground, for instance, adds up to 8,140,668 curies. [58] However the above DOE data using annual summaries attributes the Navy to only 4.2 million curies or only half as much. DOE admits that the annual summaries are understated. [59]

Summary of Waste Dumped in the Subsurface Disposal Area

Radioactivity of Waste Dumped at the Subsurface Disposal Area 1952-1983

Major Generator	**RWMIS Shipping Roll-up in Curies**
Test Area North (TAN)	63,000
Test Reactor Area (TRA) Currently Advanced Test Reactor Complex	460,000
ID Chemical Processing Plant currently Idaho Nuclear Technology Environmental Complex	690,000
Naval Reactor Facility (NRF)	**4,200,000**
Argonne-West Currently called Materials Fuel Complex (MFC)	1,100,000
Rocky Flats Plant (RFF)	57,000
Other	55,000
Total	11,000,000
EG&G-WM-10903 @ 6-26	

Flooding accident scenarios postulated in the INL Environmental Restoration/ Waste Management Draft Environmental Impact Statement (ER/WM DEIS) of Mackey Dam acknowledges that the dam "was built without seismic design criteria" and "additionally, it is not clear how resistant the dam structure is to seismic events" and the fact that "a fault segment runs

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[56] Department of Energy Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Draft Environmental Impact statement June 1994, DOE/EIS-0203-D @ B-12

[57] DEIS @ A-9

[58] EDI filed for and received a Freedom of Information Act request that included RWMIS database printouts of all the waste dumped at the RWMC. Our analysis included adding up those shipments and their characteristics.

[59] EGG-WM-10903 @ 6-26.

within 6 kilometers of the Mackay Dam" [60] is more significant than the DEIS allows. Specifically, the 16 hour time delineated for the failed dam flood waters to reach NRF is incredible. Flood waters would move considerably faster than 2 miles per hour. **See Attachment # 1 and 1-A** below that show; "Flood Area for the Probable Maximum Flood Indicated Over toping Failure of Mackey Dam." **[61]**

The DEIS inaccurately describes the Borah Peak earthquake as 6.9 when it was actually 7.3 on the Richter scale. This is a significant inaccuracy when DOE analyst Rizzo calculated peak ground acceleration at 0.24. The Special Isotope Separator EIS used a "predicted peak ground accelerations were calculated assuming a 7.25 magnitude earthquake." [62] The DEIS does acknowledge that "this beyond design basis earthquake might have a peak ground acceleration of 0.4 g at ECF" which is twice the 0.24 that the facility could sustain. [63] [DEIS (b) @ B-18] Yet the DEIS fails to explicitly acknowledge that there is a significant seismic hazard. The new ECF replacement facility proposed in 2015 would have a canal liner and be seismically designed to modern standards.

"The [NRF] Expended Core Facility $44 million Dry Cell Project has a dry shielded fuel handling, disassembly, examination and shipping facility, a decontamination shop, and a shielded repair shop. The Dry Cell contains a semi-automated production line to receive and prepare fuel for shipment to the ICPP for chemical dissolution and recovery of unused uranium. The decontamination and repair shop will be integrally connected to the Dry Cell, and to existing water pits, to allow routine servicing of equipment without removing equipment from a shielded environment. A 10,000 foot extension to the existing facility will be used to house necessary control, receiving, storage and training spaces."

"Core examinations and preparations for shipping and dissolution are currently performed in water pits and hot cells. This method is labor intensive, has notable technical disadvantages, and involves a significant burden of deliberately redundant administrative and physical controls for nuclear safety. The receipt of expended nuclear cores is expected to have increased by 1992. This surge will be compounded because many of these cores will be larger and heavier than those that are currently processed in the water pits. Existing facilities and systems cannot be economically upgraded and automated to meet the projected workload increases. The Dry Cell Project is essential to continued timely handling of expended cores in support of scheduled Navel nuclear-powered vessel refueling and inactivation's." [64]

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[60] Department of Energy Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Draft Environmental Impact statement June 1994, DOE/EIS-0203-D, @B-17.

[61] DOE/EIS-0453-D, pg. 3-38

[62] Final Environmental Impact Statement Special Isotope Separation Project, Idaho National Engineering Laboratory November 1988, U.S. Department of Energy, DOE/EIS-0136, Vol. 1.

[63] Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement, June 1994, page B-18, DOE/EIS-0203-D.

[64] DOE FY-93

The Navy fails to provide seismic analysis documenting that the super structure of the Expended Core Facility (ECF) can sustain design basis earthquake and accident scenarios during transfer of fuel using the ECF bridge crane. Water Pits 1, 2 and 3 were only constructed to earthquake "Zone 2 earthquake requirements which were judged to be appropriate under the USGS's classification of the area at the time [1957] of their construction." Subsequent USGS requirements for INL raised that standard to zone 3.

As discussed earlier, an unreported nuclear fuel accident occurred at ECF that caused evacuation of the building when a transfer cask was not properly positioned over alignment posts. The bottom door cask had holes in it that are designed to receive the alignment posts on the deck above the water pools so that a tight seal is created when the bottom door opened and the fuel dropped into the water pool. In this accident the posts and holes were not aligned and therefore there was no seal. Workers claim that when the fuel was lowered into the pool, a 25 rad per hour beam escaped between the cask and the pool exposing workers in the area. This 25 rad is considered to be understated by many orders of magnitude. The miss-alignment occurred on one shift and the fuel transfer to the pool occurred on the next shift. [65] This type of accident would not occur at the newer INTEC CPP-666 that is equipped with underwater cask loading and unloading capability as well as fully interconnected pools that keep the fuel below the water surface at all times. Because of severe deterioration of the concrete, leaks in the pool walls, and the gate seal leaks, the ECF pools cannot be isolated.

Navy Waste Characterization

Publicly available summary DOE data recorded between 1952 and 1981 cites the Navy's NRF as dumping 195,000 Curie (Ci) in the RWMC, making the Navy the second largest curie contributor to INL's dump. [66] Yet, DOE's restricted access Radioactive Waste Management Information System Solid Waste Master (RWMIS) Database attributes 187,050,351 curies to Navy's NRF dumping at the RWMC between 1960 and 1981. [67] Between 1960 and 1989 the Navy dumped 188,140,668 curies at the RWMC. [ibid] This figure makes the Navy the largest curie contributor to INL's dump. DOE recently revised these figures claiming a mistake in data entry more fully described below. DOE now claims that there was an entry error in their database that went undetected for 24 years.

DOE/ID recently provided Environmental Defense Institute (EDI) with a copy of EG&G's Radioactive Waste Management Information System (RWMIS) verification process

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[65] Author's interview with Duane Allen then Oil & Chemical Workers Union, Safety Representative. The ECF cask misalignment accident --- says 25 rem doses. But, when there is gamma radiation from even a portion of a single fuel rod, you can have very high radiation levels. For instance an Advanced Test Reactor fueled test experiment can shine 1 million rem per hour and be lethal for 100 meters. Time, distance and shielding determine the dose. But when the Navy says the dose was perhaps 25 rem for the misalignment, an analyst will wonder if NRF had any real basis for this dose. It could have been significantly higher. Additionally, the fact that this radiation hazard lasted through two worker shifts, many ECF workers would have been affected.

[66] ID-10054-81@15

[67] RWMIS, P61SH090

that was initiated because EDI publicized the data of an earlier DOE Freedom of Information request. According to the RWMIS 1/4/88 and 10/24/89 computer runs, there were four waste shipments on 9/15/69 from the Naval Reactors Facility (NRF) to the Radioactive Waste Management Complex (RWMC). The RWMIS lists the times of the four shipments at 820, 830, 840, and 850. The 820 NRF shipments are listed as "metal scrap".

Kloss McNeel, Manager of EG&G's Environmental Technical Support Unit who reported to DOE/ID's Paul Allen (9/7/93) on their verification process of the RWMIS, made a correction to the 9/15/69 shipment number 850 entry that originally contained a 1.8 E+8 (180,000,000) curie entry. The correction included a new curie value of 1.8 E+4 (18,000). EG&G's accompanying explanation includes a copy of the Waste Disposal Request and Authorization form ID 124 that describes the waste as "SCRAP INSERT 176 With Dummy Source and S5W Misc. hardware from disposal effort." This description more accurately describes the 9/15/69 820 shipment listed as "metal scrap" in the 1/4/88 and 10/24/89 database runs. The 820 "metal scrap" waste shipments is missing from EG&G's "corrected" RWMIS 9/24/92 data base run.

Mr. McNeel makes no attempt to account for the deletion of the 820 NRF "metal scrap" shipments to the RWMC. The 850 shipment, which earlier was reported to have a curie content of 1.8 E+8 is described as "011 CORE + LOOP COMP." Clearly, the waste description on form ID 124 does not match the RWMIS 850 waste shipment description. Also, there is no explanation why the curie content on form ID 124 is hand written when the other data fields are type written. Do other shipping manifests for that period also contain hand written entries for curie content? Even if one accepts this change in the data, this still shows the Navy dumped nearly three times (8.14 million) more curies than publicly acknowledged total of 3.1 million curies. The Navy's reactor core wastes that have been buried at the RWMC must be exhumed at considerable expense and hazard to workers. The core assemblies are extremely radioactive and require remote handling. Individual NRF shipments to the RWMC of 81,000 curies attest to this hazard. Furthermore, the cores are not packaged in any radiation containment unit. NRF officials only acknowledge that the waste is shipped in a canister from the NRF, and the shipping canister is returned to the facility.

The below Table 3-4 “Waste Comparison Analysis is drawn from Annual Performance Assessment and Composite Analysis Review of the Active Low-Level Waste Disposal Facility at the RWMC FY 20145”, Page 3-11 and 3-12, April 2015, RPT-1356. This DOE report shows a rare glimpse into the “Total Inventory of the Remote-Handled-Low-Level Waste radionuclide Inventory” in the RWMC/Subsurface Disposal Facility burial ground and the projected inventory in 2020. EDI’s total of the below Table 3-4 third column (Total Disposals 1952-9/14) = >8,057,453 curies. The fact that DOE intends to keep RWMC open through 2020 is unconscionable given the evidence of contaminate migration into the aquifer.

Table 3-4. Comparison of composite analysis modeled, actual, and projected disposals (Ci) for all Remote-Handled- Low-Level Waste radionuclides with a half-life greater than 5 years.

Radionuclide	CA Total Inventory Assumed 1952–2009[a]	Total Disposals 1952–9/30/14[b]	Projected Disposals 10/1/14–9/30/20[c]	Total Projected Disposals 1952–9/30/2020[d]	Ratio of Total Projected Disposal to Total CA Inventory Assumed[e]
Am-241	2.30E+05	2.30E+05	4.29E-01	2.30E+05	1.0
Am-242m	**8.96E-06**	**3.19E-03**	**6.35E-03**	**9.54E-03**	**1064**
Am-243	**1.18E-01**	**1.24E-01**	**3.52E-03**	**1.27E-01**	**1.1**
C-14	7.39E+02	7.08E+02	5.84E+01	7.66E+02	1.0
Cl-36	1.65E+00	1.23E+00	1.69E-01	1.40E+00	0.8
Cm-243	**2.36E-02**	**2.59E-02**	**2.93E-03**	**2.88E-02**	**1.2**
Cm-244	4.43E+01	4.47E+01	4.73E-01	4.52E+01	1.0
Cm-246	1.28E-02	1.29E-02	1.62E-04	1.30E-02	1.0
Co-60	3.82E+06	3.48E+06	1.46E+04	3.49E+06	0.9
Cs-137	1.73E+05	1.68E+05	1.26E+01	1.68E+05	1.0
H-3	2.69E+06	2.68E+06	6.07E+01	2.68E+06	1.0
Hf-178m	**1.73E+00[f]**	**1.73E+00**	**3.46E+00**	**5.19E+00**	**3.0**
I-129	1.91E-01	1.65E-01	1.34E-05	1.65E-01	0.9
Nb-94	1.47E+02	1.41E+02	1.11E+01	1.52E+02	1.0
Ni-59	9.48E+03	7.77E+03	9.00E+02	8.67E+03	0.9
Ni-63	1.12E+06	8.97E+05	6.45E+04	9.61E+05	0.9
Pu-238	2.08E+03	2.05E+03	7.15E-01	2.06E+03	1.0
Pu-239	6.41E+04	6.41E+04	8.20E-02	6.41E+04	1.0
Pu-240	1.46E+04	1.46E+04	4.09E-02	1.46E+04	1.0
Pu-241	3.81E+05	3.81E+05	1.05E+01	3.81E+05	1.0
Pu-242	8.59E-01	8.59E-01	3.60E-04	8.60E-01	1.0
Sn-121m	**8.39E-02**	**7.71E-02**	**1.52E-01**	**2.29E-01**	**2.7**
Sr-90	1.37E+05	1.32E+05	9.87E+00	1.32E+05	1.0
Tc-99	4.30E+01	4.09E+01	4.17E-01	4.13E+01	1.0

Above Table 3-4. (Continued).

Note: Bold text indicates radionuclides that are projected to be disposed of at an activity more than 5% above the total inventory assumed in the CA (DOE-ID 2008a).

a. From Table 2-9 of the CA (DOE-ID 2008a).
b. From WILD and IWTS data pull conducted September 30, 2014.
c. Calculated from annual maximum listed in Table 3-2 (6 years total projected).
d. Sum of waste disposed (1952–FY 2014) and projected waste to be disposed of (FY 2015–2020).
e. Divide the fifth column value by the second column value to obtain this value.
f. Not included in CA. Since Hf-178m was not identified in inventory until FY 2012, assume the CA inventory is equal to total disposed of from FY 2012 through FY 2014.
g. No screening threshold available; the screening threshold for Hf-178m will be included in the next revision of EDF-8251. Since the decay half-life is relatively short (31 years) and Kd is relatively large (450 mL/g [Jenkins 2001]), the screening threshold for Hf-178m is expected to be "No Limit," consistent with other radionuclides with similar parameters such as Cs-137 and Sr-90.

CA=composite analysis; FY=fiscal year; IWTS= Integrated Waste Tracking System; WAC=waste acceptance criteria
WILD=Waste Information and Location Database

Total of above Table 3-4 third column (Total Disposals 1952-9/14) = >8,057,453 curies.

Until the mid-1970's the Navy dumped fuel element parts and specimens into the RWMC pits and trenches. Since then, the Navy continues to dump reactor core assemblies at the RWMC in "soil vaults", which are defined as shallow (2 to 6 feet diameter) holes in the ground where the waste is dropped in and covered with 3 feet of soil. As of 1979, there are 1,150 "soil vaults" in 20 separate rows. Currently the RWMC is undergoing environmental restoration under the CERCLA Superfund cleanup process. Remediation projects have been underway for over a decade, starting with Pit 9. Even the most pedestrian of observers can see how ludicrous cleanup activities are when dumping continues in the immediate vicinity creating new future Superfund.

Radioactive Waste Management Information System database printout (RWMIS) of Reactor Fuel Description includes: "Irradiated Fuel, Fuel Rods, Ceramic Fuel, Un-irradiated Fuel, SS Clad Plate Elements, PBF Fuel,, Uranium Fission Fuel, HTGR fuel, ERB-I Mark III Fuel, PBF Pellets, LWR Spent Fuel-I, Spent Fuel, PWR Rods, Fuel Encased in Epoxy, Uranium Rod Scrap, Plutonium Flux Wands, Scrap Elements and Plates, Uranium Element, Scrap Fuel Rods." [68]

DOE's Plot Plan drawing the shows the RWMC and SDA burial grounds position and description (date opened/closed) of the pits and trenches. At the bottom of the list of trenches, there is a Notation that states; "Trench 55 still available on east end for high-level waste." [69]

The 1985 Low Level Waste Amendment requires DOE take ownership of the NRC licensee of GTCC waste. But as DOE manages its own and Navy 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 except when it wants to send this waste to a state or NRC-licensed facility. See below are exemptions to the Low-level waste law for NRC licensees like commercial power reactors.

Expended Core Facility Waste Issues

The NRF EIS talks about a seismic assessment for the current ECF, but addresses the basic concrete --- it does not address leakage etc... It's too complicated to address how they are treating the old current ECF operations. The important thing is that the seismic design for the new facility is the most stringent there is. Detailed very old history on the old ECF doesn't make much difference if they are building the new one. Except, when mismanagement of ECF over the decades resulted in extensive contamination of the area.

The unique nature of the Navy spent fuel assemblies and the Naval Reactor Facility's processing/inspection operations is secret. The highly enriched Navy spent fuel waste poses a significantly greater environmental threat (because of the decay heat) than other conventional low-enriched reactor fuel that goes directly into storage cooling ponds. Additionally, the Navy waste going to the RWMC must be classified as high-level waste and/or Greater-Than-Class C

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[68] Letter to Richard Poeton, EPA Region 10 from Chuck Broscious 9/26/96. This list – gleaned from FOIA RWMIS printouts - is by no means inclusive, but it gives us a glimpse into to extent of reactor fuel (high-level waste) that DOE officially continues to deny.

[69] Idaho Operations document No. IDO-22056, Drawing No. DWG-1230-825-101-1, Attachment # 7 below.

waste by virtue of the fact that it contains reactor core assembly sections contaminated with long-lived radionuclides. The destructive testing can access the uranium section of the rod which means the cutting chips will contain uranium. The extremely high curie content of these waste shipments (called canal trash) attests to this fact.

Institute for Energy and Environmental Research's book *High-Level Dollars, Low-Level Sense* challenges the NRC radioactive waste disposal standards: "In examining the NRC regulations, one is thus led to believe that the class limits [Class A, B, C, and greater than C] were derived from the requirements imposed by these hazard definitions and time frames. However, even according to NRC's own definitions of what is 'hazardous' and what is 'acceptable' the time frames of 100 years [Class A] and 500 years [Class C] are logically incompatible with the class limit definitions, raising serious questions about their environmental and public health adequacy." ... "For example, much of the '100 year' waste (Classes A & B), for example, will not decay to NRC-defined 'acceptable' levels in 100 years. Consider nickel-63. Buried at Class B concentrations levels of just under 70 curies per cubic meter, waste containing nickel-63 would still have concentrations of about 35 curies per cubic meter after the institutional control period of 100 years had elapsed. According to NRC regulations, at this point the waste should have decayed to the point where it 'will present an acceptable hazard to an intruder.' Yet, at 35 curies per cubic meter, the waste, if retrieved from the disposal site and re-buried, would still be classified as Class B waste since it has concentrations levels which are 10 times higher than the Class A limits. As a matter of fact, this waste would take a total of well over 400 years to decay just to the Class A upper limits (at which point the NRC regulations would still define it as hazardous for another 100 years if it were being buried for the first time)." [70]

IEER continues: "This analysis makes an even stronger case against the NRC regulations when applied to the Class C limits, which pertain to 'long-lived radionuclides'. Class C waste contaminated with technetium-99, however, buried at concentrations of just under the Class C limit of 3 curies per cubic meter, will be hazardous according to NRC definitions for far longer than 500 years. It will take such waste over the three half-lives - some 640,000 years - just to decay to the upper boundary of Class A levels. The illogical nature of the above regulatory approach is made even more explicit in the NRC's discussion of the 'long-lived' radionuclides in the waste. According to the NRC, in managing low-level waste, 'consideration must be given to the concentration of long-lived radionuclides ... whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures'". [71]

IEER continues: "In essence, there is an admission that the hazard due to long-lived radionuclides 'will persist long after' the controls imposed by the regulations fade away. This is

[70] IEER @ 74&75

[71] IEER(c)

an extraordinary admission of the regulations fundamental inadequacy right in the text of the regulation. The only thing the NRC regulations will apparently do with respect to the long-lived components of low-level waste, is push the hazard into the future, since NRC-mandated controls will, at most, only 'delay the time when long-lived radionuclides could cause exposure'. In the case of many long-lived radionuclides, they will continue to be present in almost exactly the same concentrations when institutional controls have lapsed as when they were first buried."

Summary of Nuclear Navy Waste
Dumped at INL's RWMC SDA Burial Ground 1960 to 1993

Year Dumped	Curie Content of Waste *
1960	1,364
1961	6,717
1962 #	20,900
1993	34,933
1964 Navy Knolls Atomic Lab. Reactor Core + Loop Comp.	6,400
1965	517,571
1966	787,300
1967	801,100
1968 #	198,600
1969 #	644,000
1970	3,572,048
1971	54,669
1972	10,577
1973	9,411
1974	5,782
1975	4,911
1976	73,348
1977	144,758
1978	34,962
1979	109,171
1980	39,206
1981	19,219
1982	8,401
1983	39,035
1983 NRF S1G Reactor vessel	5,579
1984	372,614
1985	141,784
1986	35,928
1987	29,664
1988	6,722
1989 #	126,400
1990 #	74,120
1991 #	102,600
1992 #	49,300

1993 #	27,560
Total 1960 to April 1, 19 93	**8,140,668**

Source for above table: [Radioactive Waste Management Information System Master Database, P61SH090, 10/24/89]; [#] [Senate Armed Services Committee, Subcommittee on Nuclear Deterrence, Arms Control and Defense Intelligence, Hearing on shipment of Spent Nuclear Fuel, 28 July 1993, Questions and Answers for the Record, @ 25]

Notes for Above Table:
* Curie content of shipments less than 1 curie were not added to the above summary table, therefore, the totals are understated. Also **not included** are Navy contractors, General Dynamics' (Electric Boat Div. and General Atomics Div.) seven shipments of "irradiated fuel" to the RWMC; and General Electric's eleven shipments of "irradiated fuel" and ten reactor "core + loop" assemblies; and Office of Isotopes Specialists' one shipment of "irradiated fuel" to RWMC. DOE and Navy officials publicly deny that spent fuel was dumped at the INL burial ground (RWMC) in direct contradiction to their own data base entries. (See Spent Nuclear Fuel Dumped in Burial Ground that shows 90.282 metric tons of irradiated fuel dumped in RWMC).

Nuclear Regulatory Commission (NRC) requires in classifying a specific waste shipment that the part of that volume that contains 90% of the radioactivity be separated and used to determine the concentration and thereby the waste classification. The Navy and DOE continue to use the entire volume of the shipment to calculate the average concentration. The result is that the radioactive concentration appears low because of dilution. The NRC's Staff Technical Position specifically prohibits this practice of factoring in other material as a means of dropping the average concentration. The Navy is also using total volume averaging to avoid NRC regulations in burial of reactor shells at the DOE Hanford site. An EG&G groundwater sampling report found significant radioactive contaminates at the 600 foot level under the INL burial grounds.

Equally significant are spent nuclear fuel related waste shipments to the RWMC burial grounds. This waste includes spent nuclear fuel parts cut off the fuel elements prior to storage and fuel storage "canal trash" that represents over **9,866,112 curies.** The burial grounds are a shallow disposal area that would not meet municipal garbage landfill regulations.

Navy Waste Characterization
Partial listing of isotopes found in Navy waste dumped at INL

Isotope	Symbol	Half-Life in days	Half-Life in Years
Americium-241	Am-241	1.7 E+5	465.7
Antimony-125	Sb-125	877	2.4
Barium-133	Ba-133	12	

Cerium-144	Ce-144	290	
Cobalt-58	Co-58	72	
Cobalt-60	Co-60	1,900	5.2
Chromium-51	Cr-51	27	
Cesium-134	Cs-134	840	2.06
Cesium-137	Cs-137	1.10 E+9	30.17
Europium-154	Eu-154	5,800	15.89
Hafnium-181	Hf-181	46	
Iron-55	Fe-55	110	
Iron-59	Fe-59	45	
Iridium-192	Ir-192	74	
Lead-210	Pb-210	7,100	19.4
Manganese-54	Mn-54	300	
Neptunium-237	Np-237	8.0 E+8	2,191,780
Nickel-59	Ni-59	2.9 E+7	79,452
Nickel-63	Ni-63	2.9 E+4	79.4
Niobium-95	Nb-95	35	
Potassium-40	K-40	.50	
Plutonium-238	Pu-238	3.3 E+4	87.7
Plutonium-239	Pu-239	8.9 E+6	24,131
Plutonium-240	Pu-240	2.4 E+6	6,575
Plutonium-241	Pu-241	4.8 E+3	14.35
Plutonium-242	Pu-242	1.4 E+8	383,561

Promethium-147	Pm-147	920	2.5
Radium-226	Ra-226	5.9 E+5	1,616
Ruthenium-106	Ru-106	365	
Silver-110M	Ag-110M	270	
Sodium-22	Na-22	950	2.6
Strontium-89	Sr-89	50	
Strontium-90	Sr-90	10,512	28.8
Technetium-99	Tc-99	7.7 E+7	210,958
Thorium-232	Th-232	5.1 E+12	13,972,600,000
Tin-119	Sn-119	112	
Uranium-233	U-233	5.9 E+7	161,643
Uranium-234	U-234	9.1 E+7	249,315
Uranium-235	U-235	2.6 E+11	712,328,767
Uranium-236	U-236	8.7 E+9	23,835,616
Uranium-238	U-238	1.6 E+12	4,383,561,644
Zirconium-95	Zr-95	63	

Source: USDOE, Radioactive Waste Management Information System Master Solid Database, 10/24/89

The above table shows clearly how Navy waste dumped in the burial grounds contains transuranic waste. [72] 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 via canal trash. In recent DOE documents characterizing the waste streams going to the RWMC they acknowledge presence of, "Irradiated fuel element end boxes that were cut off of the fuel plates in the hot

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

cells. The end boxes may contain some fuel, but generally only activation products". [73] Independent characterization of this waste must be made before more is dumped at the RWMC.

Spent fuel rods from over 40 reactors around the US and the world are being stored at various sites around INL. Current inventory is 1,225 metric tons total mass. [74] DOE plans on considerable expansion (15-20,000 metric tons) of its spent fuel processing and storage. This Plan is called "Directed Monitored Retrievable Storage", which is the product of nuclear electric utilities forcing the government to take possession of spent fuel. Since a high-level waste repository has yet to be built, the utilities do not want to store the spent fuel on their sites.

Spent Reactor Fuel Dumped at INL's RWMC
Subsurface Disposal Area Burial Grounds 1952 to 1980 [RWMIS] [75]

Generator	Mass in Grams
Materials Fuels Complex (MFC) aka. Argonne Laboratory-West	2,177,150
Idaho Nuclear Technology and Environmental Center (INTEC)	9,246,306
Naval Reactors Facility (NRF)	**27,707,700**
General Dynamics, General Atomics Division San Diego, CA	22,861,440
General Electric, Vallecitos Atomic Laboratory Pleasanton, CA	11,568,800
Special Power Excursion Test (SPERT) INL	14,517
Test Area North (TAN) INL	16,433,193
Advanced Test Reactor Complex aka. Test Reactor Area (TRA)	273,866
Total Mass in Grams	90,282,972
Total Mass in Metric Tons	90.282

The above preliminary numbers, compiled by the Environmental Defense Institute, are drawn 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

[73] EGG-WM-10903 @ 2-30. See References below.

[74] A. Hoskins, WINCO, 7/11/94. The Blue Ribbon Commission report can be cited as a more current reference; there are INL citations in the BRC of INL spent fuel, 308 metric tons heavy metal.

[75] 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).

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. Also see Attachment # 7 that lists Pits, Trenches and notes Pit-55 east is available for high-level waste.

CERCLA Remediation Cleanup Issues and Resource Conservation Recovery Act Violations

Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) a federal law that establishes a program to identify, evaluate and remediate sites were hazardous substances were released to the environment, also called "Superfund." Various INL sites were established as CERCLA sites; NRF was called Waste Area Group (WAG) 8. Within WAG -8 there were 18 Operable Units (OUs) each investigated to determine the extent of the contamination problem and the risk to the underlying aquifer. **Attachment #12** shows an ariel photo with the location of 9 of the more significant NRF cleanup OU's.

The Environmental Protection Agency (EPA) also found that INL violates the Resource Conservation and Recovery Act (RCRA) and "That the presence and/or release and potential release of hazardous waste from USDOE's facility may present a substantial hazard to human health and/or the environment ..." [76] Substantive corrective action has yet to occur because EPA does not have the authority to shut down any INL facility. Consequently violations are interpreted as a peer review without being binding according to a 1989 Government Accounting Office report. [77]

Another major assumption that is extensively evoked in the INL Cleanup Plan is continuous 100 years of DOE monitoring and institutional control of the contaminated sites as a means to ensure restrictive public access in order to justify not cleaning up the contaminates. In real life, when entities break the law, and are required to do major corrective actions in the future, they are generally required to establish a trust fund so that if they again decide to disregard their legal requirements, or are no longer in existence, the funding will be there for the state or local government to do the cleanup job. The state of Idaho should therefore, require the Navy and DOE to establish a monitoring/institutional control trust fund to cover those costs at INL.

An example of where this issue is important is the current designation that NRF is not in the Big Lost River (one mile away) 100 year flood plain. This designation is due to Big Lost River dams that divert flood waters southwest into spreading areas. These dams and their related water channels require regular maintenance in order to provide that flood protection to NRF and other INL facilities such as the new Remote-Handled Dump near ATR. **See Attachment # 1**. Prior to construction of the diversion dam, NRF was in the Big Lost River 100 year flood plain. [78] Nuclear Regulatory Commission (NRC) radioactive waste disposal requirements state, "waste disposal shall not take place in a 100 year flood plain." [10 CFR ss 61.50] Institutional control

[76] EPA(a),9/15/87

[77] GAO/RCED-89-13, p.3

[78] NRF Remedial Investigation/ Feasibility Study (RI/FS@5).

must include diversion dam and water channel maintenance as well as monitoring and fencing of waste.

The NRF Cleanup Plan states: "The Comprehensive RI/FS Waste Area Group 8 represents the last extensive Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) investigation for the Naval Reactors Facility." This Plan is not "comprehensive" because it excludes the Retention Basin (one of the most contaminated waste sites at NRF) from the CERCLA cleanup process. The Retention Basin (OU-8-08-17) is a large concrete tank that temporarily holds liquid radioactive and chemical wastes (presumably to allow short-lived isotopes to burn off) prior to discharge to the various leach pits. The Plan fails to state that the sludge in the basin contains cesium-137 at 192,700 pico curies per gram (pCi/g)(risk-based action level is 16.7 pCi/g) and Cobalt-60 at 20,410 pCi/g. [79] A long history of Basin leaks assures significant soil contamination under the basin and therefore should have been included in the Comprehensive Plan but never was.

ECF Canal Leaks Violate Discharge Regulations

The Comprehensive Cleanup Plan's exclusion of the NRF Expended Core Facility (ECF) leaks additionally demonstrates the incompleteness of the so called "comprehensive" Remediation Plan. The ECF, built in 1958, does not meet current spent reactor fuel storage standards that require stainless steel liner, leak containment, and leak detection systems. The ECF should be shut-down for exactly the same reasons the Idaho Chemical Processing Plant (CPP-603) Underwater Fuel Storage Facility was shut-down - it was an unacceptable hazard and did not meet current standards. ECF has been leaking significantly >62,500 gallons of radioactive water over the past decade and the soil contamination around and underneath the basins must be included in the CERCLA cleanup process. The Plan offers no soil sampling data to substantiate exclusion of the ECF from CERCLA action.

The ECF was built in 1957. It has four separate unlined concrete water pools that contain 3 million gallons of water. The ECF does not meet current spent nuclear fuel (SNF) storage or seismic code requirements. NRF workers claim that 16,000 gallons per day are leaking from the pools. In an attempt to slow these leaks, NRF tried injecting grout around the perimeter of the pools. The grouting caused increased hydrostatic pressure that forced some horizontal leakage into the perimeter access corridor around the pools which then must be pumped out. ECF also lacks a leak detection system. All other fuel storage and processing facilities at the INL with similar characteristics have been designated unsafe and scheduled for closure. Therefore, the Navy's claim "that operation of the INL-ECF does not result in discharges of radioactive liquids" is inaccurate. [80] Since "three separate milling machines in the water pools are used to separate spent fuel components into smaller sections for examination in the shielded cells." [81] NRF

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[79] NRF Remedial Investigation/ Feasibility Study (RI/FS@H8-8).

[80] DOE Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Draft Environmental Impact Statement, June 1994, DOE/EIS-0203-pg. 5.2-12.

[81] DOE/EIS-0203 pg. B-13

suggests that significant contaminates are released to the water in the pools. These processes make the uncontrolled leaks uniquely significant.

The Navy fails to provide seismic analysis documenting that the super structure of the Expended Core Facility (ECF) can sustain design basis earthquake and accident scenarios during transfer of fuel using the ECF bridge crane. Water Pits 1, 2 and 3 were only constructed to earthquake "Zone 2 earthquake requirements which were judged to be appropriate under the USGS's classification of the area at the time [1957] of their construction." Subsequent USGS requirements for INL raised that standard to zone 3.

"Between December 8, 1991 and February 6, 1992 significantly more water was added to the [ECF] water pits than anticipated. The detailed investigation of this event identified that and 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. The water pit was drained and the leak location found The leak was on the south side of the water pit at construction joints of two reinforced concrete canal gate interferences. The joints were repaired by sawing and chiseling the joint area and grouting the joints. A water leak test was performed to confirm the leak as repaired. 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 radionuclides 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(10-6) curies of manganese-54, 1.9 x 10(-5) curies cobalt-58, 4 x 10(-4) cobalt-670, 6.6 x 10(-5) curies nickle-63, 1.2 x 10(-6) strontium-90, 1.2 x 10(-5) yttrum, and 1.1 curies cesium-137. Thus, total of 5.25 x 10(-2) curies of radioactivity was 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 <u>rarely</u> indicated the presence of radioactive contamination.** The release occurred about 30 feet below ground level." [82] [Emphasis added]

EDI has not found any additional disclosures about the EFC's leak history except the above dated data 1992, which is now ~ 23 years. So how much ECF canal water has leaked in these last 23 years and more importantly what is the contaminate levels in the underlying perched and deep aquifer?

The NRF Cleanup Plan's exclusion of the Sewage Lagoon (NRF-23) from its so called "comprehensive" CERCLA cleanup, again, demonstrates the incompleteness of the Plan. Contaminate levels of arsenic, mercury, and cesium-137 would normally require remedial action. In fact, the Track 1 investigations recommended inclusion of the lagoons into the comprehensive RI/FS primarily due to radionuclides and the risk assessment results showed increased cancer rate of 1 in 10,000 from exposure to the site. [83] The Plan offers no data to substantiate the "risk management decision" to exclude the lagoons. NRF intends to continue to use these unlined

[82] Final NRF Comprehensive Feasibility Study Report Waste Area Group 8 Naval Reactors Facility Idaho Falls, Idaho Page 5-1.Prepared for the USDOE Pittsburgh, Naval Reactors Office Idaho Branch Office Idaho Falls, ID.

[83] NRF Plan@25

leach pits despite the fact that every gallon of waste water that flows into the pit, leaches more contaminates toward the aquifer below. NRF should be required to close the Sewage Lagoons, remove all contaminated soil, and build new lined ponds that meet current regulations.

ECF Pit Water Analysis at Time of Leaks [8]

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

Constituent	Estimated Amount Released (Curies)	Concentration (pCi/l) of pit	Concentration Term (pc/I) - Decay-Corrected to 1996
Carbon-14	9.7 x 10-6	41	41
Cesium-137	1.1 x 10-5	46.5	42.3
Cobalt-60	4 x 10-4	1691	930
Manganese-54	7.1x10-6	30	0.8
Nickel-63	6.6x10-5	279	270
Strontium-90	1.2 X 10-6	5.1	4.5
Tritium	5.2 X 10-2	219,791	170,761

The Cleanup Plan offers inaccurate data to support the preferred alternative. The Plan states that the maximum soil concentration at all of the 8-08 Operable Units for cesium-137 is 7,323 pCi/g. [85] Appendix H of the RI/FS however credits the S1W Leach Pit with a maximum detected cesium-137 concentration of 149,759 pCi/g. [86] This contaminate concentration discrepancy is significant because the undisclosed higher amount qualifies under NRC radioactive waste classification criteria in 10 CFR ss 61.55 and the "technical requirements for land disposal facilities" in 10 CFR ss 61.50. The preferred alternative does not meet NRC requirements. Actually, DOE's preferred alternative does not even meet municipal garbage landfill requirements under Resource Conservation Recovery Act (RCRA) Subtitle D which require liner, leachate monitoring wells, impermeable cap, and location restrictions over sole source aquifers. The NRF Plan contains none of these essential features. This Plan effectively shifts the risks, hazards, and ultimate cleanup costs to future generations. The high levels of hazardous materials in the NRF waste qualify it as a mixed hazardous and radioactive waste under the 1992 Federal Facility Compliance and RCRA Land Disposal Restrictions. Hazardous contaminates in the soil include chromium at 2,090 mg/kg and lead at 1,140 mg/kg when the EPA maximum concentration level (MCL) for both is 50. Also, mercury at 56.1 exceeds the MCL at 2 mg/kg.

[84] Comprehensive NRF RI/FS pg.5-2
[85] NRF Plan@14
[86] NRF RI/FS@H4-22

Under the circumstances, it is difficult to see how the Plan's preferred alternative can claim to meet all the "Applicable or Relevant and Appropriate Requirements" (ARAR).

1971 Samples NRF Leaching Bed Mud [87]

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

Sample Number	Soil				
	Cs-137	Cs-134	Co-60	Hf-181	Sb-124
1	310,000	42,000 .a·	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

As the above H6-6 Table shows in 1971 sampling data buried in the Administrative Record show long-term waste mismanagement at the S1W Leach Pit with cesium-137 at 310,000 pCi/g, cesium-134 at 42,00 pCi/g, hafnium-181 at 20,000 pCi/g, and cobalt-60 at 1,300,000 pCi/g. [88] Algae (accessible to ducks using the pond) sampling show 667,447 pCi/g. [89] By comparison, the risk based soil concentration for cesium-137 applied to this Plan is 16.7 pCi/g. These high contamination levels were due primarily to once through reactor cooling water dumped in the leach pits which was discontinued by 1980. No explanation is offered why the remediation goal applied to Waste Area Group 3 of 0.02 pCi/g for cesium-137 was changed.

NRF and DOE representatives stated at a public meeting in Moscow, ID that the groundwater and aquifer are not at risk because contaminates are absorbed by the soil column. Review of the historical deep well sampling data at NRF does not support the Navy's conclusion. The NRF October 1995 Remedial Investigation / Feasibility Study (RI/FS) Appendix K 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. The federal drinking water standard for gross beta is 8 pico curies per liter. This deep well sample data confirm the contaminates do migrate, contrary to the Navy's claims.

The Plan's "remediation goals" that set risk-based soil concentrations for contaminates of

[87] NRF Remedial Investigation/ Feasibility Study (RI/FS) @H6-14
[88] NRF Remedial Investigation/ Feasibility Study (RI/FS) @I-59).
[89] NRF Remedial Investigation/ Feasibility Study RI/FS@ pg. H6-13

concern (cleanup goals) fail to include inhalation as an exposure pathway. This exclusion represents a major flaw in the Plan. Inhalation is the most biologically hazardous for alpha emitting contaminates of concern listed as americium-241, neptunium-237, plutonium-238, plutonium-244, and uranium-235, yet inhalation is not considered for these isotopes, nor for lead. The wide difference between ingestion of beta/gamma contaminated soil also appears out of balance. For instance cleanup goals for cesium-137 external exposure is set at 16.7 pico-curies per gram (pCi/g) while ingestion of soil is set at 24,860 pCi/g. Additionally, the beta emitter strontium-90 is not considered for external or inhalation exposure but is considered for soil ingestion at 15,416 pCi/g and food crop ingestion at 45 pCi/g.

An integral factor in the Plan's establishing a "remediation goal" is the maximum concentration of contaminates of concern. The Plan acknowledges (pg. 14) that the maximum cesium-137 soil contamination detected at the NRF is 7,323 pCi/g which generated a risk based cleanup goal of 16.7 pCi/g. Again, this must be recalculated using the above cited maximum detected cesium-137 at 149,759 pCi/g "decay corrected to obtain equivalent 1995 results." This significant discrepancy begs the question as to the quality of regulatory review the State and EPA are bringing to the process and whether the "remediation goals" are supportable.

The Navy likes to characterize its operations as a responsible employer and steward of the environment, but the above discussion of NRF's unwillingness to meet even these lax cleanup standards should dispel any such illusion. Before Idaho allows any expansion of NRF, the Navy must first clean up the mess (including its buried waste, calcine HLW, and liquid high level waste) it has already made. The very bottom line is that the Navy must not be allowed to dump any more of its radioactive waste over our sole source aquifer. EDI supports former Governors Andrus and Batt in their challenge to DOE's new shipments of SNF to INL before they follow through with previous Consent Order stipulations to move the high-level and TRU waste out of Idaho. We simply cannot compromise future generations of Idahoans access to the water they will need to survive especially in this era of climate change.

Idaho Senator Kemthorne statement to Congress said: "No more quick fixes. That's what got us in this fix we are in today." "The Navy can no longer give its waste to the Department of Energy, and say, 'We've done our job, and we have a great record,' while the Navy's waste sits in one facility plagued by corroding containers in unlined pools sitting above one of nation's largest underground aquifers. Even the contractor believes these pools should be shut down." [90] The Navy does need to replace the existing leaking ECF pools. And the Navy needs to stop burying its significant quantities of waste above the Idaho Snake River Plain aquifer. The navy and its radioactive waste are here to stay. Idaho lacks strong enforcement of environmental laws due to its economic leverage as the single largest employer. Current environmental laws

[90] Opening Statement, Senator Dirk Kemthorne, July 28, 1993, Subcommittee on Nuclear Deterrence, Arms Control and Defense Intelligence, pages 3 and 4.

regarding these military and DOE operations don't protect human health and the environment.

Exclusion of NRF workers from EEOICPA compensation

Unlike the DOE, the Navy continues to exclude the NRF workers from EEOICPA compensation due to unsupportable assertions about the perfection of NRF's radiation control programs.

"The Energy Employees Occupational Illness Compensation Program Act (EEOICPA) was passed by Congress in 2000, and amended in 2004, to compensate American workers who put their health on the line to help fight the Cold War. In the course of doing their jobs, many of these workers were exposed to radiation and other toxic substances and, as a result, developed cancer and other serious diseases. The purpose of this program is to acknowledge the sacrifice of these workers and to compensate them in some small way for their suffering and loss.

As originally enacted in 2000, EEOICPA included Part B (administered by the Department of Labor (DOL)) and Part D (administered by the Department of Energy (DOE)). In October 2004, Congress repealed Part D and enacted Part E of the Energy Employees Occupational Illness Compensation Program Act, effectively transferring responsibility for administration of contractor employee compensation from the DOE to the DOL. The 2004 amendments also created the Office of the Ombudsman for Part E and directed that it be an independent office, located within the Department of Labor, charged with a three-fold mission:

• To conduct outreach to claimants and potential claimants to provide information on the benefits available under this part and on the requirements and procedures applicable to the provision of such benefits;

• To make recommendations to the Secretary of Labor about where to locate resource centers for the acceptance and development of claims;

• To submit an Annual Report to Congress by February 15, setting forth the number and types of complaints, grievances and requests for assistance received by the Ombudsman, and an assessment of the most common difficulties encountered by claimants and potential claimants under Part E during the previous year." [91]

According to risk analyst Tami Thatcher; "Of the hundreds of INL claims submitted over the years, many or most have been denied because the recorded dose and industry-biased estimate of cancer-risk are not claimant favorable. Former NRF employees with illness who submitted EEOICPA claims were denied without dose review simply because they worked at NFR. The "cold war" is over but exposures continue to cause radiation-induced cancers in radiation workers even as they are told that they are being protected from any health adverse effects from their radiation work. This is basic red-white-and-blue-washing of a negligent employer, the Department of Energy, which operates the INL and NRF.

"The recent discovery by NIOSH that radiation protection was inadequate at the INTEC

[91] See 42 U.S.C. § 7385s-15(e).

facility at INL has led to the creation of a special exposure cohort which approves EEOCIPA claims despite their recorded dose. Further investigations are ongoing regarding insufficient radiation worker protection at INL especially in earlier decades. Chemical contamination at NRF was also found during CERCLA Superfund characterization and workers may have received chemical exposures that would be covered under EEOICPA that NRF workers are also categorically denied.

"The argument that NRF workers were perfectly protected from a wide variety of radiation and chemical exposure prone activities since the 1950s while the Department of Energy didn't understand how to protect workers at other INL facilities doesn't hold up to any rational scrutiny."

"Facilities at NRF conduct diverse operations with the large potential for inadequately monitored overexposure. The operations have included reactor operation and fuel dissolution, and will still include spent fuel pool operation, transfers of spent fuel to pool and examination areas and airborne contamination from resizing or cutting of irradiation material. The potential for elevated airborne contamination or unplanned loss of shielding has created inadequately monitored and controlled radiation exposures at Department of Energy facilities including those at INL.

"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 3and 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." [92]

EDI's 1988 Freedom of Information Act (FOIA) request for NRF's worker radiation exposure records (without personal identifiers) was rejected on the grounds of national security. There is no legitimate reason for this and many other FOIA and NEPA denials other than the Navy's fear of having its mismanaged operations exposed.

Summary

If future generations are a concern, then Idahoans' must take the initiative to force Idaho Governor Otter, Idaho Legislature, Idaho Department of Environmental Quality to back Idaho Attorney General Wasden, former Governor Andrus and Batt's challenge to DOE new non-Navy waste shipments for not fulfilling the 1995 Settlement Agreement stipulations. Clearly, the ongoing more significant Navy shipments of spent nuclear fuel to Idaho for processing remain unacceptable. The reckless dumping of this processed highly radioactive waste in flood zones with the continued contamination above Idaho' sole source Snake River Aquifer is tragic. The decades of false promises to clean up the huge contamination of the existing burial grounds, is a clear indicator of the Navy and DOE's sociopathic lack of concern for future generations must be stopped.

In the words of four term former Governor Andrus; "In the 40-plus years I have been observing and dealing directly with the U.S. Department of Energy (DOE), I have noticed two things that seem never to change.

"First, DOE makes promises that it does not keep and when called to account for those failures attempts to change the subject. Second, the agency - and the country for that matter - has never developed a realistic long-range plan for permanently and safely disposing of the most dangerous and long-lasting nuclear waste." [93]

The Navy represents the largest high-level nuclear waste importer to Idaho and the largest contributor to this most hazardous radioactive waste dumped and migrating into our aquifer. Despite the best intentions of Idaho Secretary of State Wasden and former Governor Andrus and Batt, the Navy continues unimpeded using Idaho as its dumping ground.

The tragic fact is that the entire system, starting with Congress providing the Navy and DOE exemptions otherwise imposed on commercial nuclear operations by the Nuclear Regulatory Commission, to the local INL contractors cutting corners without fear of accountability for environmental contamination or worker life-threatening uncompensated radiation exposure.

Idaho Department of Environmental Equality along with EPA Region 10 is "captured regulators" who follow the lead of politicians serving the largest employer in Idaho with equally the most significant economic leverage to get their way.

If Idahoan's care about future generations access to clean uncontaminated water without more cancer causing radionuclides polluting it, then it's time to take to the streets and demand a new nuclear policy in Congress and state legislators.

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[92] 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 Tami Thatcher. The full text of these comprehensive comments is available on EDI's website.

[93] Holding DOE to its commitments**,** Posted: November 1, 2015 *Post Register*, by Cecil D. Andrus, Short-term economic gain is not worth setting aside the leverage the Batt Agreement gives Idaho with the federal government, writes Cecil D. Andrus.

Attachments by Number below with Sources and Descriptions:

Attachment 1. Figure 3.4-4: Surface Water Features, Wetlands, and Flood Hazard Areas at INL, DEIS/EIS-0453-D *Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel,* Pg. 3-38 show Big Lost River Flood Zone, Source: DOE/EIS-0373D. This is DOE's own INL map that clearly shows the "Flood Area for the Probable Maximum Flood-Induced Over-toping Failure of Mackey Dam" inclusion of the Remote Handled Waste Facility Dump immediately south-east of the Advanced Test Reactor (ATR). Overlay this map with Attachment #4 below that shows DOE's designation for the Remote-Handled Waste dump location.

Attachment 1-A. Figure 3.4-6: Water Table Contour Map with Direction of Groundwater Flow for NRF, DEIS/EIS-0453-D *Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel,* Pg. 3-42. This NRF map extrapolated contour lines in feet above mean sea level, shown as horizontal black dash lines **(see 4464)** that runs through NRF and Big Lost River indicating flood hazard. Source BMPC2012. This map together with Attachment # 1 above also shows NRF in the flood zone.

Attachment 2. *Explanation of Significant Differences Between Models Used to Access Groundwater Impacts for Disposal of Greater-Than-Class-C-Like Waste Environmental Assessment for the INL Remote-Handled Low-Level Waste Disposal Project,* INL/EXT-10-19168, Table 2, page 7. "The total waste volume is 11,700 cubic meters and contains a total of 159 mega-curies [159 million curies] of radioactivity mainly from decommissioning of commercial nuclear power reactors currently in operation." This data is useful to apply to the Navy.

Attachment 3. Table 5. Summary of Naval Reactors Facility best-estimate radionuclide inventories in waste sent to the Subsurface Disposal Area from 1953 through 1999. When added the total curie content is 952,986.86. *"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.

Attachment 5. *"Radioactive Waste Management (RWMC) Subsurface Disposal Area (SDA) (WAG-7) has been Divided into 14 Operable Units (OUs)"* color diagram Drawing No. Z920576, showing TRU Contaminated pits and trenches, and Non-TRU contaminated pits and trenches, Soil Vaults, TSA Releases, SDA Acid Pit.

Attachment 6. RWMC SDA, Figure 2-4 Location of Acid Pit at the SDS, Plot Plan showing the number of pits, trenches, and soil vaults (*EG&G-WM-9638)* October 1991, pg. 2-24.

Attachment 7. RWMC/Subsurface Disposal Area Document No. (IDO-22056), Drawing No. (DWG-1230-825-101-1, lists Transuranic Storage Area pads, Pits and Trenches opening and closing dates. Note on Trench # 55 states: "Trench 55 still available on east end for high-level waste."

Attachment 8. *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).

Attachment 9. RWMC/Subsurface Disposal Area (SDA) Ariel photo from DOE/ID.

Attachment 10 and 11. Available on request.

Attachment 12. Ariel photo Naval Reactors Facility with the CERCLA Waste Area Groups located.

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. Referred to here as NRF-RI/FS.

2. Nuclear Regulatory Commission 10 Code of Federal Regulation ss 61 Subpart D.

3. Environmental Protection Agency, 40 Code of Federal Regulations ss 261

4. United States Nuclear Waste Technical Review Board, Summer Meeting, 6/29/2010. States; Navy Spent Nuclear Fuel generated 65 metric tons, current inventory SNF is 25 MT, pg. 103 &104. The difference is apparently due to reprocessing.

5. The Final Environmental Assessment and Finding of No Significant Impact prepared in accordance with the National Environmental Policy Act, herein after referred to as EA-1793, is available at: http://www.id.energy.gov/insideNEID/PDF/Final EA DOE_EA-1793 2011-12-20.pdf

6. Phase 1 Interim Remedial Action Report for Operable Unit 7-13/14 Targeted Waste Retrievals, October 2014, DOE/ID-11396, Revision 3

7. 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 EG&GWM-10903.

8. IDO-10054-81; Radioactive Waste Management Information, 1981 Summary and Record to Date, June 1982, DOE ID Operations Office. IDO-10054-81

9. Citizens Guide to Idaho National Laboratory, Chuck Broscious, Environmental Defense Institute.

10. IEER(a); Estimating Risks and Doses from the Nuclear Weapons Complex; Case Study of the Feed Materials Production Center, Fernald, OH, Institute for Energy and Environmental Research, B. Franke, Arjun Makhijani, Stacy Stubbs, December 2, 1991

11. IEER(b); Radioactive and Mixed Waste Incineration, D. Kershner, S. Saleska, A. Makhijani, Institute for Energy and Environmental Research, June 1993.

12. IEER(c); High-Level Dollars Low-Level Sense, A. Makhijani, S. Saleska, Institute for Energy and Environmental Research, 1992 Apex Press

13. Knoles Action Project Report (5/93) on Navy's Bettis and Knolls Atomic Power Laboratories (KAPL) that houses facilities supporting prototype reactor training/development plants. KAPL also has significant hazardous/radioactive contamination problems to INL's NRF, however these issues are beyond the scope of EDI's report. Also see FY 2013 Congressional Budget for Naval Reactors pages 480 to 486. KAPL lists the following reactors: S3G submarine reactor Trident class, SIC submarine reactor Tullibee [sic] class, DIG destroyer reactor Bainbridge class, MARF modification and additions to reactor facility, S8G submarine reactor Trident/Seawolf AFR class.

14. Agreement to Implement U.S. District Court Order Dated May 25, 2006, signed by James Riskpoli Ass Secretary Navy and Butch Otter, governor Idaho et.al.

15. Addendum to the 1995 Settlement Agreement, agreed to by Idaho Governor and Secretary of Navy.

16. Draft Environmental Impact Statement for the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling. June 2015, DOE/EIS-04563-D.

17. U.S. Nuclear Waste Technical Review Board, Summer Meeting, 6/29/10.

18. Evaluation of Ground-water Impacts to Support the Natural Environmental Policy Act Environmental Assessment for Idaho National Laboratory Remote Handled Low-Level Waste Disposal Project, AUGUST 2011, inl/ext-10-19168 Rev.3.

19. Naval Reactors Facility, Environmental Monitoring Report, Calendar year 1991, NRFRC-EC-1007.

20. Naval Reactors Facility, Environmental Summary Report, NRFRC-EC-1046.

21. Final NRF Comprehensive Feasibility Study Report Waste Area Group 8, Naval Reactors Facility Idaho Falls, Idaho, (NRF-WAG 8 Comprehensive RI/FS.